RSA APPROVED HYDRAULIC TEST IN COMPLIANCE WITH BS9251:2005.

Following considerable discussion within the RSA it became apparent that there was a wide range of opinion as to how the Hydraulic Flow Test required in Section 6.2.2 of BS9251:2005 should be conducted. It was therefore agreed that a Working Party should come up with recommendations for a standardised methodology for conducting this Commissioning Flow Test and the following is a resume of their findings.

The Working Party recognised early on that whatever methodology it came up with must accommodate a number of specific practical problems involved with pressure and flow measurement. Included in these were -

- unknown losses in the service pipe between the main and sprinkler system control valve,
- problems of catching and disposing of comparatively large quantities of water and at pressure,
- accuracy of measuring the flow and dynamic pressure in the system,
- cost of equipment,
- simplicity and sturdiness of test rig,
- adaptability of test rig for a wide range of installations.

The Working Party agreed that it should make its priority Domestic Sprinkler Systems. Although it was acknowledged that exactly the same principles should be used for the commissioning of Residential Sprinkler Systems it was thought that they may pose further practical problems due to the increased flows required.

In as much as many domestic sprinkler systems are installed long before any water is provided to the property, it was deemed impractical to require the measurement of the open flow from the service pipe where it entered the property as the basis of this methodology. This is because where the service pipe has already been connected to the Sprinkler Control Valve it is difficult, if not impossible, to disconnect it later for test purposes.

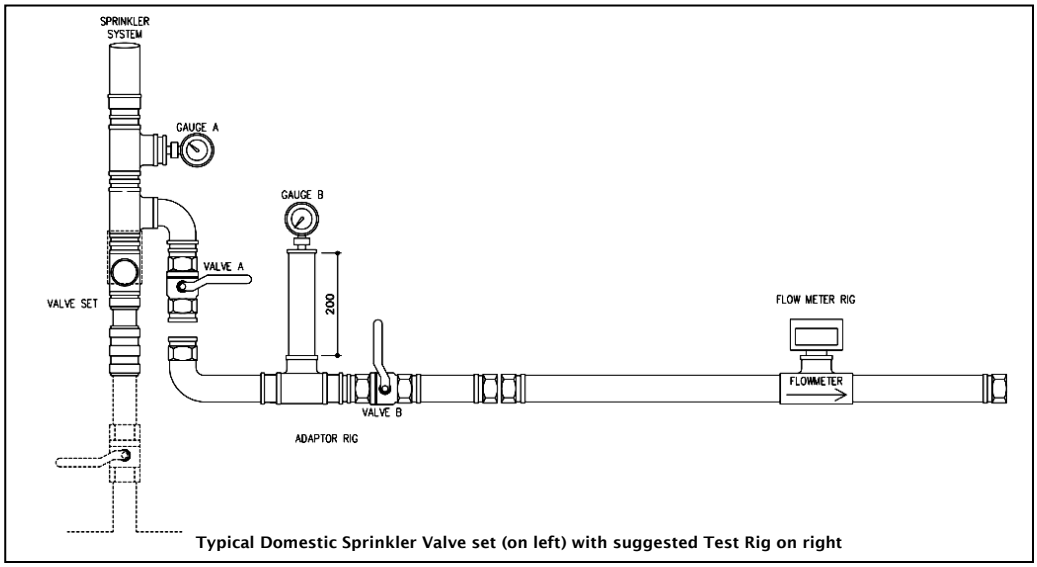
Therefore the Working Party agreed that tests should be conducted at the drain and test point of the Sprinkler Control Valve as described in BS9251. The Working Party then looked at the relative merits of simply measuring

- what was available from an open valve,
- setting the pressure and measuring the flow,
- setting the flow and measuring the pressure.

Bearing in mind the above considerations the Working Party felt that running the system at a flow rate above the Design Flow may bring unknown restrictions within the service pipe into play, which could distort the picture substantially. Therefore the Working Party agreed that whatever practical methodology was employed it should be based on first controlling the flow from the drain and test point to the Design Flow and then measuring the Dynamic Pressure on the system.

To do this properly and easily it was felt that a calibrated flow meter should be used but, although fiddly and less accurate, a traditional 'bucket' test could be employed. Also it was acknowledged that accurate measurement of the Dynamic Pressure in the system required both care and careful location of the gauge to avoid inaccurate reading due to the venturi effect.

Therefore a test apparatus as shown overleaf was developed, which is easy to connect to the Sprinkler System Control Valve set and has minimal, or no, pressure losses within it. To achieve this it was agreed that the pipework should have a bore of at least 25mm (1 inch) or larger to minimise back pressure - although when testing a system with just one head in any compartment it might be acceptable to use pipe with an internal bore of 22mm (3/4 inch).



Typical Domestic Sprinkler Valve set (on left) with suggested Test Rig on right

Practical Considerations

It is acknowledged that the test rig itself will affect the measurement of the flow and pressure of the system. It is therefore important to ensure that this is minimised wherever possible. Nevertheless the pressure and flow actually measured using the rig will always be slightly less than the pressure and flow actually be available to the Sprinkler System due to the extra pipework and fittings.

Methodology

Connect the Test Rig to the Sprinkler Control Valve drain and test point as shown above. Sufficient length of drain hose of at least equal internal bore should be connected to the end of the test rig, with the open end run to a suitable drain point such as a surface drain, or water tank. This should be as straight and level as practicably possible and the open end of the pipe MUST NOT be submerged.

Before testing begins, you will need to know the Design Flow for the system. For example if the system were a domestic system designed strictly to BS9251 and using a head that required 49 litres per minute with 2 in a compartment, then the Design Flow would be 98 l/min. (*note* not 84 l/min as per BS9251 which is now outdated*). You will also need to know the Design Pressure of the system at the Sprinkler Control Valve. Both these pieces of information should have been provided by the system designer as part of the Hydraulic Calculations.

The Test

With a Flow Meter. To perform a test close valve B and open all other valves. Then slowly open valve B until the Design Flow is registered on the Flow Meter. Ensure the system runs for a reasonable period of time (at least 1 minute) to allow residual pressures to dissipate. Read off the dynamic pressure on the test gauge B. If this pressure equals or exceeds the Design Pressure of the system then the system complies with the requirements of the Hydraulic Test in BS9251:2005 Section 6.2.2.

With a Bucket. If a flow meter is not available the same test can be conducted but the water will have to be caught in a calibrated tank over a timed period and adjusted until it equals the Design Flow. Then the dynamic pressure can be read as above and compared to the Design Pressure of the system. As before if the dynamic pressure equals or exceeds the Design Pressure then the system complies with the Hydraulic Test in section 6.2.2 of BS9251:2005.

* ***see FSA guidance document***

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