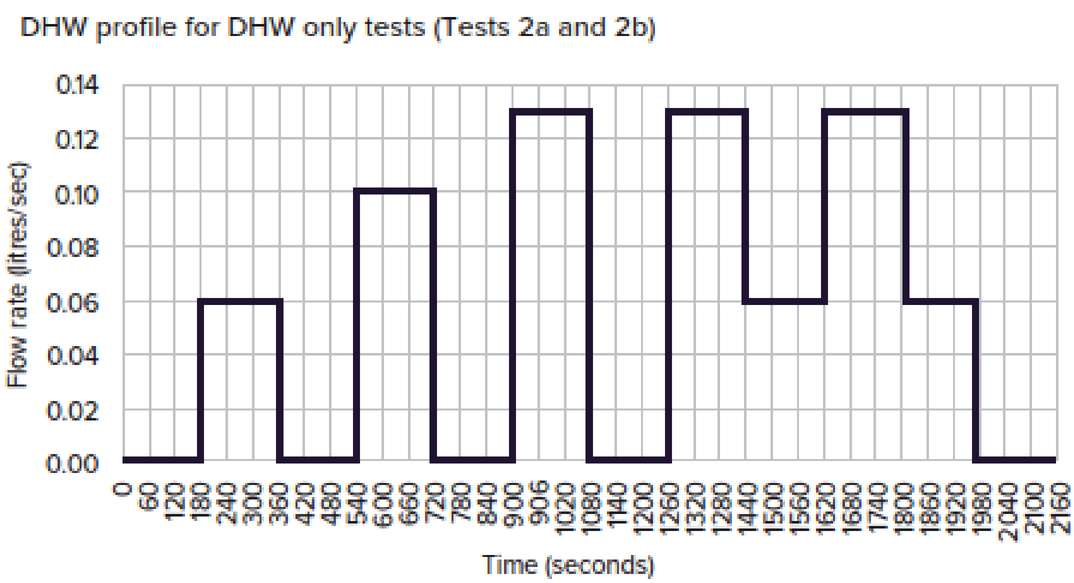
| Technical Note | TN-015 |
|---|---|
| **Test:** DHW | **Test no.:** 2a 2b |
| **Assumption:** DHW dynamic draw off duration and duration of pauses | **Assumption no: 20** |

| **Rev:** | **Date:** | **Author:** | **Checked:** |
|---|---|---|---|
| 1 | 20 Aug 20 | Martin Crane | Valeria Khnykina |

## 1. Introduction

The DHW outputs used in the Test, the 0.06 l/s (10kW), 0.01 l/s (17kW) and 0.13 l/s (22kW) each flow is for 180 seconds with a 180 second pause in between. The pattern of flows is shown below.




The return temperature during these 180 second periods are used in the VWART calculation

## 2. Considerations for draw off duration and duration of pauses

The DHW draw off periods should match the typical DHW demands, to allow the calculated VWART to be representative. The pattern of DHW flow should test the HIU such that the accuracy and speed of control of the HIU can be deduced from the graph. The test pattern should seek to produce conditions where the HIU is more likely to generate DHW temperature spikes to test the HIUs ability to manage temperature of DHW output.

## 3. Consideration 1

DHW demands vary significantly in both flow rate and duration and the 180 second duration seeks to be a ‘typical’ DHW demand duration. The 180 second between DHW draw off seeks to be long enough for the HIU to stablise after the DHW demand giving time for the DH flow rate to drop to zero.

## 4. Consideration 2

Data from more recent Tests (all but the initial SBRIfunded Tests ) show that thefor all the HIUs the DHW and DH return temperatures stabilsies quickly after the change in DHW flow rate, so increasing or reducing the length of DHW draw off would have little impact on the average return temperatures – which are the inputs to the VWART calculation.

