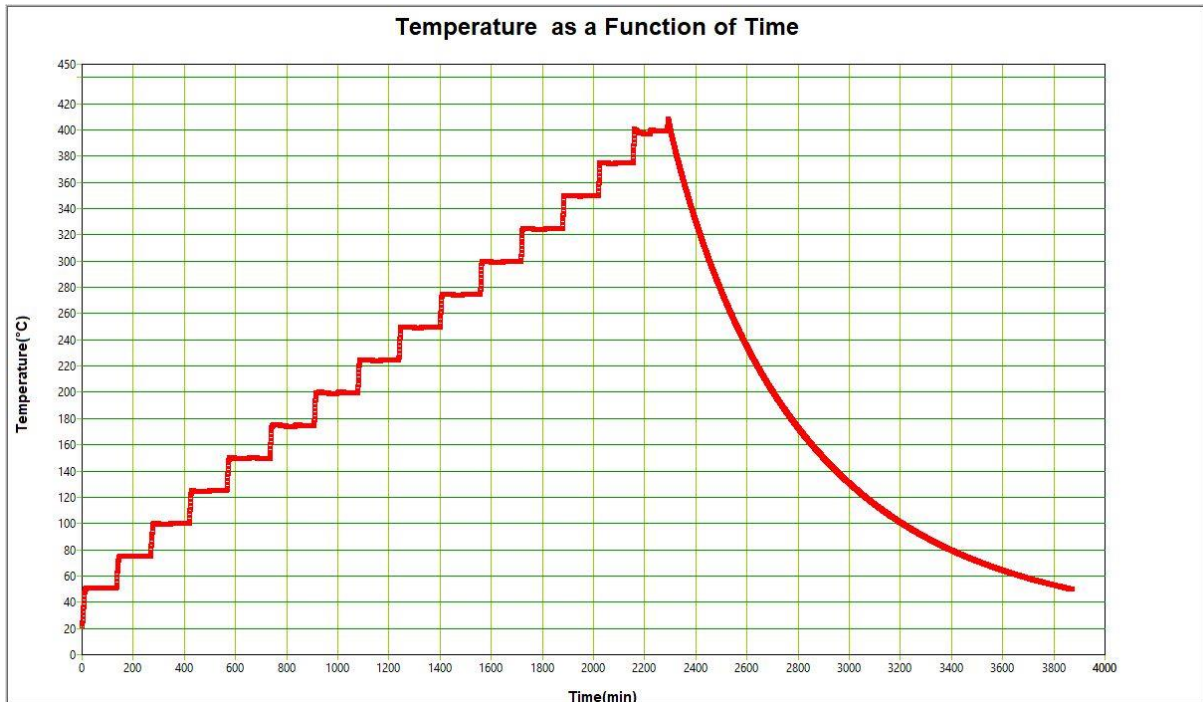


EV χ Tuning / Performance Results

Calibration Run

A calibration run was carried out to 405°C with a sensitivity of 0.01°C/min at 25°C heat steps. Additional settings were 5% power using software heating to allow for the relatively light weight of the test-cell when compared to a battery sample, along with a 40 min wait time.



A summary of the calibration drift rates is given below ..

Time (min)	Temp (°C)	dT/dt (°C/min)
133.3870	50.5870	0.0000
267.3930	75.0540	-0.0010
418.0660	99.9700	0.0000
565.6050	124.9250	-0.0000
733.0220	149.5460	-0.0020
906.5570	174.5110	-0.0020
1077.9130	199.7170	-0.0010
1238.3290	224.9390	-0.0000
1400.0290	249.9740	0.0000
1557.1470	274.9540	-0.0000
1716.4510	299.8450	-0.0000
1879.0340	324.9970	-0.0000
2019.0700	349.9030	-0.0010
2154.4730	374.6810	-0.0000
2288.8990	398.9560	-0.0010

