

Technical Note			TN-003
Test: DHW response time			Test no.: 5a and 5b
Assumption: Allowable dip in DHW temperature after reaching 45C			Assumption no: 33
Rev: 1	Date: 11 Dec 19	Author: Martin Crane	Checked: Gareth Jones

1. Introduction

4.38 of the Test states: “Immediately after testing the no-load characteristics for Test 4, steady-state conditions, without domestic hot water draw-off or space heating load, will have been established. At this point, DHW is to be drawn-off at 0.13 l/s. The time taken for the DHW, t_{32} , to achieve 45°C *while not dropping below a temperature rise of 42°C* thereafter, will be recorded.”

This technical note covers the element in italics “*while not dropping below a temperature rise of 42°C*”

2. Considerations for current test value

The Swedish Test for DHW response time is quite different to the BESA Standard in that it looks for “stabilisation at DHW set point” at the end of a 5m of hose over a much longer time scale of 100 seconds. The BESA HIU Test Standard Steering Group was keen to capture how quickly the HIU delivered useful DHW, as this is what the user is seeking, and the response time is what sets the HIU keep warm levels. To rapidly deliver DHW there is likely to be some overshoot, which is typically followed by an undershoot. This clause seeks to limit the undershoot to 42°C and therefore minimise any potential negative impact on residents.

3. Consideration 1

In the SBRI study the under shoot was large in some HIUs (e.g. see the Altecnic chart below). However, all the more recent units published under the BESA Standard (including Altecnic) show much less hysteresis, and this test criteria looks to be easily met.

4. Consideration 2

The temperature variation at the tap will be less than the HIU Test data as the thermal mass of the pipe will moderate the short-term peaks and troughs of the DHW flow temperature. It is unclear if the allowable drop is causing customer impacts. It should be noted that where there are temperature drops, they are for less than 10 seconds on the units tested under the BESA standard.

5. Conclusions

There is no evidence to support a change to this the 42°C threshold.

6. Recommendation

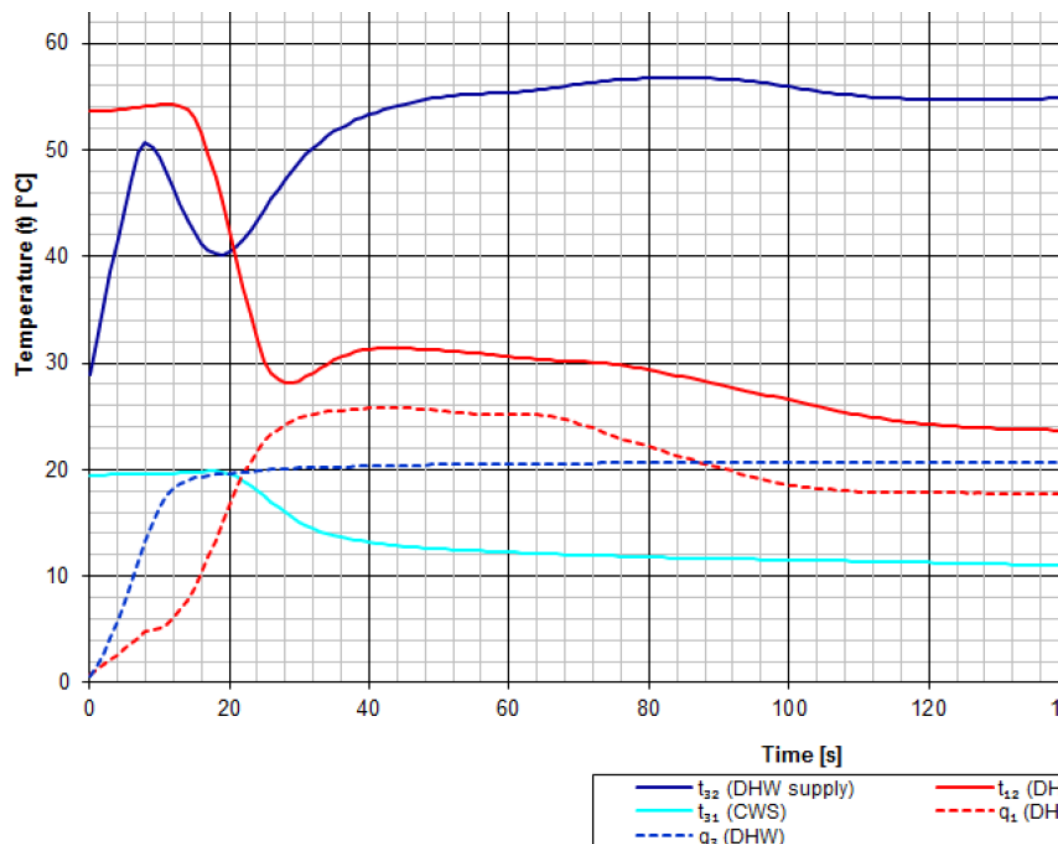
Leave the threshold for the allowable dip at 42°C at this time.