## 5. Consideration 3

The rapid changes of DHW flow rate, from zero to test flow rate in one step and the return to zero again in one step is assumed to be the most challenging for the HIU to control with increases in DHW or DH return temperatures. Some HIUs do react a little differently in the step from 0.13 l/s to 0.06 l/s, rather than to zero and as such this pattern is deemed to be a useful additional step

## 6. Conclusions

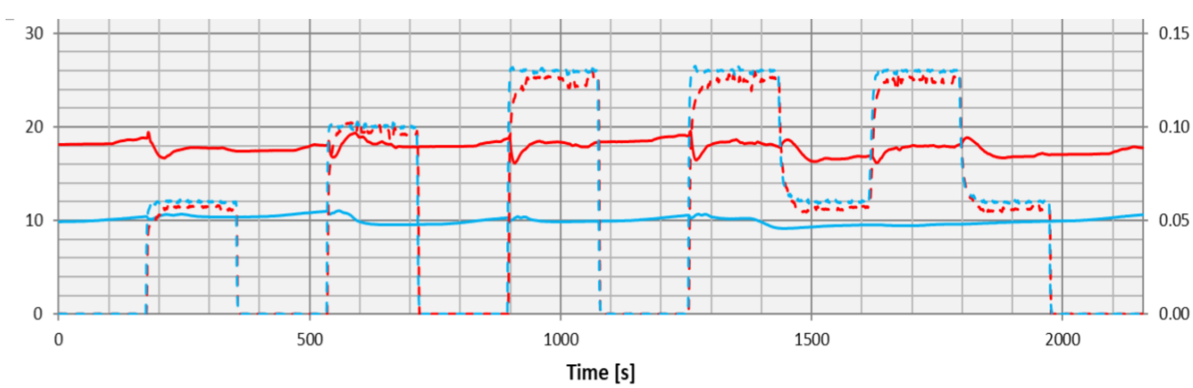
Current Test methodology provides what seems to be representative data for the VWART calculation and the graphed results show the effectiveness of the HIU control. The Test methodology provides a check that the HIU does not generate high DHW temperature spikes.

## 7. Recommendation

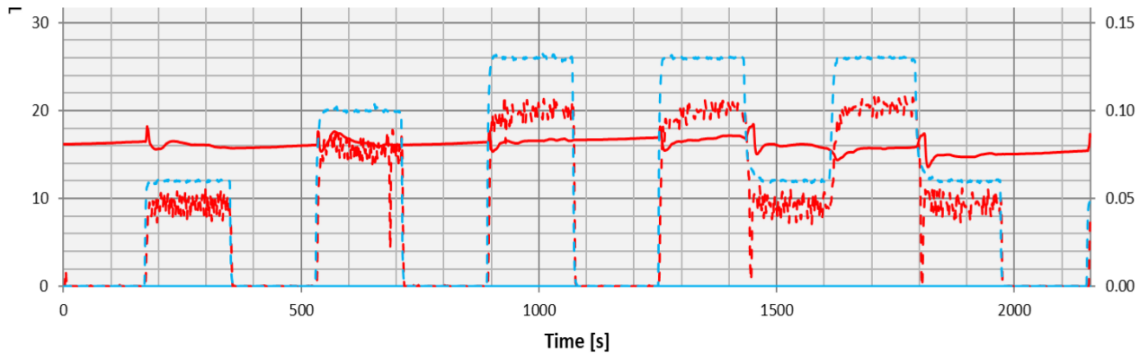
Leave Test pattern as it currently is.

