



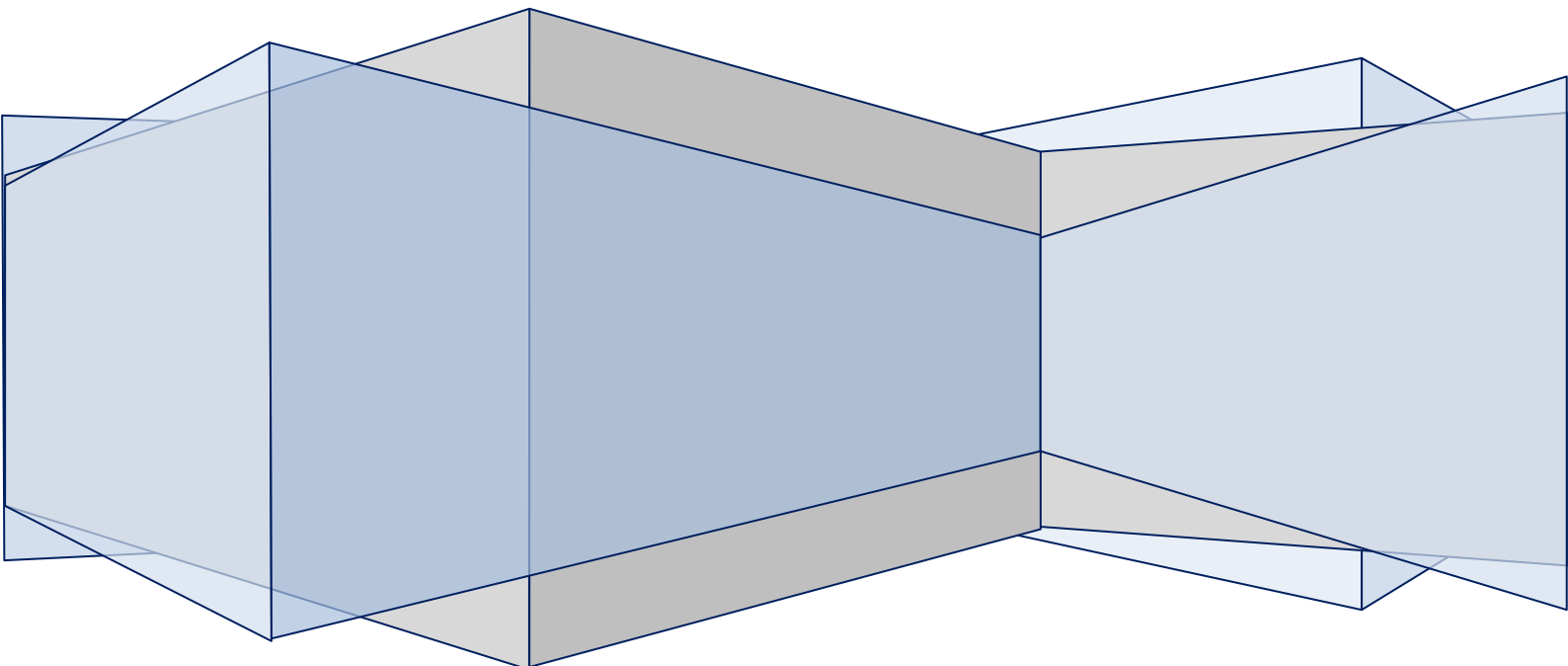
LONDON SOUTH BANK
UNIVERSITY

Electronic Radiator Valve Acoustic Testing

KTP Associate - Shyel Stark

Test Conducted for – Chalmor Ltd

Test Conducted on – 19th May 2011

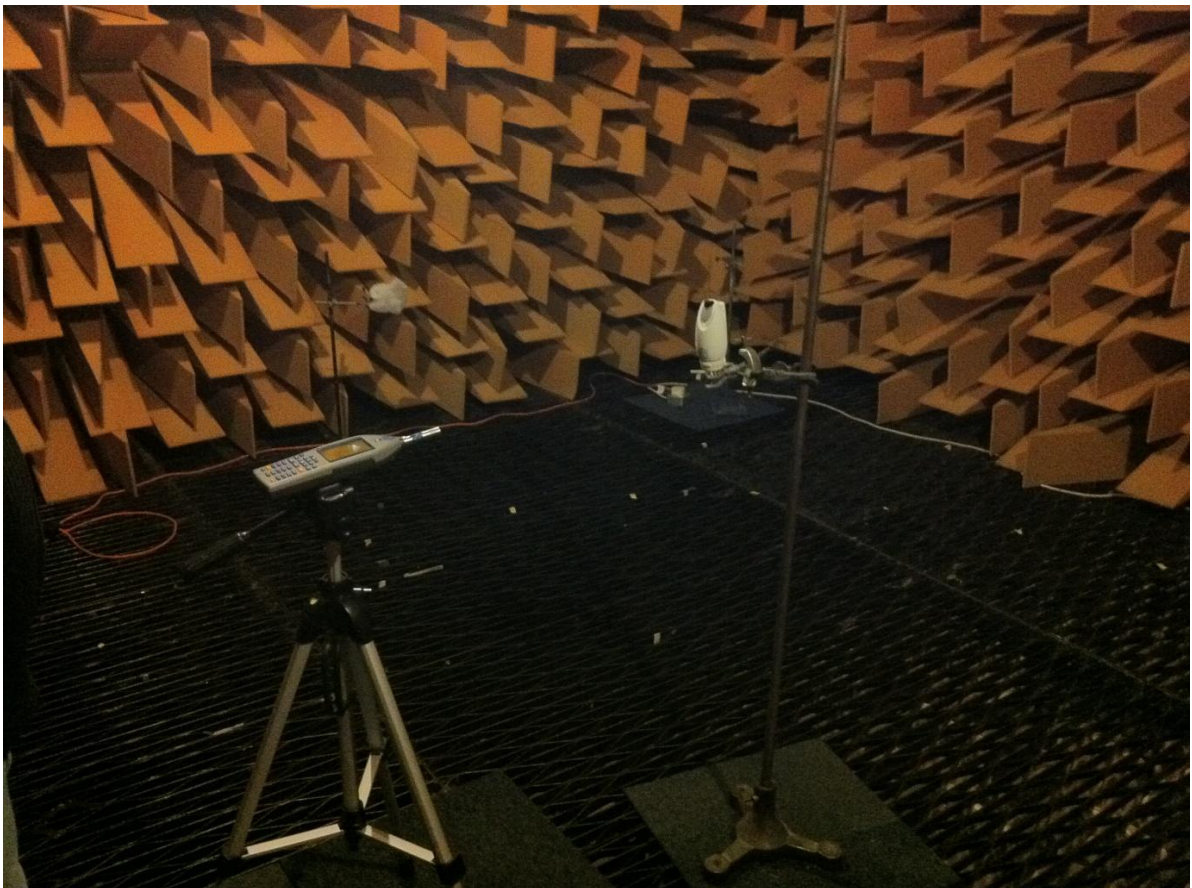


1.0 Objective

Acoustic testing to be performed on market sample of electrical radiator valves to measure decibel outputs of products including frequency levels . This will take place in the London South Bank University acoustic chamber.

Valves to be tested: - *eTRV*
- *Honeywell Rondostat*
- *Pegler Terrier I-Temp*
- *RWE Smarthome*
- *SPARmatic Comet*

2.0 Set Up



Location – Acoustic sound chamber, London South Bank University

- Electronic radiator valves to be tested from the centre of acoustic chamber.
- Standard 30mm Drayton valve body to be held in place by clamp from which valves to be tested will be attached – all tests to be carried out from same position.
- A Norsonic 140 sound meter to be positioned at same height one meter away.

3.0 Method

- A sound measurement will first be taken of the background noise within the acoustic chamber – Reading will be taken in silent condition.
- Each tested electronic radiator valve will be attached to the Drayton valve body which is held in place by a metal clamp.
- The electronic radiator valves will motor a complete “valve travel” with the sound meter recording the noise over its travel.
- Acoustic data will be collected from the electronic valves fully opening, and a second with them fully closing.

4.0 Results

- The data was collected from the Norsonic 140 and downloaded to a computer. The measurements are presented as follows from noisiest to quietest.
- Separate tables are shown for each Up and Down Travel for each valve.
- Measurements were taken for
 - Average sound level
 - Peak Sound Level
 - Total energy over time
 - Frequencies

4.1 LAeq

The LAeq is the A-weighted average sound level.