7. References

Selection of DHW response time charts below. In all cases the DHW temperature is the solid blue line. A mix for high and low temperature results are presented. The HT DHW temperature set point is 55°C and the low temperature test set point is 50°C

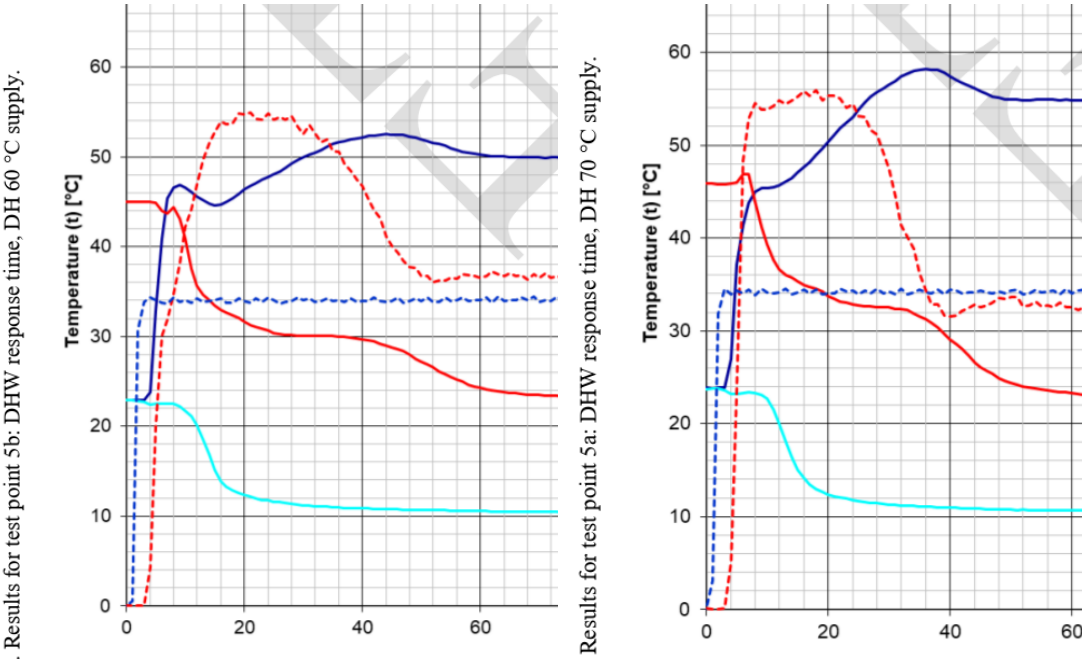
Altecnic 2016

Figure 17. Results for test point 7b: DHW response time.



