

RSA APPROVED HYDRAULIC TEST IN COMPLIANCE WITH BS9251:2005.

Methodology

Connect the Test Rig to the Sprinkler Control Valve drain and test point as shown below. 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.

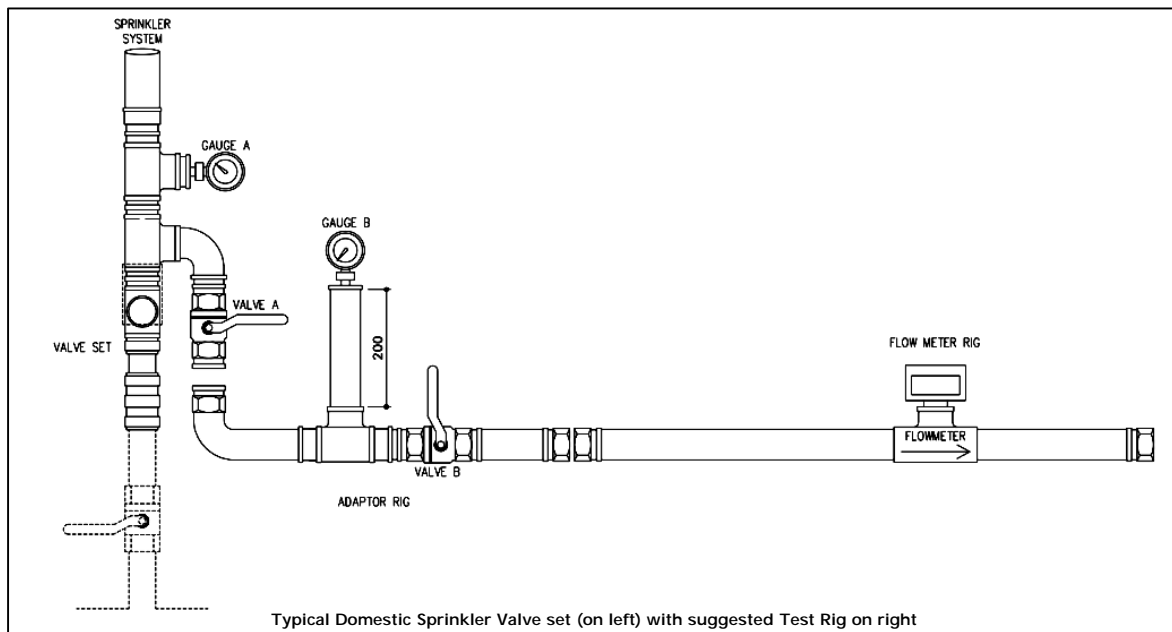
Before testing begins, you will need to know the Design Pressure and the Design Flow for the system. For example if the system were a domestic system designed strictly to BS9251 and using heads that require say 49 litres per minute with 2 in a compartment, then the Design Flow would be 98 l/min. (*note* not 84 l/min as per BS9251 which is now outdated*).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. This is the pressure requirement of the most remote sprinkler head, plus the pressure loss due to elevation and the intervening pipework. Both these pieces of information should have been provided by the system designer as part of the Hydraulic Calculations for the system.

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 Pressure is registered on the Pressure Gauge B. Ensure the system runs for a reasonable period of time (at least 1 minute) to allow residual pressures to dissipate. Read off the flow on flow gauge. If this flow equals or exceeds the Design Flow of the system then the system can be said to comply 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. To do the test this way proceed as above and set the pressure on Gauge B to the Design Pressure by adjusting valve B. Allow the system to stabilise and then catch around 1 minute's flow or 100 litres of water, whichever is the lesser, in the calibrated tank and measure the time this takes with a stopwatch. As before, if the measured flow equals or exceeds the Design Flow then the system can be said to comply with the Hydraulic Test in section 6.2.2 of BS9251:2005.



Explanatory Notes

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

The WP recognised early on that whatever they recommended 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, sturdiness and durability of test rig,
- adaptability of test rig for a wide range of installations.

The WP decided to make a testing system for Domestic Sprinkler Systems its priority. Although they recognised that exactly the same principles would be used for the commissioning of Residential Sprinkler Systems, they felt further practical problems may arise due to the increased flows required of Residential systems.

In as much as many domestic sprinkler systems are installed long before any water is provided to the property, the WP deemed it was 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 mainly 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 WP 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 WP felt that running the system at a flow rate substantially above the Design Flow may bring unknown restrictions within the Service Pipe into play, which could distort the picture substantially. Therefore the WP decided that whatever practical methodology was employed, it should be based on first setting the pressure from the drain and test point to the Design Pressure, and then measuring the resulting flow.

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

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. For Domestic Systems it is recommended 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).

The rig has been tested over a variety of flow requirements and has returned consistent results.