LAeq (Up)			
Performance	Measurement	Travel	dBA
-	Background	-	20
1st	eTRV	Up	21
2 nd	RWE Smarthome	Up	23.7
3 rd	Pegler Terrier I-Temp	Up	24.3
4 th	Honeywell Rondostat	Up	24.8
5 th	SPARmatic Comet	Up	30.1

LAeq (Down)			
Performance	Measurement	Travel	dBA
-	Background	-	20
1st	eTRV	Down	24.5
2 nd	Honeywell Rondostat	Down	25.2
3 rd	RWE Smarthome	Down	28
4 th	SPARmatic Comet	Down	30.6
5 th	Pegler Terrier I-Temp	Down	31.1

4.2 LApeak

The LApeak is the A-weighted peak sound pressure level.

LApeak (Up)			
Performance	Measurement	Travel	dB(A)
-	Background	-	36.4
1st	eTRV	Up	38.4
2 nd	RWE Smarthome	Up	40.3
3 rd	Honeywell Rondostat	Up	44.5
4 th	Pegler Terrier I-Temp	Up	45.2
5 th	SPARmatic Comet	Up	55

LApeak (Down)			
Performance	Measurement	Travel	dB(A)
-	Background	-	36.4
1st	eTRV	Down	44.4
2 nd	RWE Smarthome	Down	46
3 rd	Honeywell Rondostat	Down	46.8
4 th	Pegler Terrier I-Temp	Down	49.7
5 th	SPARmatic Comet	Down	53.5

4.3 LAE

The LAE is the total output sound pressure (energy) over the time it take for a valves to complete its travel.

LAE (Up)				
Performance	Measurement	Travel	Time(secs)	dB(A)
-	Background	-	-	27
1 st	RWE Smarthome	Up	25	37.7
2nd	eTRV	Up	60	38.8
3 rd	Pegler Terrier I-Temp	Up	30	39.1
4 th	SPARmatic Comet	Up	8	39.5
5 th	Honeywell Rondostat	Up	30	39.6

LAE (Down)				
Performance	Measurement	Travel	Time(secs)	dB(A)
-	Background	-	-	36.4
1 st	Honeywell Rondostat	Down	35	40.7
2 nd	SPARmatic Comet	Down	11	41.2
3 rd	RWE Smarthome	Down	25	42
4th	eTRV	Down	60	42.3
5 th	Pegler Terrier I-Temp	Down	30	45.8