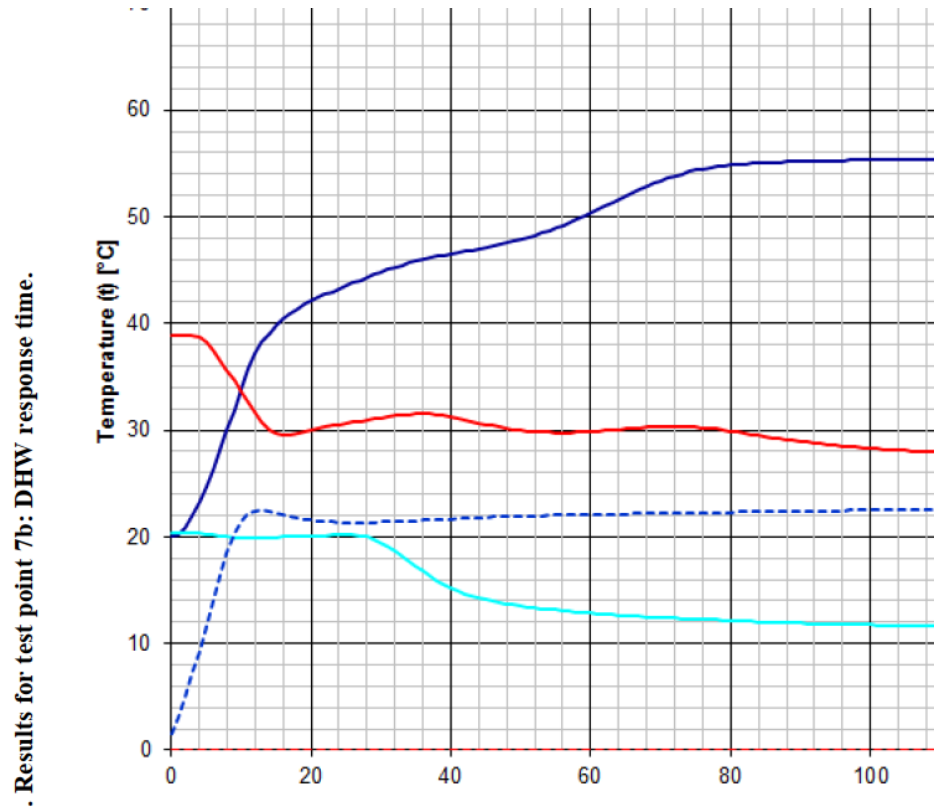
10C drop to 40C – so well out of the current Test spec

Current Altecnic HIU much better:

