Appendix 3. VWART calculations

High temperature VWART calculations with keep warm function active

High temperature VWART Calculation for Uponor with keep warm active

Test carried out by RISE in November 2019

Manufacturer: Uponor; Model: Combi Port PRO XU; Serial number: D-10_0244263; Year of manufacture: 2019

VWART calculation prepared by Henrik Persson of RISE on 06 December 2019

	VWART	Volume
DHW	19,4	26,69
Standby	45,9	88,43
Space Heating	41,0	16,54

Period	VWART	% Time
No Heating	39,7	93%
Heating	40,6	7%
Overall	**40**	

	DHW Draw test results			Post DHW Draw (60 seconds)	
	Power (W)	Primary flow (m3/hr)	Return Temp(°C)	Primary flow (m3/hr)	Avg Return Temp(°C)
Low	11394	0,199	19,5	0,009	19,5
Medium	17600	0,306	19,3	0,013	19,1
High	23408	0,402	19,2	0,020	19,1

DHW Draw Volumes per annum		
kWh	Hours	Volume pa (m3)
729	63,98	12,732
297	16,88	5,164
444	18,97	7,625

Post DWH Draw Volumes per annum		
Events	Average duration (secs)	Volume pa (m3)
10000	30	0,750
660	75	0,179
300	145	0,242

	Standy test results	
	Primary flow (m3/hr)	Return Temp(°C)
Standby	0,011	45,9

Standby Volumes pa	
Hours	Volume pa (m3)
8 039	88,43

	Space Heating test results		
	Power (W)	Primary flow (m3/hr)	Return Temp(°C)
1kWp	1026	0,043	40,3
2kWp	2058	0,019	40,9
4kWp	3938	0,036	41,6

Space Heating Volumes pa		
kWh pa	Hours	Volume pa (m3)
98	95,52	4,107
787	382,41	7,266
565	143,47	5,165