## 8. References

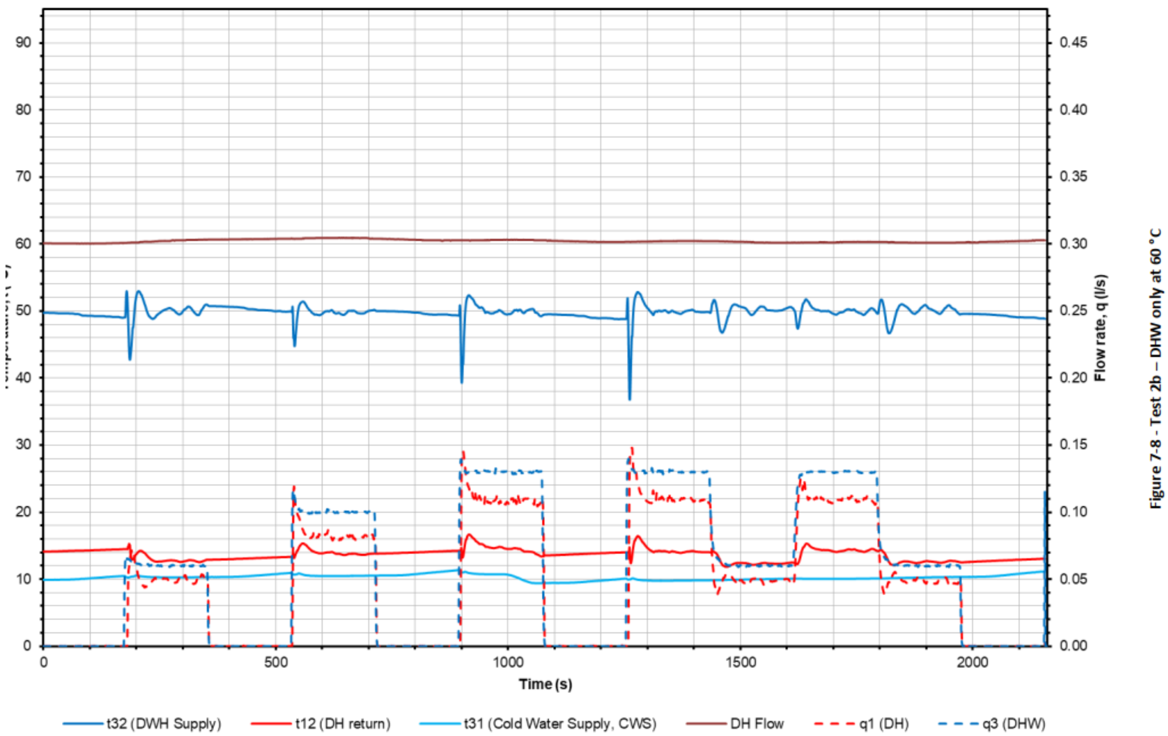
Samples of Test 2a 2b :