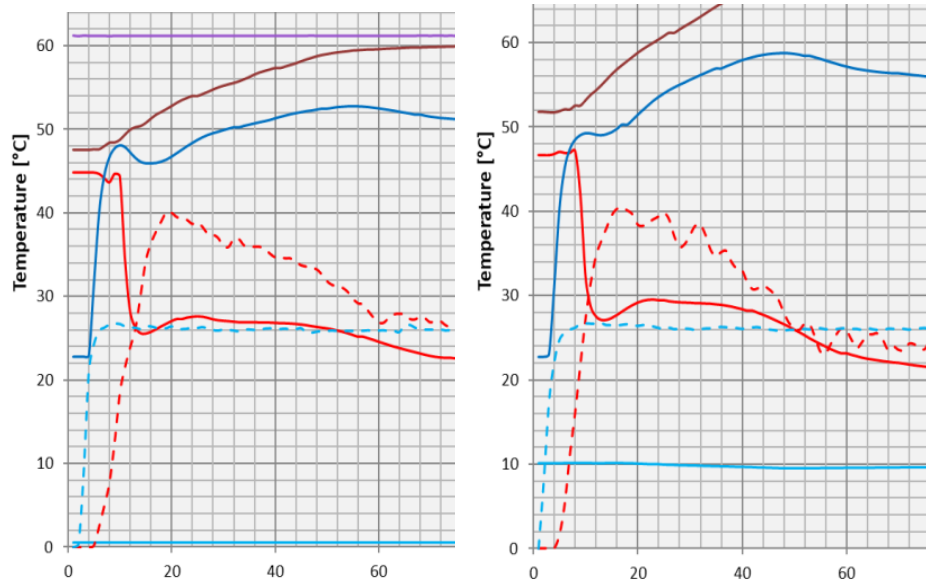


LT drop of 2C, but not below 45C. HT no drop

KaMo 2016

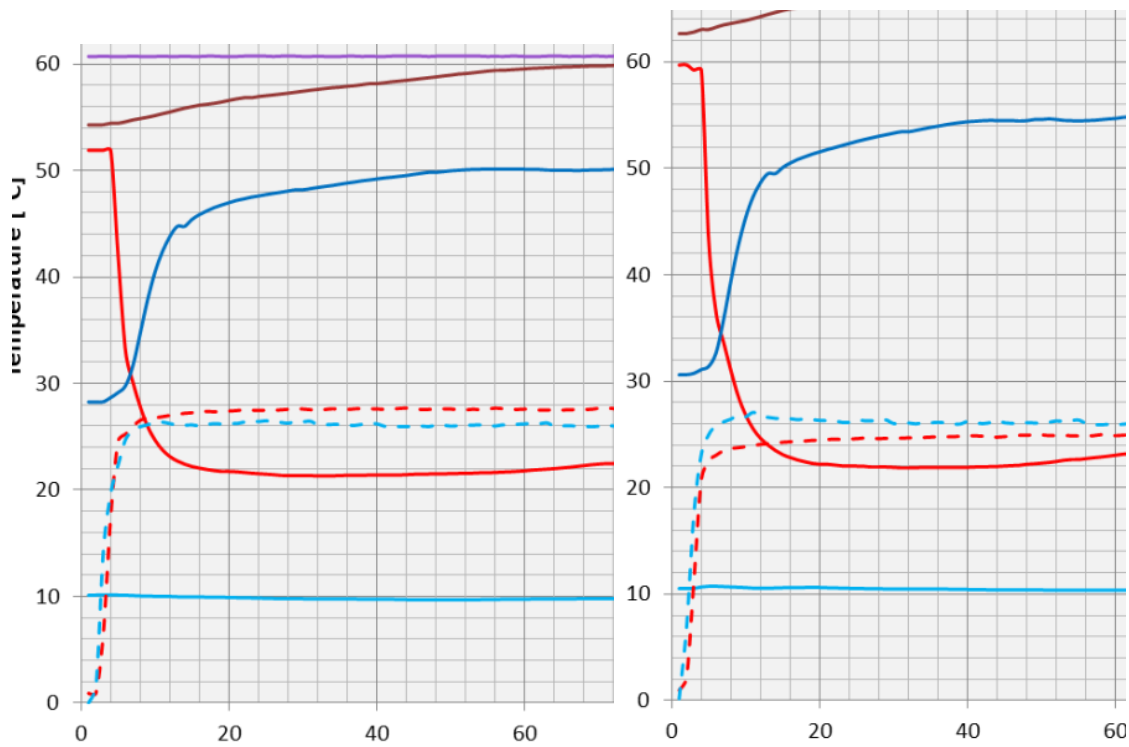


Albion April 19



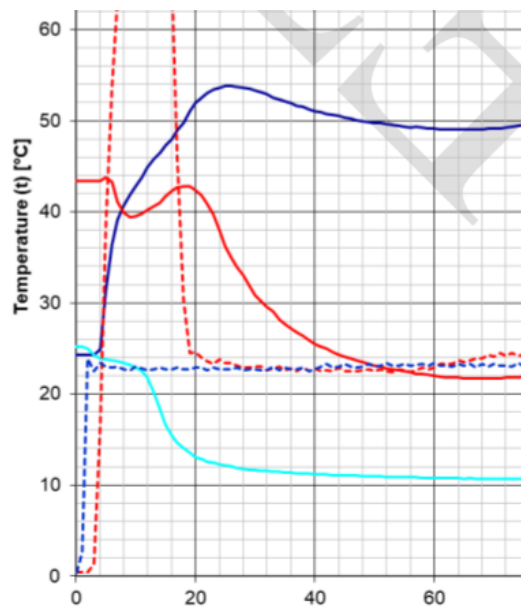
LT drop of 2C, but not below 45C. HT no drop

