

<b>Technical Note</b>			<b>TN-007</b>
<b>Test:</b> 5a/5b DHW response time DHW flow rate			<b>Test no.:</b> 5a/5b
<b>Assumption:</b> 0.13 l/s			<b>Assumption no:</b> 31
<b>Rev:</b> 01	<b>Date:</b> 13/05/2020	<b>Author:</b> Valeria Khnykina	<b>Checked:</b> Tom Naughton

## 1. Introduction

Flow rate revision is required for the draw-off flow in the DHW response time test. The test parameter has been reviewed and compared with the current flow rate requirements for various water outlets.

## 2. Considerations for reducing the flow rate for tests 5a/5b

Considerations.

Current design standards for hot water outlets have reduced flow rate values. To mirror current requirements the flow rate should be reduced. The new proposed value is 0.1 l/s based on reviewed documentation.

3. The value is proposed to be taken as a wash-basin flowrate at HIU calculated for the hot water supply proportion. It was noted that the wash-basin tap is the most likely outlet to be utilized more often than other outlets.

Consideration 1

NHBC 2020 standards [1]

Outlet	Design flow rate <sup>(1)</sup>		Minimum flow rate <sup>(2)</sup>		Supply temperature °C <sup>(3)</sup>
	L/sec	(L/min)	L/sec	(L/min)	
Bath (from storage)	0.30	(18)	0.15	(9)	48
Bath (from combi)	0.20	(12)	0.15	(9)	40
Shower (non-electric)	0.20	(12)	0.10	(6)	40
Wash basin	0.15	(9)	0.10	(6)	40
Sink	0.20	(12)	0.10	(6)	55

Resulting flow rates at 50 and 55 degrees DHW temperature setting

	Design flow rate	Minimum flow rate	Supply temperature	HIU Hot water flowrate 55°C		HIU Hot water flowrate 50°C	
	L/sec	L/sec		Design flow l/s	Min flow l/s	Design flow l/s	Min flow l/s
Bath (from storage)	0.3	0.15	48	0.25	0.13	0.29	0.14
Bath (from Combi)	0.2	0.15	40	0.13	0.10	0.15	0.11
Shower (non-electric)	0.2	0.1	40	0.13	0.07	0.15	0.08
Wash basin	0.15	0.1	40	0.10	0.07	0.11	0.08
Sink	0.2	0.1	55	0.20	0.10	0.20	0.11

#### 4. Consideration 2

BS 806-3 2006 [2]

Table 2 — Draw-off flow-rates  $Q_A$ , minimum flow-rates at draw-off points  $Q_{min}$  and loading units for draw-off points

Draw-off point	$Q_A$	$Q_{min}$	Loading units
	l/s	l/s	
Washbasin, handbasin, bidet, WC-cistern	0,1	0,1	1
Domestic kitchen sink, - washing machine <sup>a</sup> , dish washing machine, sink, shower head	0,2	0,15	2
Urinal flush valve	0,3	0,15	3
Bath domestic	0,4	0,3	4
Taps /garden/garage)	0,5	0,4	5
Non domestic kitchen sink DN 20, bath non domestic	0,8	0,8	8
Flush valve DN 20	1,5	1,0	15

<sup>a</sup> For non domestic appliances check with manufacturer.

Resulting flow rates at 50 and 55 degrees DHW temperature setting

DHW	Draw-off flow rate, l/s	Min flow rates, l/s	Supply temperature	HIU Hot water flowrate 55°C	HIU Hot water flowrate 50°C
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			<i>Assumed</i>	Hot water Draw-off flow rate, l/s	Hot water min flow, l/s	Hot water Draw-off flow rate, l/s	Hot water min flow, l/s
Washbasin, handbasin	0.1	0.1	40	0.07	0.07	0.08	0.08
Domestic kitchen sink	0.2	0.15	55	0.20	0.15	0.20	0.15
Shower head	0.2	0.15	40	0.13	0.10	0.15	0.11

Other data sources reviewed:

**Plumbing engineering services design guide 2002 [3]:**

The document has considerably higher flow rates for wash basins and other outlet options.

**BREEAM 2018 (non-domestic) [4]:**

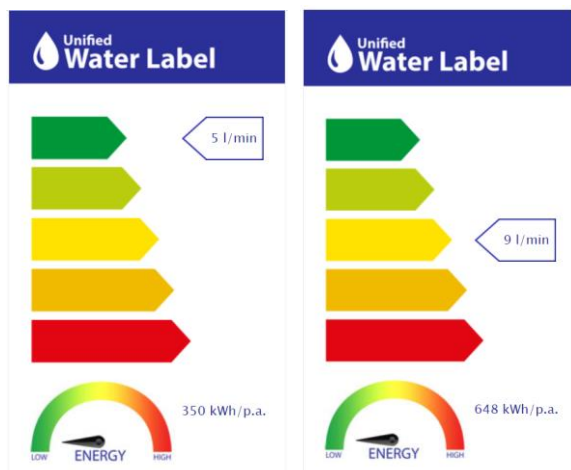
Wash-basin flow rates range between 0.17 l/s (Base) to 0.05 l/s (level 5)

**Home quality mark technical standard BRE, SD239, 2018 [5]:**

Wash-basin flow rate is  $\leq 5$  l/min (0.08 l/s) for both – optional fittings and advanced fittings standards.

**European water label [6]**

European water label is the scheme to certify water outlets to a certain level of water flow rate according to the matrix below. The lowest flow rate (green bar) is 5 l/min (0.08 l/s) with many water outlets achieving this rating.



## **5. Conclusions**

Current water saving measures resulted in reduced output from water outlets which is reflected in the recent technical guidance.

Reduced 5a/5b test flow rate will potentially result in faster DHW response time due to reduced power requirement for heating up less water. Some HIUs might struggle with control temperature stability at the reduced water flow rate.

## **6. Recommendation**

The proposal is to reduce hot water flowrate for tests 5a/5b DHW response time from the current 0.13 l/s to 0.1 l/s to reflect the changes in flowrate at water taps.

## **7. References**

[1] NHBC Standards, 2020 edition.

[2] BS 806-3:2006 Specifications for installations inside buildings conveying water for human consumption. Pipe sizing. Simplified method.

[3] Plumbing engineering services design guide 2002, The Institute of Plumbing.

[4] BREEAM UK New Construction, Non-Domestic Buildings, Technical Manual SD5078, BRE 2018 3.0.

[5] Home Quality Mark Technical Standard, England, Scotland & Wales, BRE, SD239, 2018.

[6] European Water Label Scheme <http://www.europeanwaterlabel.eu/>