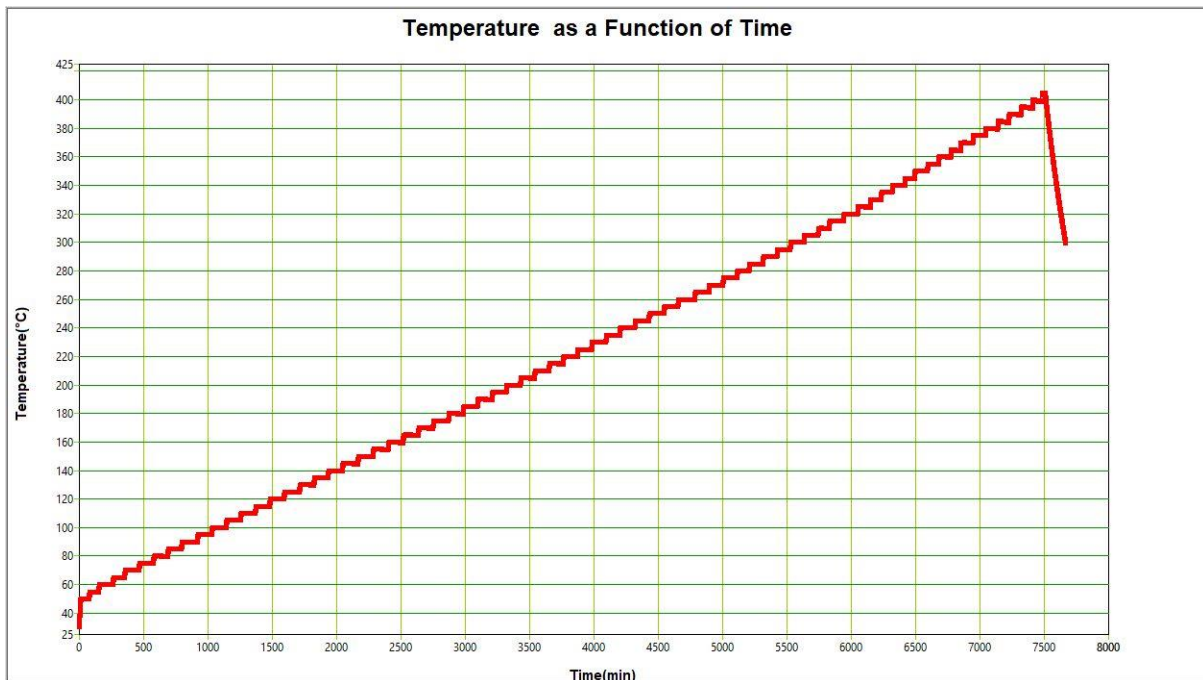
The calibration curve being ..



Temp (°C)	Offset (°C)
50.588	0.03625
75.049	0.05437
99.970	0.00018
124.924	-0.01768
149.545	-0.01768
174.509	-0.07185
199.713	-0.10868
224.939	-0.18118
249.969	-0.25368
274.952	-0.32618
299.838	-0.39868
324.843	-0.47118
349.895	-0.54368
374.670	-0.61618
398.843	-0.68868

Drift Test

A drift test was conducted from 50°C to 405°C using 5°C heat steps with a sensitivity of 0.02°C/min and a wait time of 40 mins. A heater power of 3% was used in this instance.



The drift rate results are listed in the tables below ..

Time (mins)	Temp (°C)	dT/dt (°C/min)
73.2120	50.1180	0.0000
148.2050	54.9910	-0.0000
259.2100	59.9870	0.0000
349.2080	64.9840	0.0000
460.7140	69.9680	-0.0000
572.7080	74.8900	-0.0010
685.2140	79.8980	-0.0000
791.7090	84.9210	-0.0000
914.2170	89.9530	-0.0000
1026.2140	94.9690	-0.0000
1138.2100	99.9780	0.0000
1249.7090	104.9710	-0.0000
1365.7120	109.9530	-0.0000
1477.2180	114.9450	-0.0000
1588.7160	119.9180	-0.0000
1708.7160	124.9230	-0.0000
1821.2150	129.8640	-0.0010
1930.2140	134.8030	-0.0010
2042.2200	139.7090	-0.0010
2163.2220	144.5920	-0.0020
2280.7250	149.5140	-0.0020
2398.2210	154.5040	-0.0020

