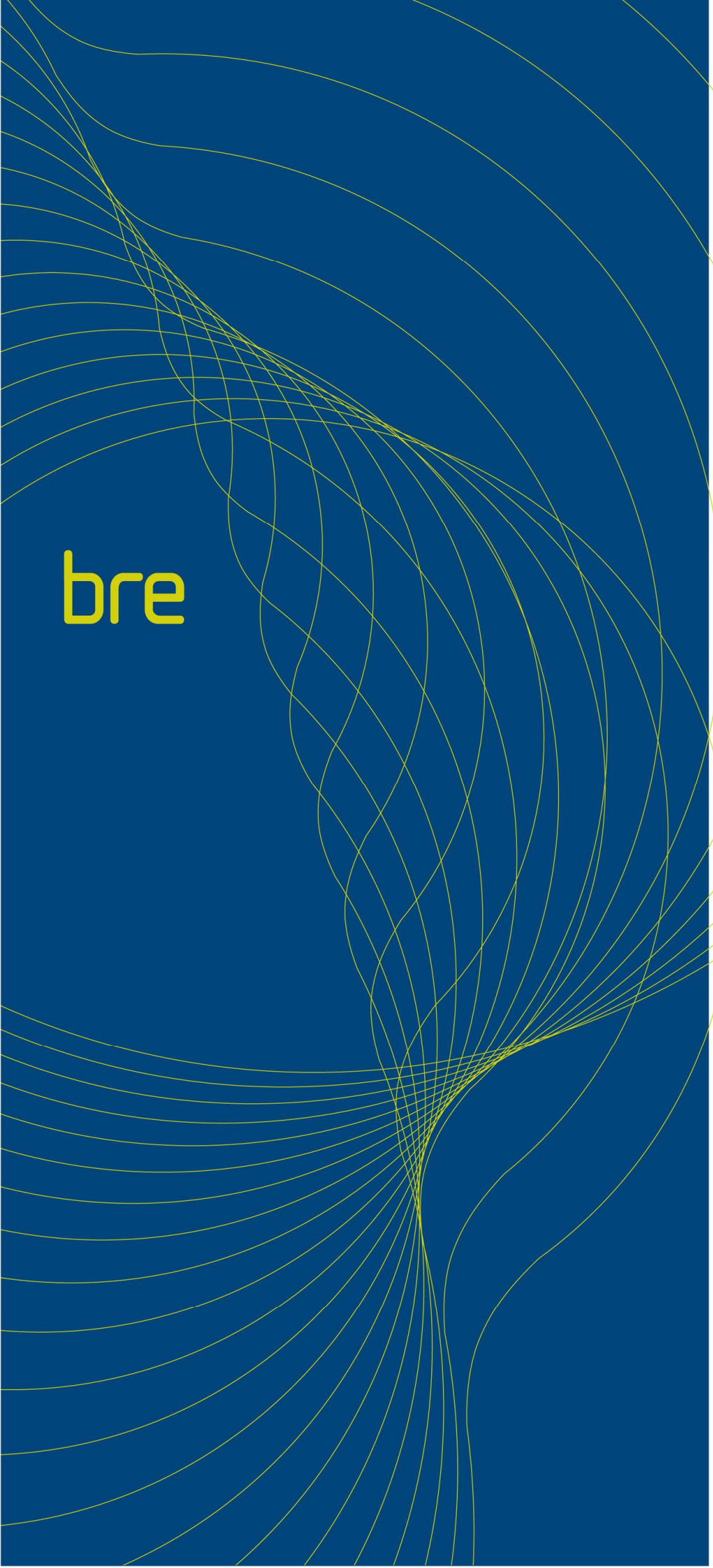

Validating the functionality and durability of LeakSafe's solutions for the detection and prevention of water leaks in domestic and commercial property

Prepared for: Mr Tim Baylis
Leaksafe Solutions Ltd

November 2012

Client report number 282299

Prepared by

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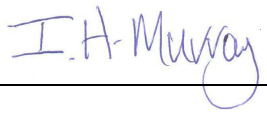
Signature 

Approved on behalf of BRE

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Executive Summary

BRE was commissioned by Mr Tim Baylis of Leaksafe Solutions Ltd to test their LeakSafe product for water leak detection and protection in buildings. The system is for automatic leak sensors or a manual wireless switch(es) to be used to prevent damage due to water leaks and to make switching off the mains water supply easy and convenient. The automatic leak sensing or manual switch is an alternative or is additional to the standard stopcock and should allow homeowners or businesses to prevent damage by readily locating and switching off the mains water as required.