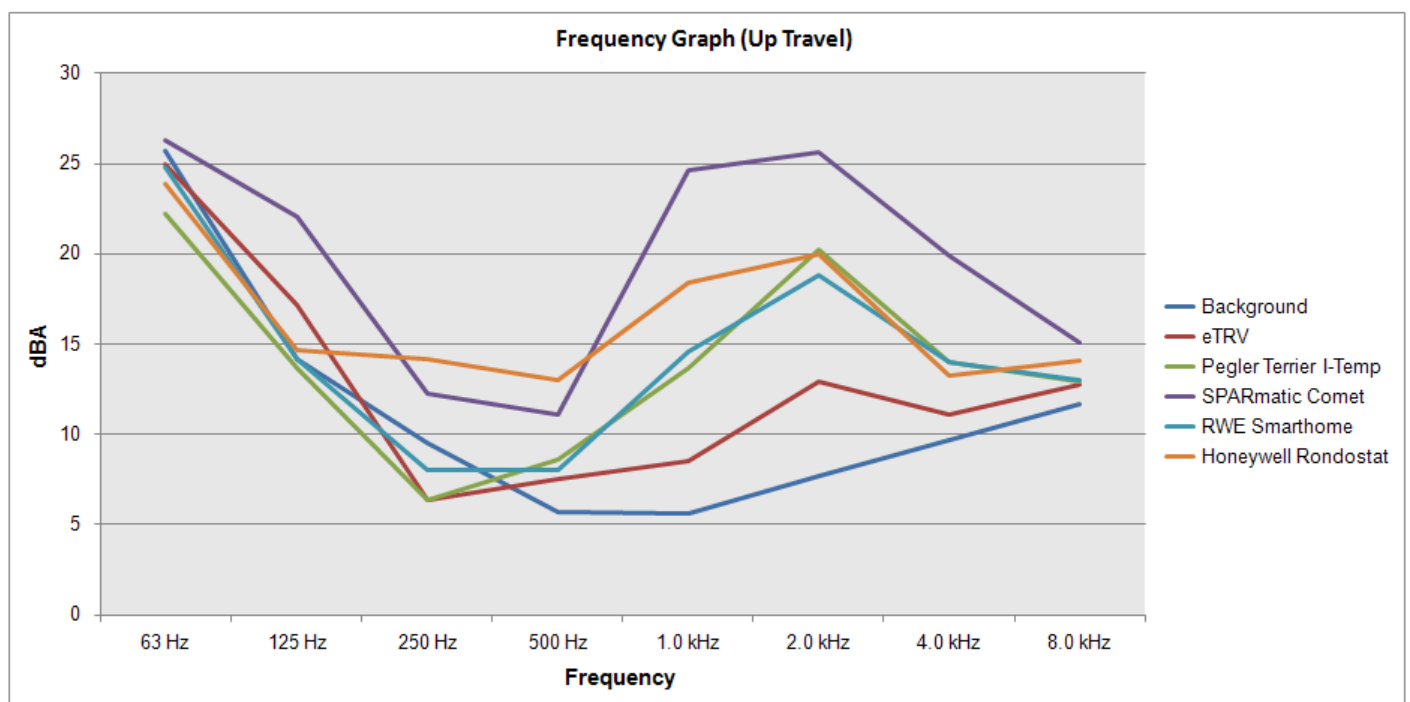
5.1 Frequency

The graph below shows the decibel output for each frequency within the test spectrum. Background sound (blue), shows the frequency curve for perceived silence.

Upward Travel

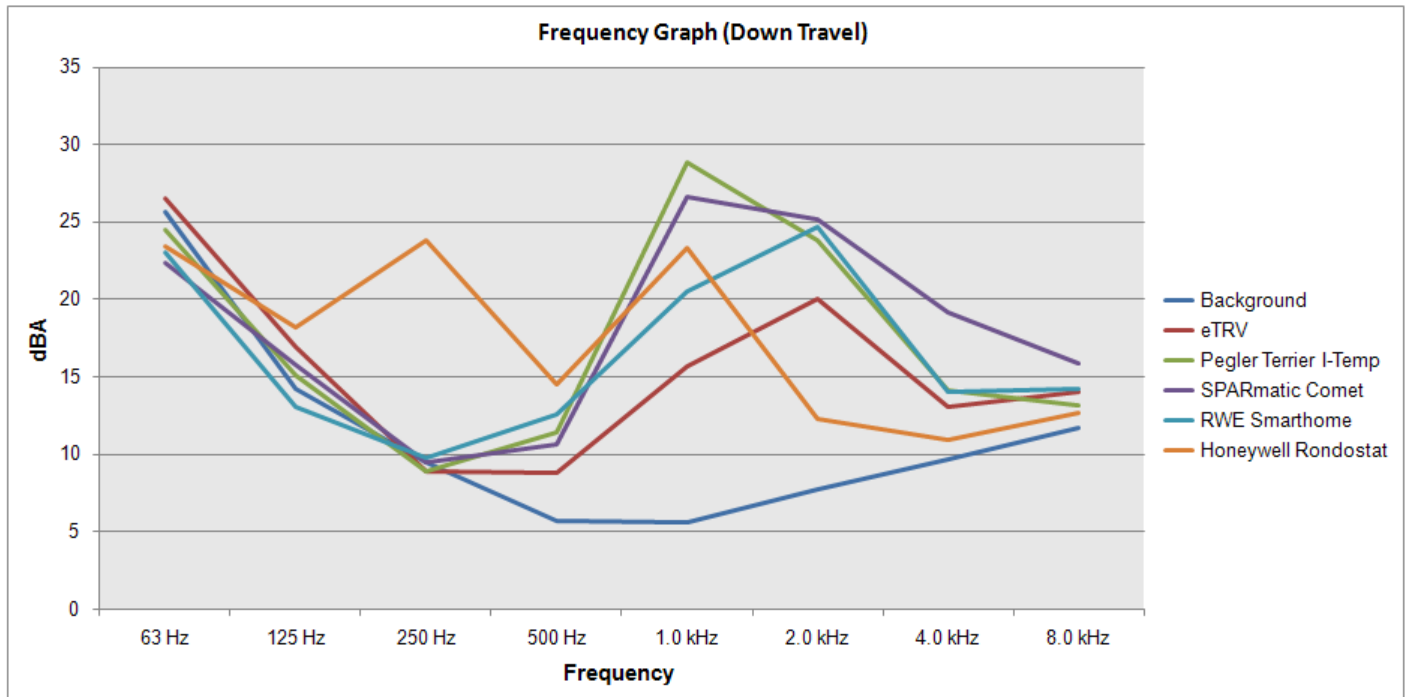
The graph below shows the frequency sound levels during the upward travel of the stem. The eTRV product follows that of background sound closer than that of the other valves. This suggests it produces a less audible sound across the frequency spectrum indicating the noise it produces it's not as "noticeable" compared to the other valves.