Switch 2 July 19



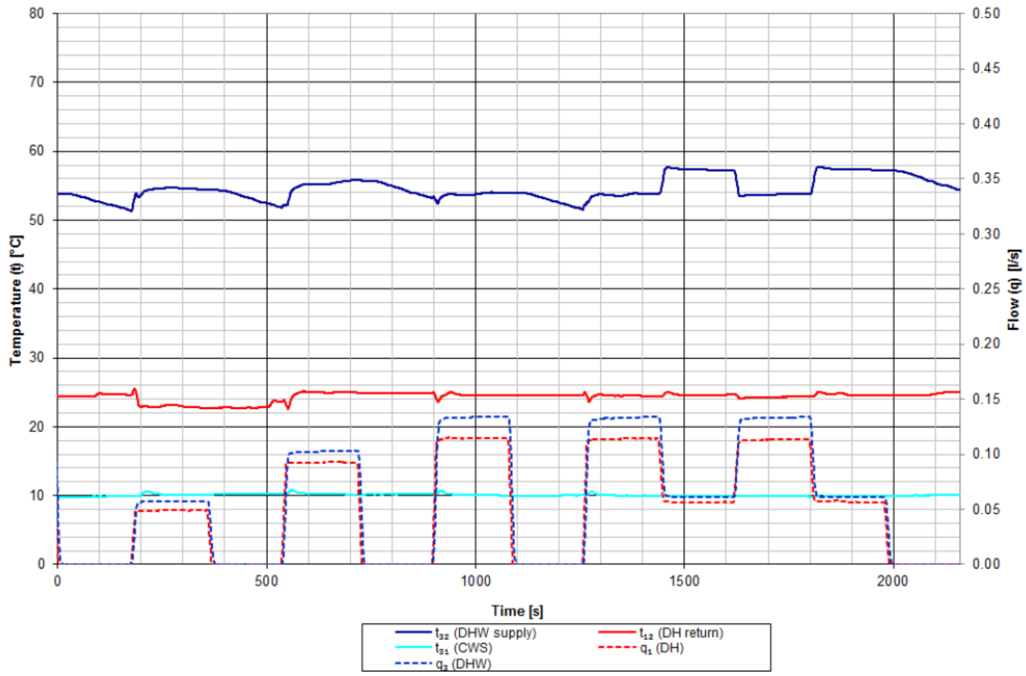

Switch 2 July 19




Vital Electronic

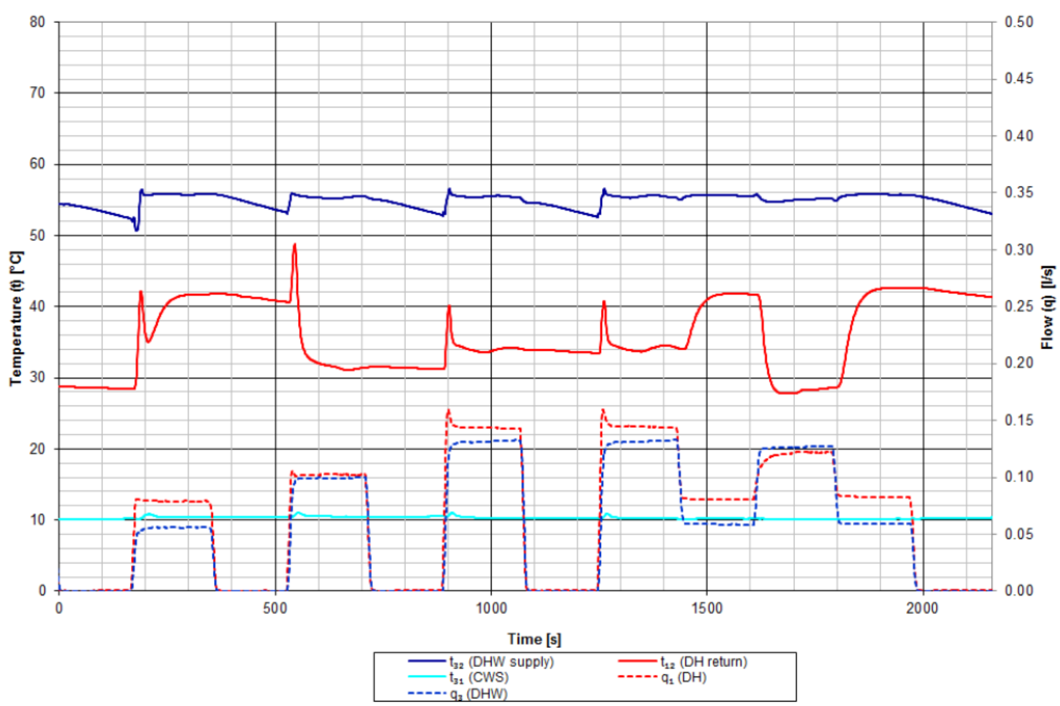
Little variation in primary return temperatures.

Figure 11. Results for test point 4a: DHW only, DH 75°C flow.