Dutypoint April 19

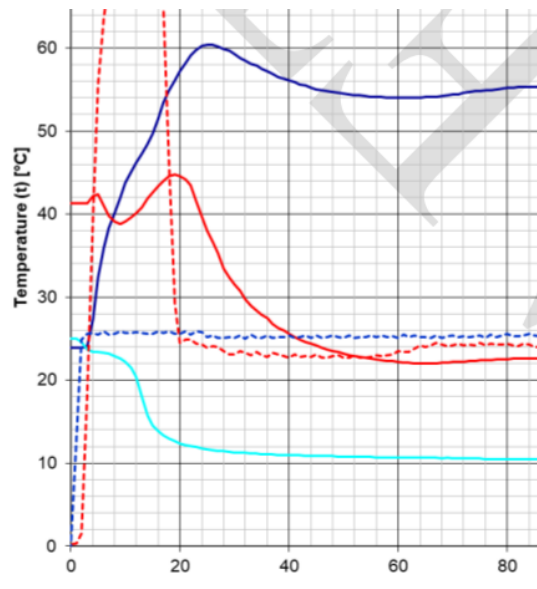


No temperature drop

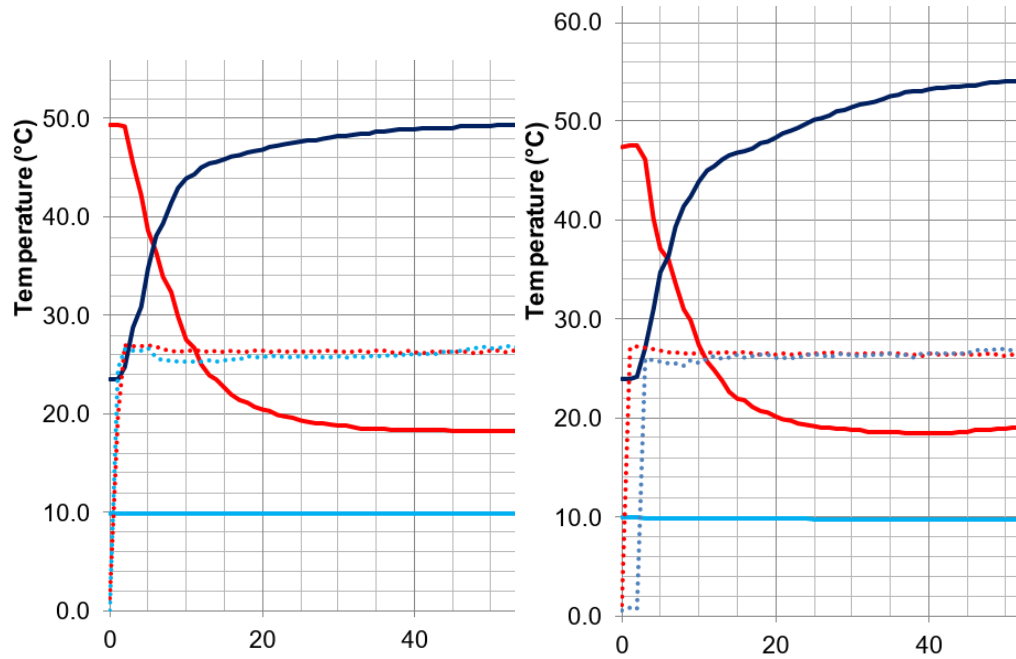
Results for test point 5b: DHW response time, DH 60 °C supply.



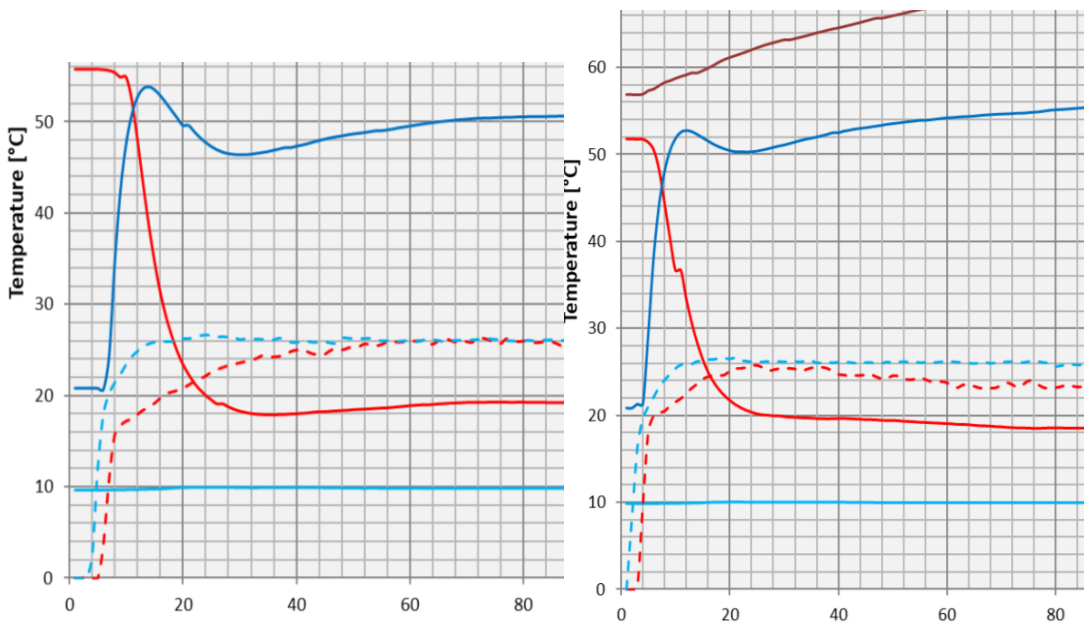
5. Results for test point 5a: DHW response time, DH 70 °C supply.