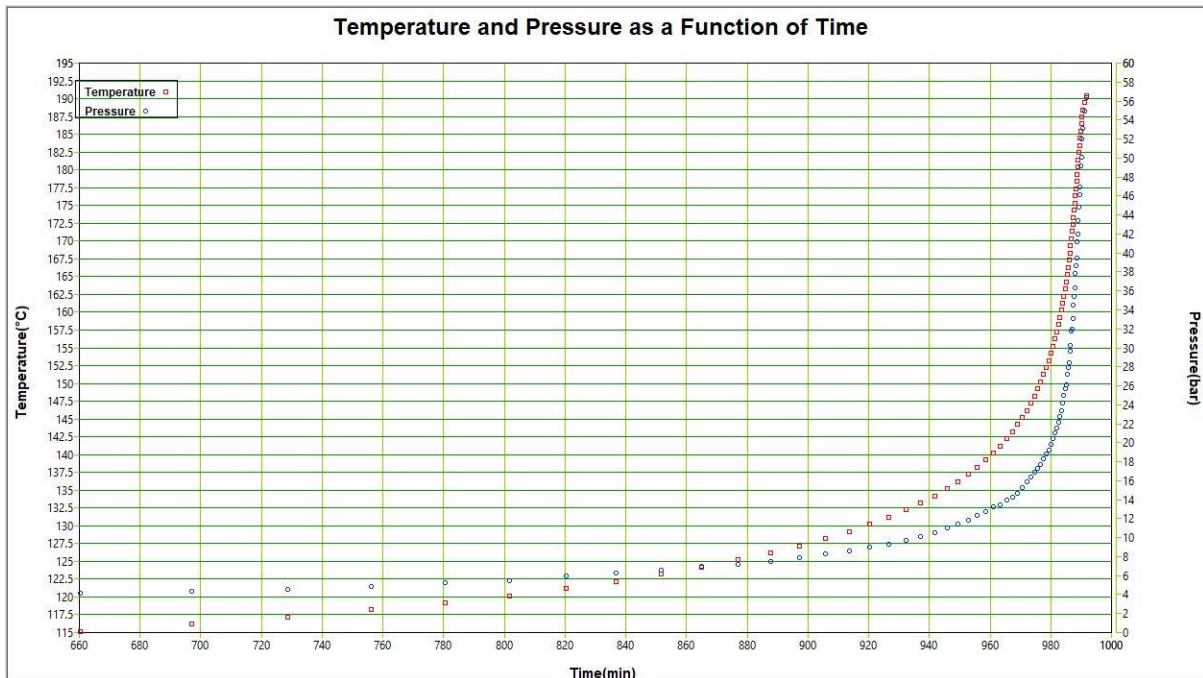
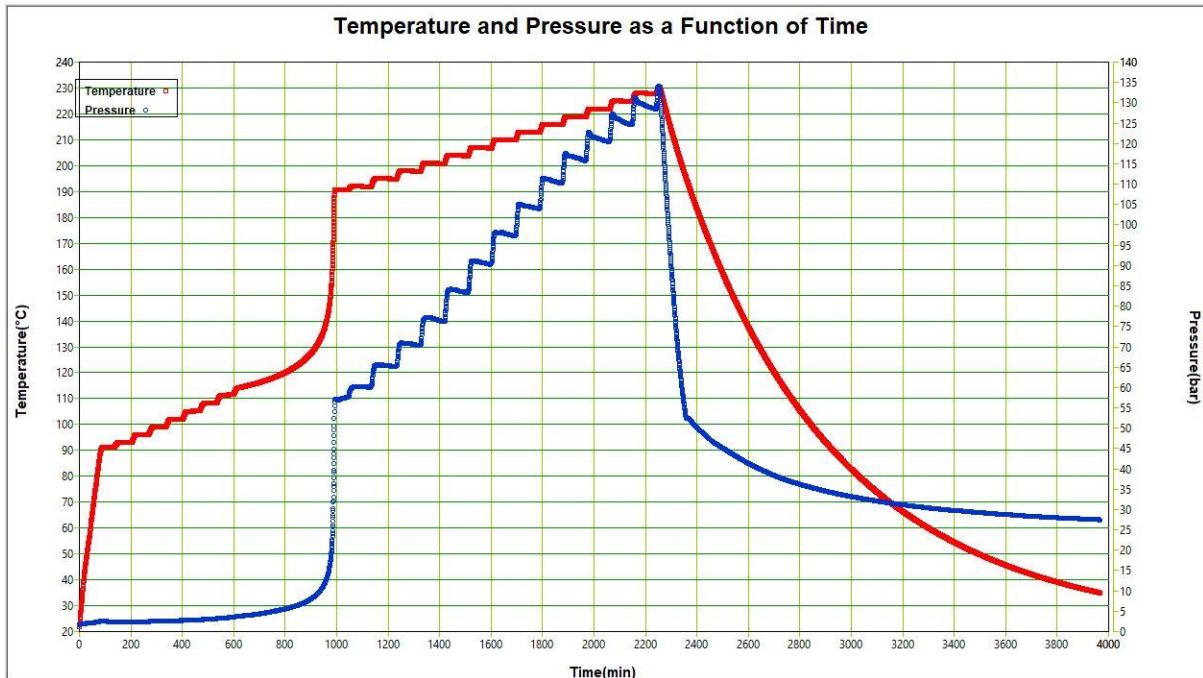
Time (mins)	Temp (°C)	dT/dt (°C/min)
2514.2200	159.5310	-0.0020
2632.7260	164.5730	-0.0020
2747.2240	169.4670	-0.0020
2867.2250	174.5600	-0.0020
2981.2250	179.5690	-0.0020
3092.2320	184.8080	-0.0010
3205.7330	189.7770	-0.0010
3315.2280	194.7690	-0.0010
3426.2300	199.7540	-0.0010
3536.2330	204.7020	-0.0010
3648.7290	209.7370	-0.0010
3758.2330	214.7980	-0.0010
3869.7290	219.7960	-0.0010
3980.2260	224.8950	-0.0010
4091.2320	229.8280	-0.0010
4198.7290	234.9440	-0.0000
4315.7300	239.9650	-0.0000
4425.2270	244.9740	-0.0000
4541.7290	249.9810	0.0000
4651.2300	254.9790	0.0000
4781.7300	259.9760	0.0000
4892.2300	264.9830	0.0000
5000.7290	269.9840	0.0000
5110.2290	274.9770	-0.0000
5203.7290	279.9740	0.0000
5311.7290	284.9580	-0.0000
5420.2290	289.9790	0.0000
5523.7280	294.9120	-0.0000
5631.7280	299.9410	-0.0000
5740.7280	304.7160	-0.0010
5827.7280	309.6920	-0.0020
5938.7270	314.7830	-0.0010
6047.7270	319.9720	0.0000
6145.7270	324.6810	-0.0010
6230.2270	329.8520	-0.0000
6315.7270	334.9800	-0.0000
6413.7270	339.9320	-0.0000
6491.2270	344.7920	-0.0000
6591.2270	349.8930	-0.0010
6676.7260	354.7100	-0.0010
6771.7260	359.8860	-0.0010
6847.7260	364.5650	-0.0010
6943.7260	369.8420	0.0000
7041.2260	374.8070	-0.0000
7137.2260	379.4780	-0.0030
7223.7250	384.1910	-0.0010

