

Report

NLB Autovent Leak Tests

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Carried out for: NLB Engineering

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1 INTRODUCTION

This report concerned tests conducted on Aladdin automatic air vents to determine their ability to function, leak free for 31 days and withstand high pressure without failure. The work was requested by NLB Engineering and carried out during the period 20 January to 20 February 2009.

2 OBJECTIVE

The objectives were:

1. To determine the ability of the Autovents (HV30C and Micro) to operate (vent) over a 30 day period, without leaking, when subject to regular air injection.
2. To withstand sustained high pressure over a 30 day period without failure.

3 ITEMS RECEIVED FOR TEST

Rig A, Rig B, Rig C, Air Hose with PCL coupling, Water hose to connect to test rigs, Spare Micro and HV30C cartridges, 2 car foot pumps

The rigs A and B consisted of a radiator attached to a back board and a 2 litre expansion vessel that provided for the injection of air. The rigs provided local heating of the top radiator tapping where the Autovents were mounted – thus simulating a heated radiator set-up. The rigs were filled with water and pressurised to approximately 1 bar.

- Rig A used a single panel round top radiator 590 mm x 320 mm.
- Rig B used a single panel seam top radiator 500 mm x 300 mm.

Rig A had a Micro vent installed, while Rig B had an HV30C vent installed.

Rig C (10 bar test rig) had Micro and HV30C valves fitted. It was connected to an air over water supply of 10 bar using the PCL connector and hose provided.