The SPARmatic produces a far higher decibel level in comparison with a clear indication at the 1.0 kHz – 2.0 kHz level when the stem disengages the pin of the valve body; therefore having less resistance



Downward Travel

The graph below shows the frequency sound level during the downward travel of the stem. As displayed, some valves suddenly rise at 1.0 kHz in line with where the stem come into contact with and pushes against the pin of the valve body.



5.0 Conclusion

From the valves tested, results showed that overall, the eTRV product is one of the quietest electrical radiator valve on the market. Measurements showed it produced the quietest peak (LA_{peak}) decibel level as well as average (LA_{eq}) decibel level across its travel; compared to the other valves tested which would produce higher sound levels as their stems would engage on the pin of the valve bodies.

In term of sound energy (LAE), results showed eTRV was not the best. However this data takes into account the time (secs) it took to make the complete travel. Therefore one can conclude that because it took longer to make a complete travel, more energy was output over this period. However, with the decibel levels being so low, the sound pressure (energy) released would not be noticeable.

In contrast, SPARmatic was one of the nosiest products tested but had the shortest travel time. Therefore on the down travel, it produced a lower LAE decibel level. However, even though the time of travel is short, the output noise is very noticeable.

Status	LAeq	LAF(max)	LAE	LApeak	Frequency								
					63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	8.0 kHz	8.0 Hz
Product					63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	8.0 kHz	8.0 Hz
Background	20	23.8	27	36.4	25.7	14.2	9.5	5.7	5.6	7.7	9.7	11.7	59.1
ETRV Up	21	23.6	38.8	38.4	25	17.2	6.4	7.5	8.5	12.9	11.1	12.8	54.9
ETRV Down	24.5	26.3	42.3	44.4	26.5	16.9	8.9	8.8	15.7	20	13.1	14	57
Pegler Down	31.1	37.5	45.8	49.7	24.5	15.1	8.9	11.4	28.9	23.8	14.1	13.2	60.2
Peglar Up	24.3	28.8	39.1	45.2	22.2	13.7	6.4	8.6	13.7	20.2	14	12.9	51.4
Comet Up	30.1	32.5	39.5	55	26.3	22.1	12.3	11.1	24.6	25.6	19.9	15.1	53.1
Comet Down	30.6	37.3	41.2	53.5	22.4	15.8	9.5	10.6	26.6	25.2	19.2	15.9	44.3
RWE Up	23.7	26.9	37.7	44.5	24.8	14.2	8	8	14.6	18.8	14	13	60.7
RWE Down	28	32.8	42	46.8	23	13.1	9.8	12.6	20.5	24.7	14	14.2	60.3
Rondo Down	25.2	33.5	40.7	46	23.4	18.2	23.8	14.5	23.3	12.3	10.9	12.7	55.5
Rondo Up	24.8	27.6	39.6	40.3	23.9	14.7	14.2	13	18.4	20	13.3	14.1	51.7



eTRV



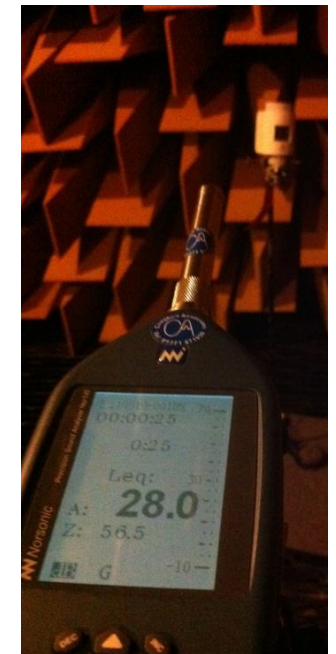
Pegler I-Temp



SPARmatic Comet



Honeywell Rondostat



RWE Smarthome