The market exists for such technology and as part of LeakSafe's proposition to clients they wanted the functionality validated by a recognised third party. To prove the durability of the system LeakSafe required that it be tested for a total of 1,000 cycles (being 2,000 operations) representing in excess of two years daily use. Two tests were then carried out in both manual and automatic modes of operation, the automatic mode included a wired leak detection sensor. The test for each mode consisted of 500 switch off and switch on cycles (1,000 operations).

From the results from the tests BRE can provide the following conclusions:

- The LeakSafe manual wireless switch, valve control unit and water stop valve were successfully operated to 1,000 off and on operations (500 switch off/switch on cycles) with no loss or deterioration of function.
- The LeakSafe water leak detection sensor, control unit and water stop valve were successfully operated to 1,000 off and on operations (500 switch off/switch on cycles) with no loss or deterioration of function.
- The LeakSafe water stop valve was successfully operated to 2,000 off and on operations (1,000 switch off/switch on cycles) with no loss or deterioration of function.

Contents

1 Introduction

BRE was commissioned by Mr Tim Baylis of Leaksafe Solutions Ltd to test their LeakSafe product for water leak detection and protection in buildings. The system is for automatic leak sensors or a manual switch(es) to be used to prevent damage due to water leaks and to make switching off the mains water supply easy and convenient. The automatic leak sensing or manual switch is an alternative or is additional to the standard stopcock and should allow homeowners or businesses to prevent damage by readily locating and switching off the mains water as required.

The equipment is easy to install and operate allowing the owner to turn water off not only in an emergency but every time they leave home.

In December 2010 there were over 100,000 insurance claims in the UK for burst pipes and water leaks at an average cost of £6,700. As a result many insurance companies now place an excess of over £250 on escape of water claims. It therefore makes financial sense for homeowners to make sure they can turn their mains water off, most especially if the winter weather is as cold as experienced in recent years.

The market exists for such technology and as part of LeakSafe's proposition to clients they wanted the functionality validated by a recognised third party. To prove the durability of the system LeakSafe required that it be tested for a total of 1,000 cycles (being 2,000 operations) representing in excess of two years daily use. Two tests were then carried out in both manual and automatic modes of operation, the automatic mode included a wired leak detection sensor. The test for each mode consisted of 500 switch off and switch on cycles (1,000 operations).

2 Test work

The approach taken was to set up the installation to test the LeakSafe components at BRE's laboratory in East Kilbride. A section of water pipe was designed and installed to the existing water supply within the laboratory.

The LeakSafe components for testing were provided to BRE on 3 October 2012 by Leaksafe Solutions Ltd along with operating instructions. A schematic diagram was also supplied giving a suggested method of component installation.

The installation of the pipe work to supply water for the tests on the LeakSafe components was carried out on 16 and 18 October 2012. The tests on the LeakSafe components were carried out between 19 and 26 October 2012.

2.1 Test components

The components for the test work consist of the following:

- Water stop valve (see photograph 1 in appendix A).
- Valve control unit (see photograph 2 in appendix A).
- Manual remote switch (see photograph 3 in appendix A).
- Water leakage detector sensor (see photograph 4 in appendix A).

The LeakSafe water stop valve was installed to a 15 mm copper water supply pipe in the BRE laboratory (see photograph 5 in appendix A).

2.2 Test method – manual switching

After installation the valve was operated using the manual on-off switch from a distance of 3.5 metres. A total number of 1,000 off and on operations (500 off-on cycles) were conducted allowing the necessary time for the valve to re-set between each off and on operation.

The LeakSafe components used for the manual switching tests were as follows:

- Water stop valve.
- Control unit.
- Manual wireless remote switch.