Figure 1 Rig A

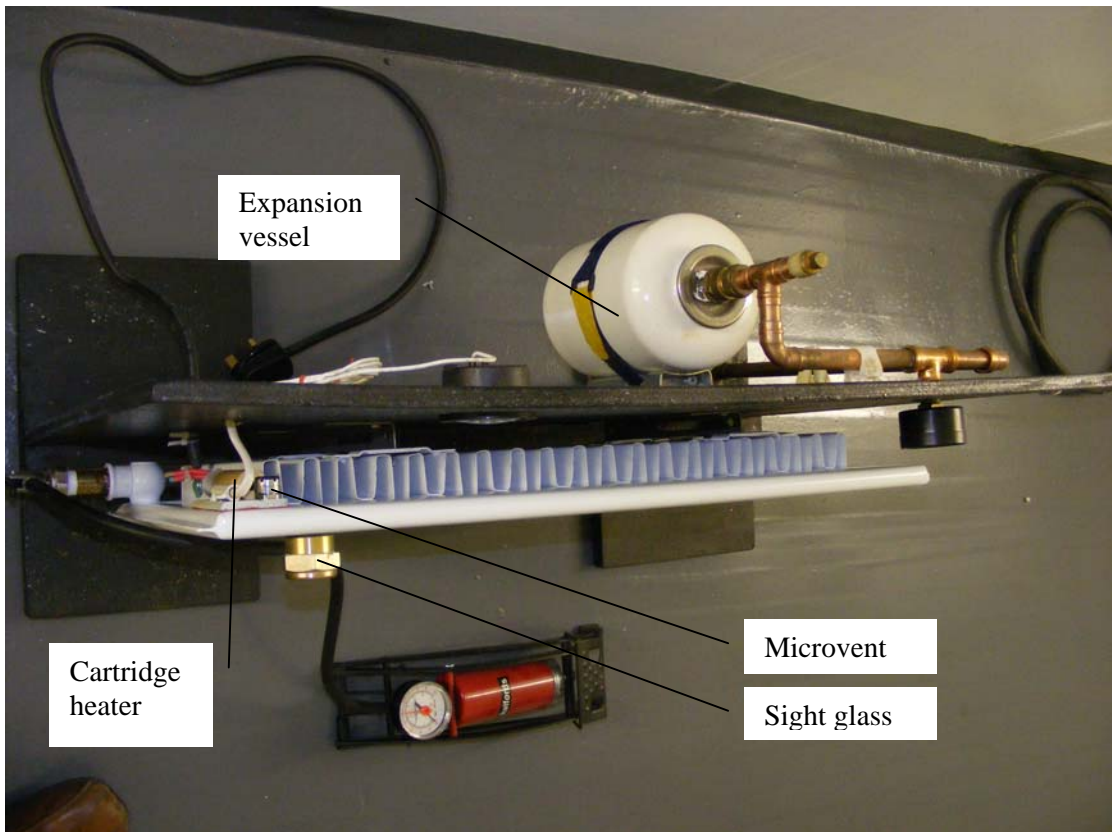
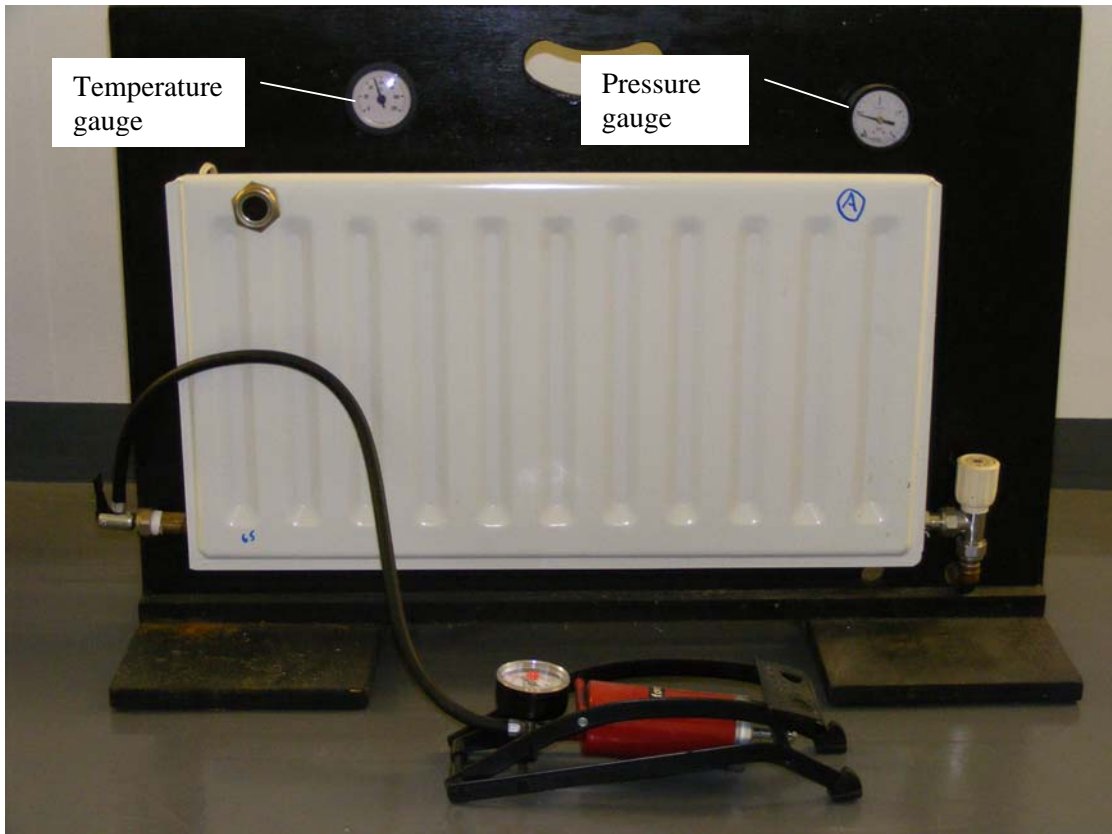
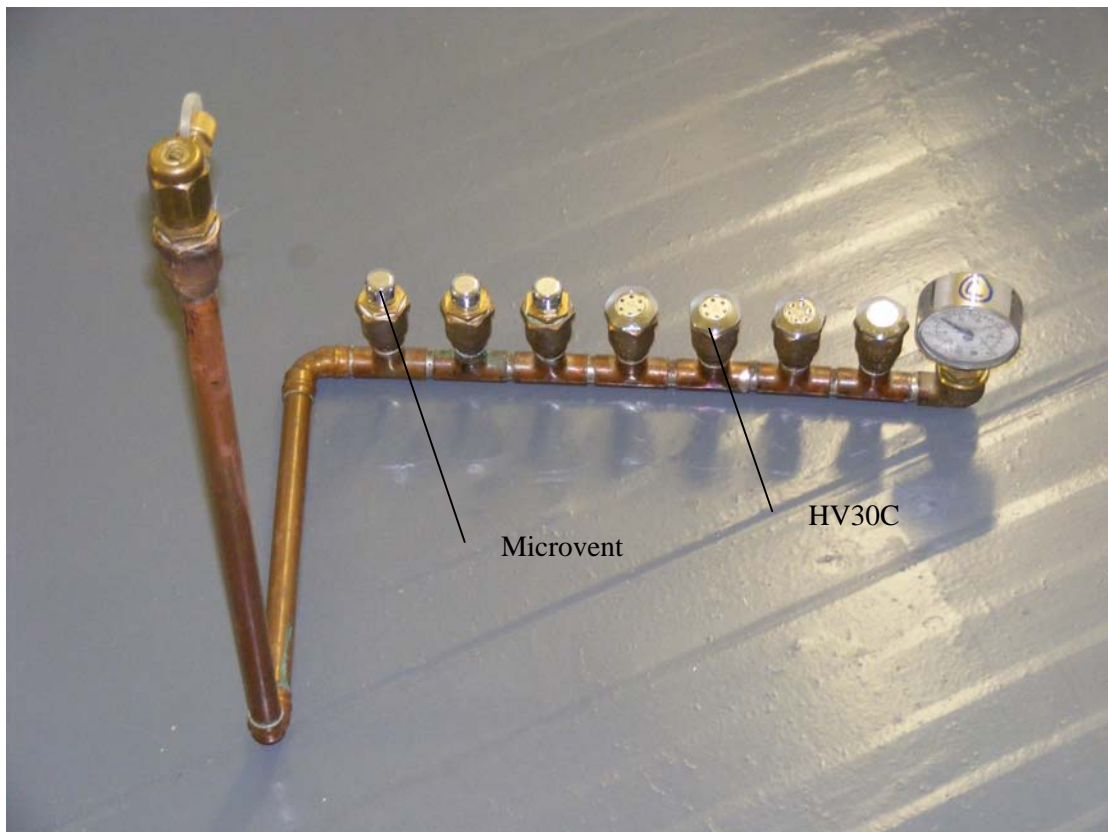