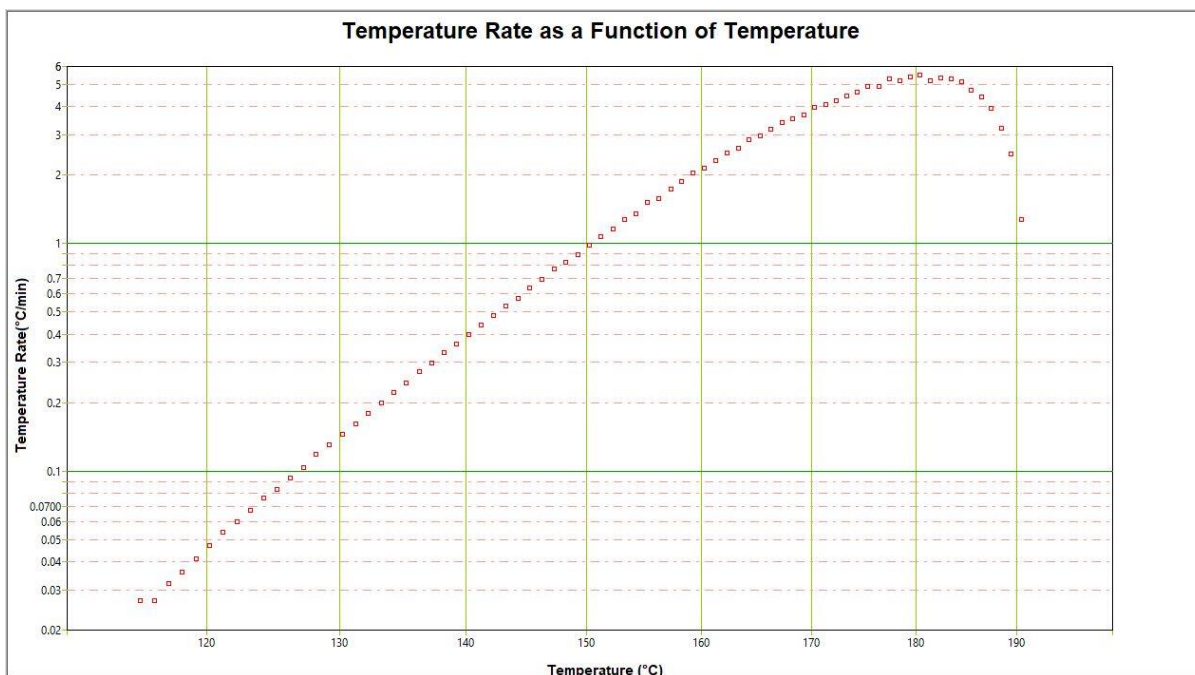
Time (mins)	Temp (°C)	dT/dt (°C/min)
7316.7250	389.5370	-0.0010
7406.2250	394.2230	-0.0030
7480.2250	398.9570	-0.0040