The control unit and switch operated from battery power during the tests. After testing for 500 off and on operations (250 off-on cycles) the batteries in both the control unit and the manual switch were replaced with new batteries (this exceeding the 12 months daily use when LeakSafe recommends to the client that all batteries should be replaced).

Photograph 6 in appendix A shows the LeakSafe system set up for manual switching the stop valve on and off.

2.3 Test method – sensor switching

On completion of the manual switching test the components were tested using the water leakage detection sensor. A total number of 1,000 off and on operations (500 off-on cycles) were conducted allowing the necessary time for the valve to re-set between each on and off operation. For this test the on and off operation of the water stop valve was conducted by placing the water leakage sensor in the water outlet of the pipe work. When the sensor becomes wet in water it triggers the control unit to switch off the water valve and stop the flow of water.

The LeakSafe components used for the sensor switching tests were as follows:

- Water stop valve.
- Valve control unit.
- Water leak detector sensor.

Photograph 7 in appendix A shows the LeakSafe system set up for water leak detection sensor switching the stop valve on and off.

The valve control unit was operated using LeakSafe's optional mains power unit. This avoids the need during testing to replace the batteries after each activation as recommended to users by Leaksafe Solutions Ltd.

A tally counter was used to record the number of cycles as the tests progressed (see photograph 8 in appendix A).

3 Results

3.1 Manual switching

The manual switch was operated for 1,000 off and on operations (500 off-on cycles) with the water stop valve successfully opening and closing during each cycle without problems, i.e. the water flow was successfully stopped (off mode) and re-started (on mode) for each cycle. There were no signs of partial water flow during the period when the water stop valve was in the closed position.

The results indicate that the LeakSafe components used for the test work are durable and can be successfully used without problems occurring for at least 1,000 off and on operations (500 off-on cycles).

3.2 Sensor switching

The water leakage detection sensor was placed in the path of the water flow from the water pipe outlet (to simulate a water leak) and operated for 1,000 off and on operations (500 off-on cycles) with the water stop valve successfully opening and closing during each cycle without problems, i.e. the water flow was successfully stopped (off mode) and re-started (on mode) for each cycle.

The results indicate that the LeakSafe components used for the test work are durable and can be successfully used without problems occurring for at least 500 cycles.

3.3 Water stop valve

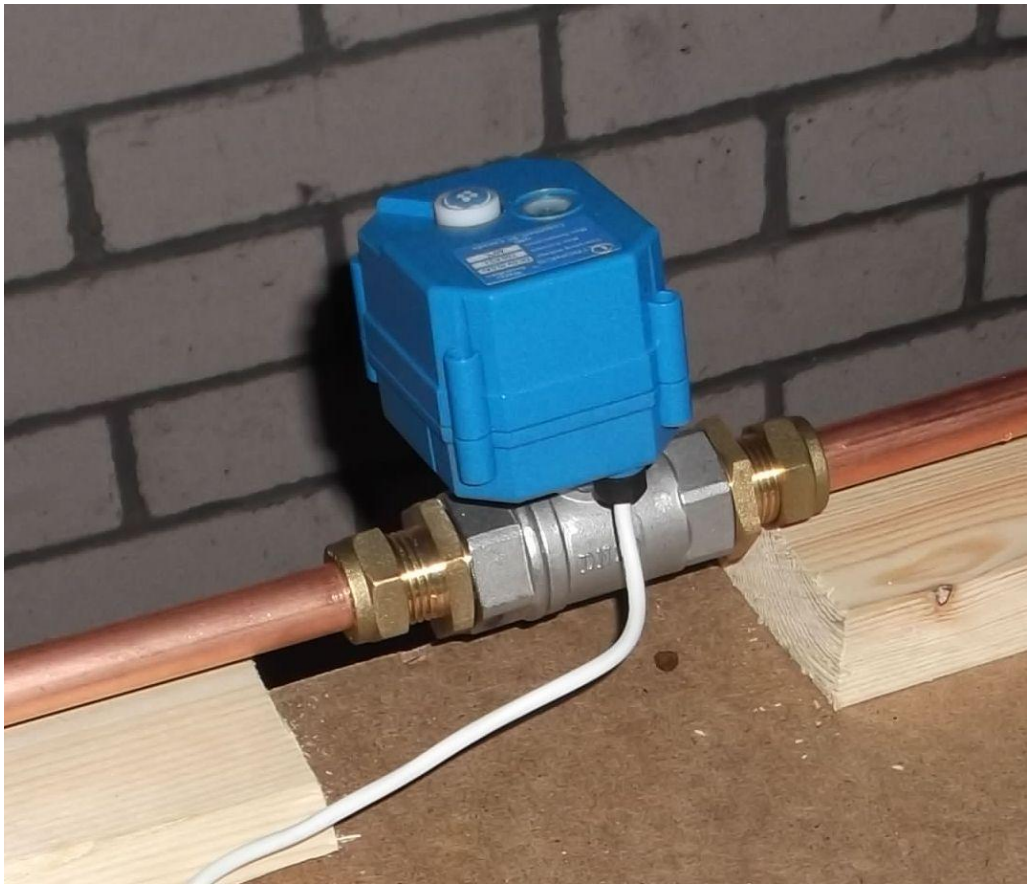
The LeakSafe water stop valve was operated during both the manual switch test and the sensor switch test and successfully operated for a total of 2,000 off and on operations (1,000 off-on cycles).