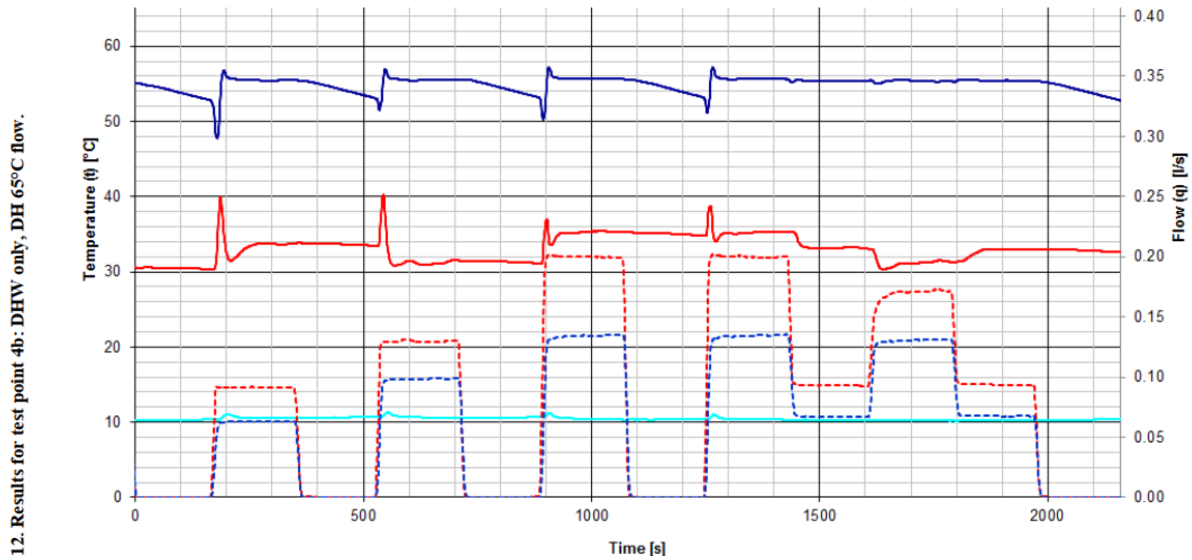



Kamo

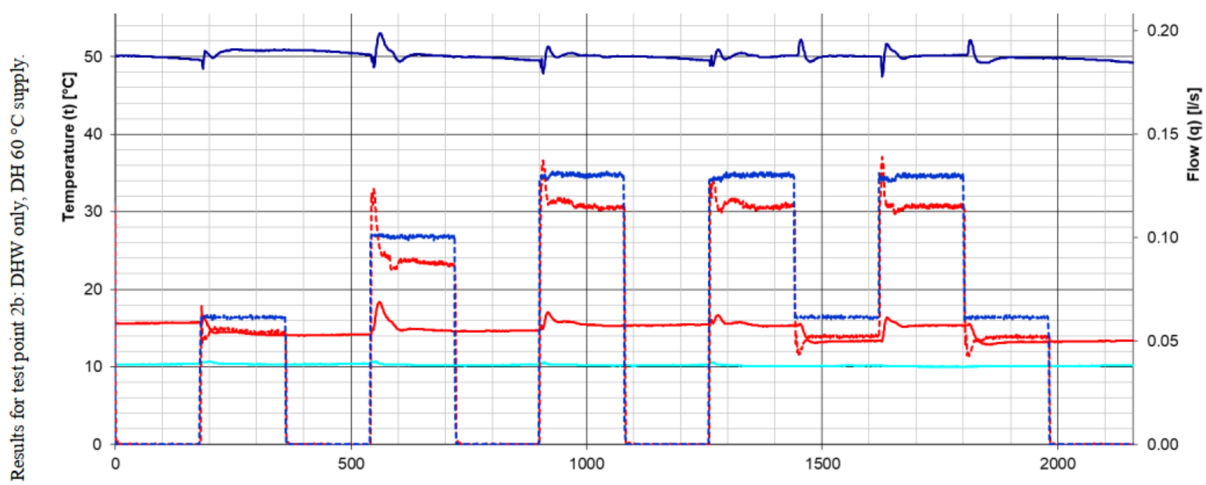
Figure 11. Results for test point 4a: DHW only, DH 75°C flow.