Herz

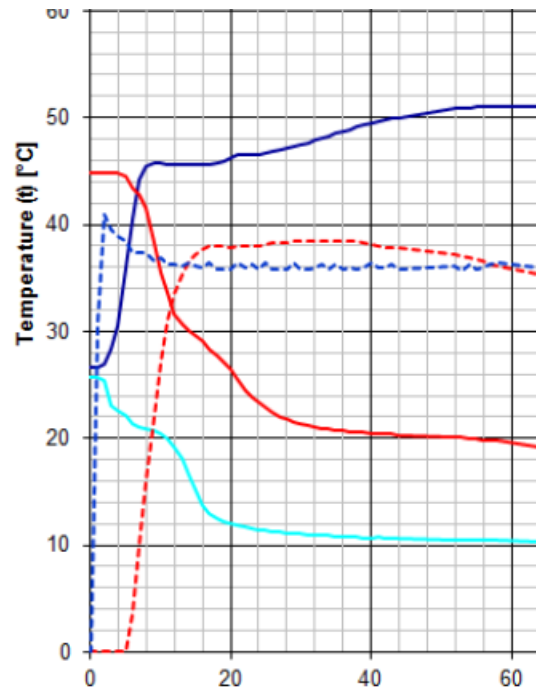


Switch 2 July 19

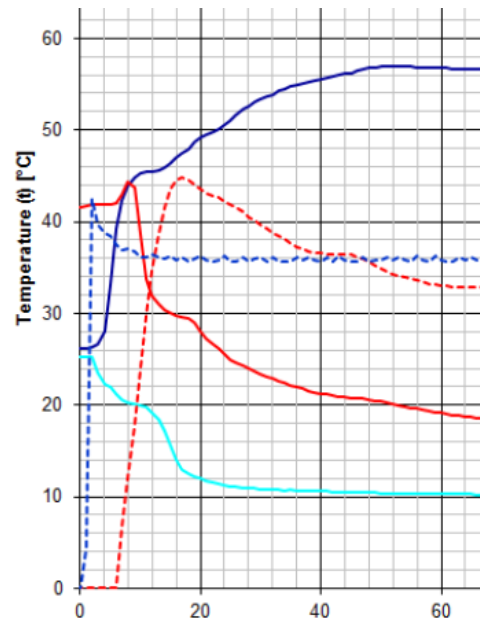


LT – about 8C dip but not below 45

6 Results for test point 5b: DHW response time, DH 60 °C supply.

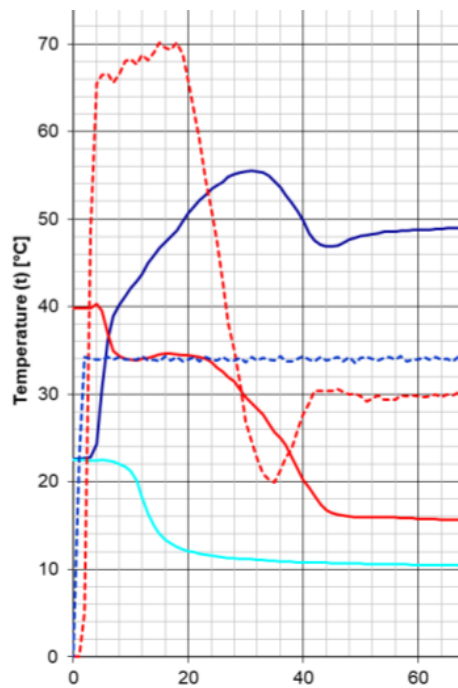


Results for test point 5a: DHW response time, DH 70 °C supply.



Flamco

16 Results for test point 5b: DHW response time, DH 60 °C supply.



Results for test point 5a: DHW response time, DH 70 °C supply.