4 Conclusions

The results from the tests provide the following conclusions:

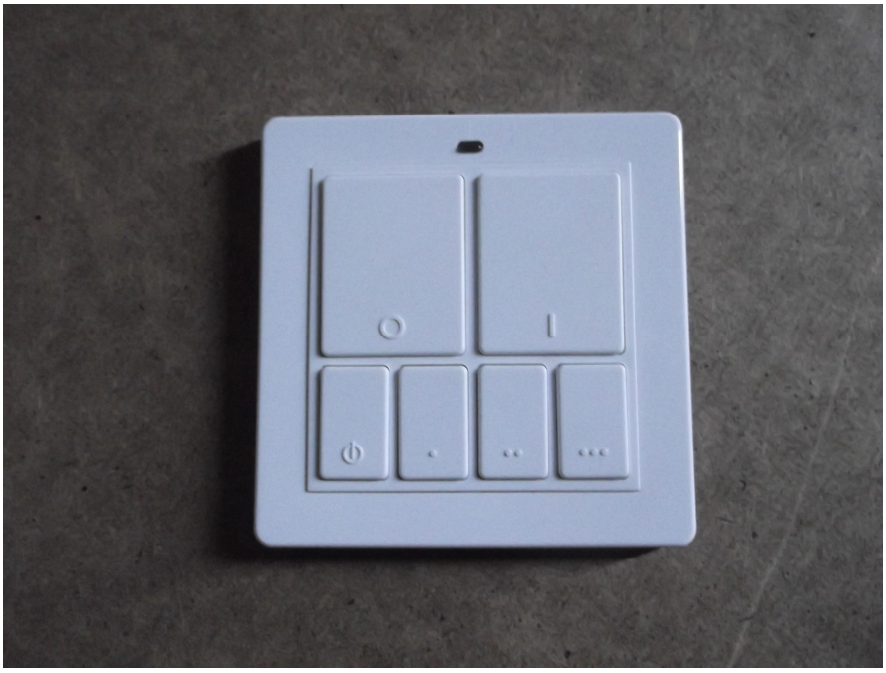
- The LeakSafe manual wireless switch, valve control unit and water stop valve were successfully operated to 1,000 off and on operations (500 switch off/switch on cycles) with no loss or deterioration of function.
- The LeakSafe water leak detection sensor, control unit and water stop valve were successfully operated to 1,000 off and on operations (500 switch off/switch on cycles) with no loss or deterioration of function.
- The LeakSafe water stop valve was successfully operated to 2,000 off and on operations (1,000 switch off/switch on cycles) with no loss or deterioration of function.