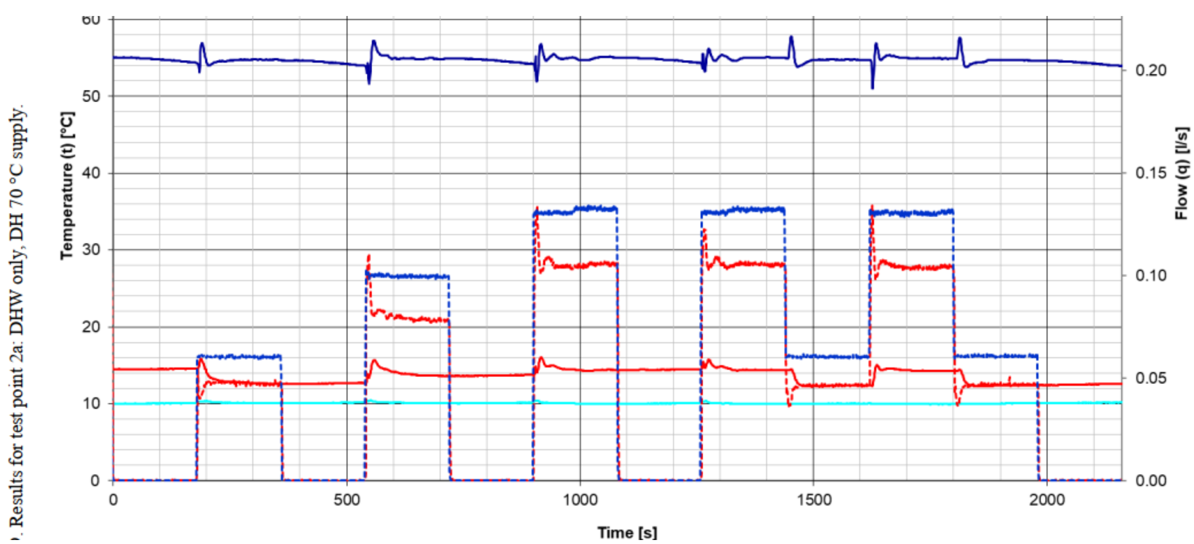

Pegler / Meibes – SBRI Test




Meibes LT SBRI Test




Flamco




Flamco

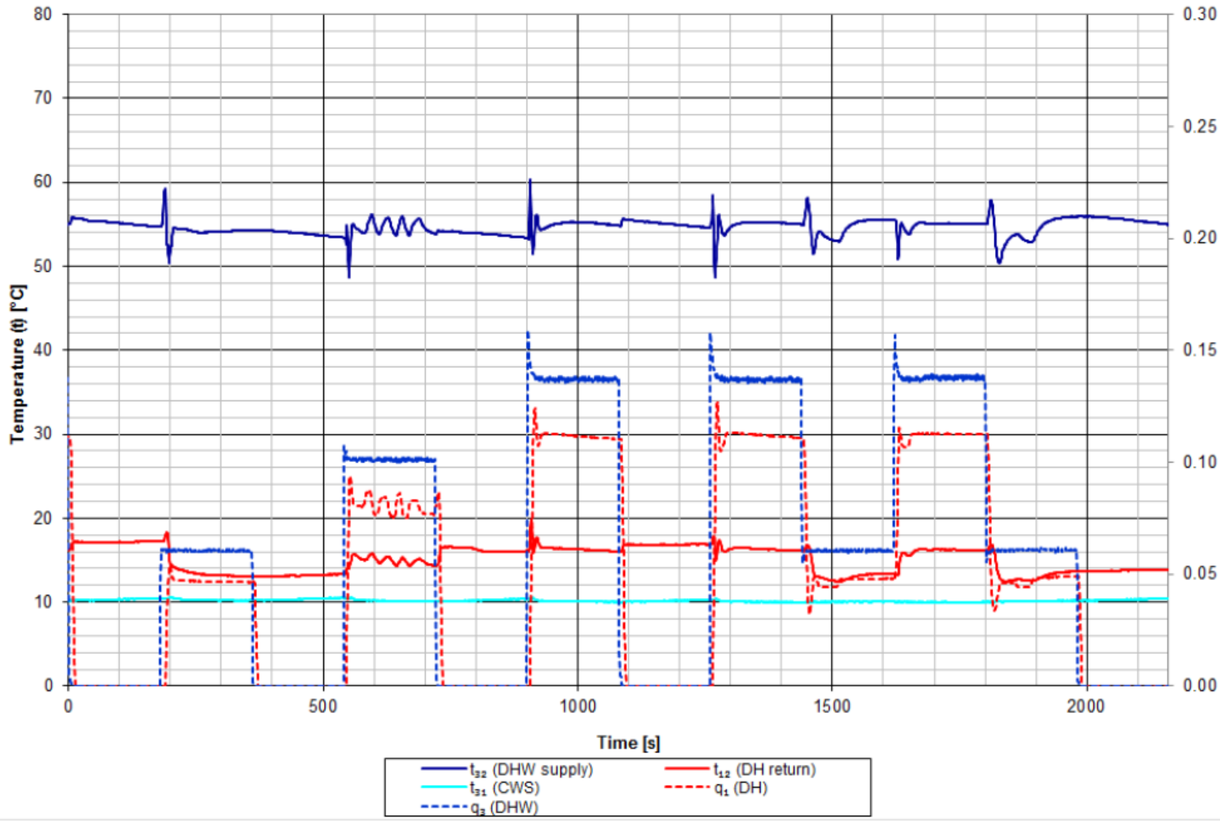



Figure 9 Results for test point 2a: DHW only, DH 70 °C supply.