Figure 2 Rig B



Figure 3 Rig C



4 INSTRUMENTATION

BSRIA Instrumentation was used to cross check the integral instrumentation on each rig before tests commenced.

Instrument description	Ident number	Calibration due
Budenberg standard test gauge 0-16 bar	623	06-11-09
Fluke digital thermometer	196	06-01-10

- Rig A pressure gauge indicated 0.9 bar compared to 1.1 bar for the standard gauge.
- Rig B pressure gauge indicated 1.0 bar compared to 1.0 bar for the standard gauge.
- Rig C pressure gauge indicated 10 bar compared to 10.2 bar for the standard gauge.

Rig A and B showed temperatures of 45°C to 53°C when measured on the top left of the front panel, using a hand held surface probe.

5 TEST METHOD

5.1 RIG A AND B

Starting conditions for the rigs were with the water level at the top of the radiator – i.e. the valve had vented. This was visible through the sight glass. The pressure was approximately 1 bar (not 1.5 bar which showed air injected). The rigs were left for 1 day in the above state to settle, wheelhead valve open, heater switched on, footpump attached, with no air injected.

The footpump was then attached and lever locked down on the connector. The wheelhead valve was open on radiator.

The foot-pump was operated three times for air injection. This approximated to 600 cm³ of injected air at ambient temperature and pressure. The water level lowered in the sight glass and the air pressure raised from approximately 1 bar to 1.5 bar on the pressure gauge. This showed air was in radiator.

The vent time depended on the temperature and pressure of the apparatus to which it was attached. The rigs ran hot at an indicated 70°C to 80°C on the integral gauges, the sensor for which was near the cartridge heater on the back of each radiator.

When the valve had successfully vented the water level in the sight glass raised and the pressure gauge lowered to approximately 1 bar.

Once vented, more air was injected, the process being repeated twice each working day over the period of 1 month.

5.2 RIG C

The 10 bar test rig had Micro and HV30C valves fitted. It was connected to an air supply of 10 bar using the PCL connector and hose. Any leaks from the 6 – hole ports on the Micro and HV30C valves were observed.

Pressure was checked daily and maintained at an indicated 10 bar at laboratory ambient temperature for the duration of the tests.

6 RESULTS

Rigs A and B maintained their venting function over the 1 month period without leaking.

Rig C held a 10 bar pressure over a 1 month period without leaking.