The results from the drift test showed that the performance of the EV χ lay within specifications throughout the temperature range of operations.

Di-tert Butyl Peroxide (20% by mass) in Toluene Test

A round-robin DTBP (20%-mass) test was carried out using standard test conditions apart from use of software heating with a 5% heater power setting and a 40 min wait time. A sensitivity of $0.02^{\circ}\text{C}/\text{min}$ was used with a start temperature of 90°C and a stop temperature of 230°C .





Identifiers	Results
Sample Name:	DTBP 20% mass + toluene
Sample Mass (g):	6.047
Sample CP (J/g K):	2.09
Sample Density (g/l):	796
Sample RMM (g/mol):	146.23
Test Cell Type:	ARCTC-Ti-NCQ
Test Cell Mass (g):	10.337
Test Cell CP (J/g K):	0.587
Phi Factor:	1.480116
Onset Temp. (°C)	115.183
Onset Temp. Rate (°C/min)	0.027
Max Rate Temp. (°C)	180.403
Max Temp. Rate (°C/min)	5.515
Max P. Rate (bar/min)	10.812
Final Temp (°C)	190.457
Max Pressure (bar)	56.384
Adiab. Temp Rise (°C)	75.274
Total Enthalpy (J)	1408.079132
Heat of Reaction (J/g)	232.855818
Reaction Order:	0
Purity (%)	20

The results and the analysis verify the integrity of the calorimetry from the EV χ calorimeter despite the irregular fall in pressure following the exotherm which ultimately held at 27.5 bar once the system had cooled, indicating no pressure leak. The oil line had been fully filled prior to running the experiment.