Evinox 2017

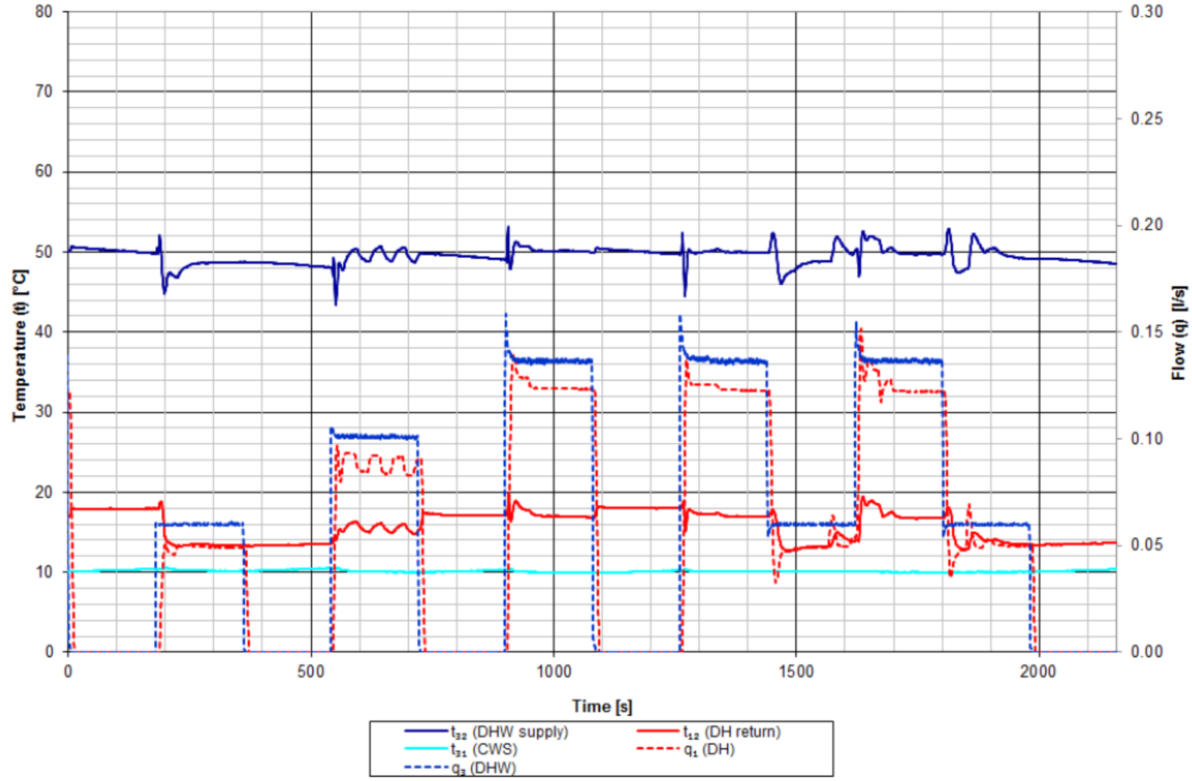



Figure 10 Results for test point 2b: DHW only, DH 60 °C supply.