Appendix A – Photographs

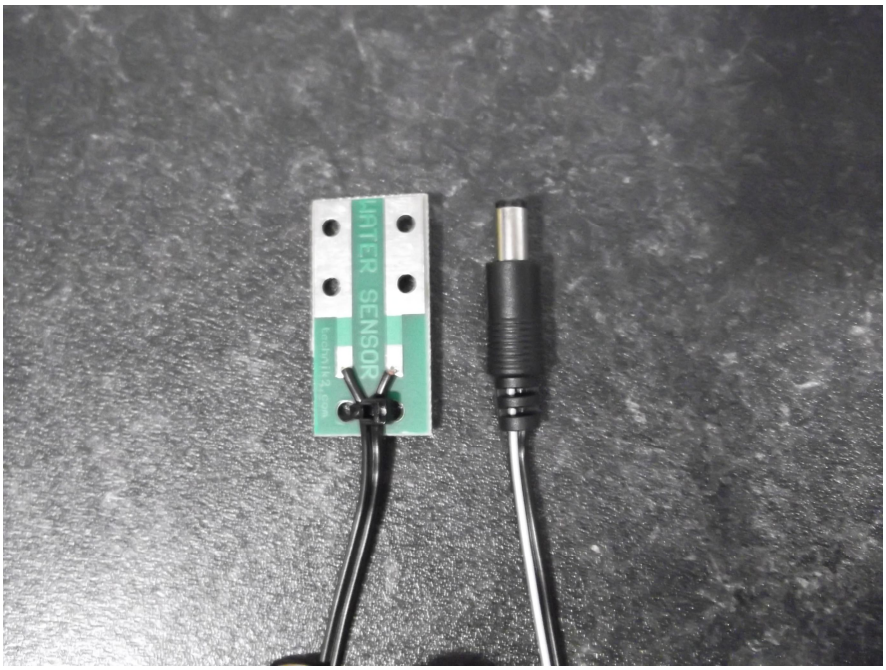


Photograph 1: LeakSafe water stop valve

Photograph 2: LeakSafe valve control unit



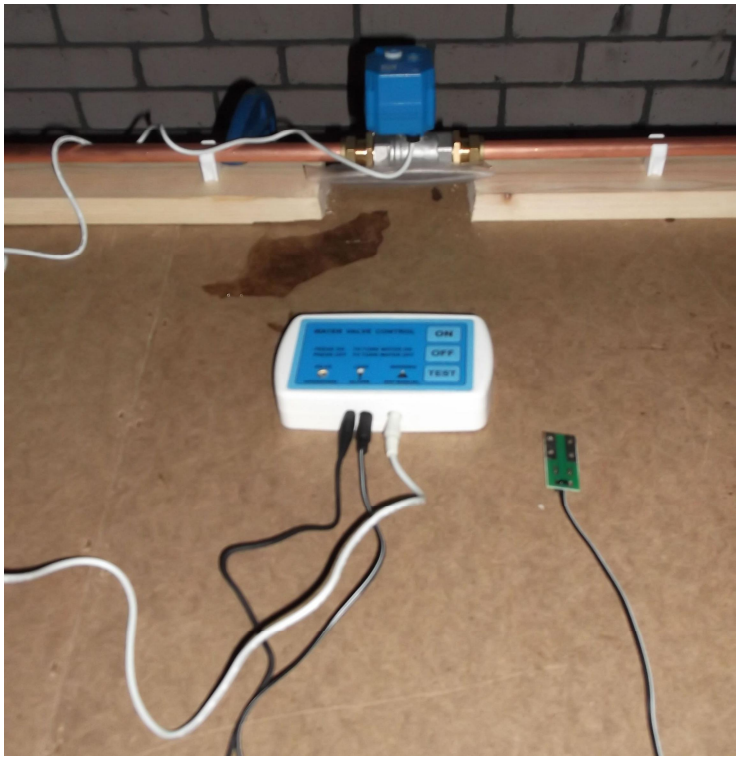
Photograph 3: LeakSafe manual remote switch (wireless)



Photograph 4: LeakSafe water leak detection sensor with cable and connector plug to fit valve control unit

Photograph 5: LeakSafe water stop valve fitted to 15 mm water supply pipe

Photograph 6: LeakSafe set up for manual remote switching on and off the water supply (water stop valve connected to valve control unit)



Photograph 7: LeakSafe set up for water leak detection sensor switching on and off the water supply (water stop valve, sensor and mains supply connected to valve control unit)

Photograph 8: Tally counter to record the number of cycles completed by the LeakSafe components