Evinox 2017

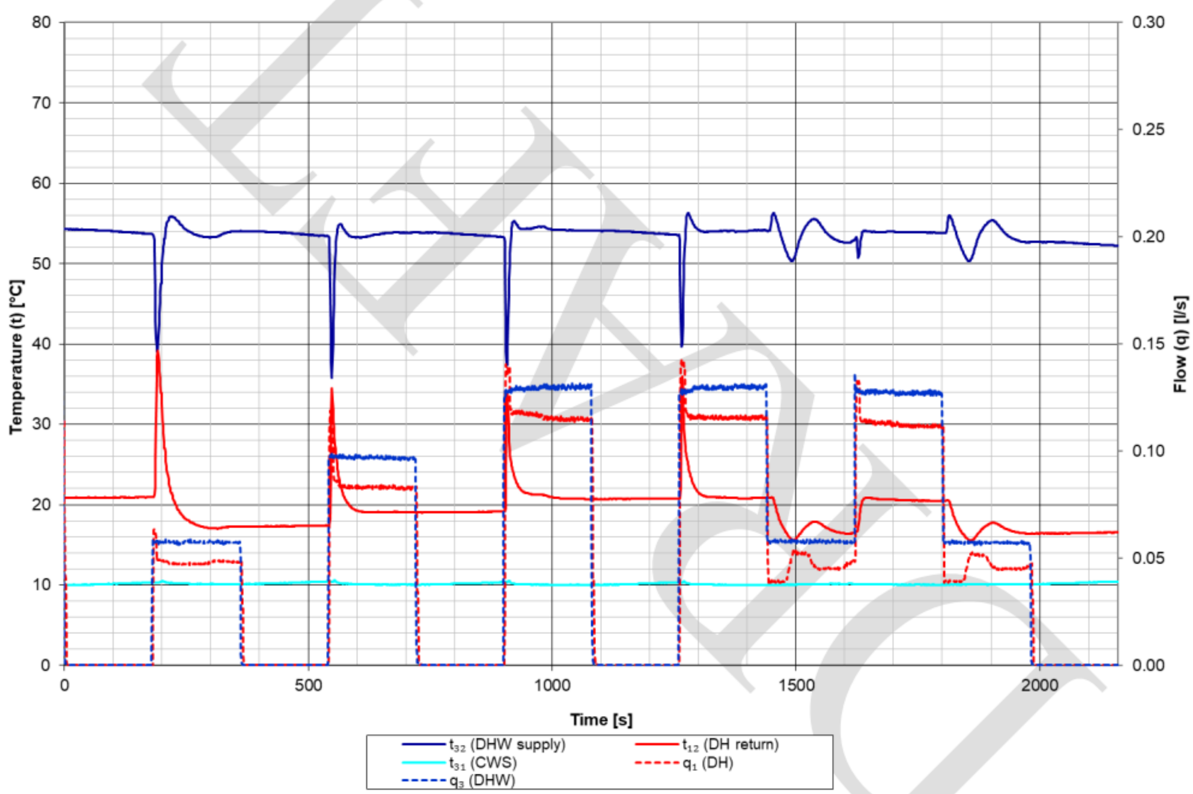



Figure 9. Results for test point 2a: DHW only, DH 70 °C supply.

ESSCO

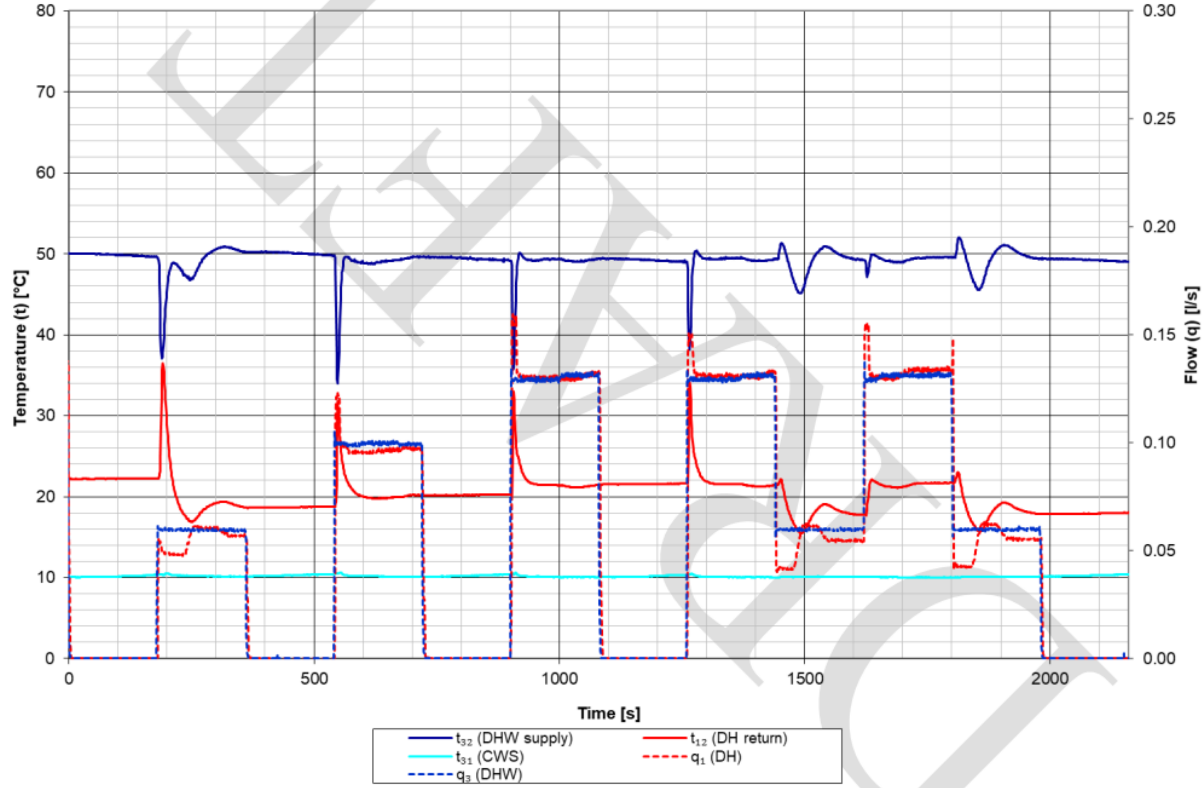



Figure 10. Results for test point 2b: DHW only, DH 60 °C supply.

ESSCO