Communities and Local Government

The Water Efficiency Calculator for new dwellings

The Government's national calculation methodology for assessing water efficiency in new dwellings in support of:

The Code for Sustainable Homes, May 2009 and subsequent versions

The Building Regulations 2000 (as amended)

The Building (Approved Inspector etc) Regulations 2000 (as amended)

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September 2009
Department for Communities and Local Government

Produced on behalf of Communities and Local Government by:

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This document outlines the assessment methodology to support the May 2009 version of the water efficiency calculator for new dwellings. It is important to ensure that the most up to date version of this document is being used. Updated versions of this document will be published by Communities and Local Government on www.planningportal.gov.uk

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Contents

Section 1

1. The water calculator methodology

1.1 The following document sets out the water calculation methodology for assessing the whole house potable water consumption in new dwellings. The calculation method is to be used to assess compliance against the water performance targets in Building Regulations 17.K and the Code for Sustainable Homes (referred to in this document as the Code) as set out below. It is not a design tool for water supply and drainage systems. It is also not capable of calculating the actual potable water consumption of a new dwelling. Behaviour and changing behaviour can also have an effect on the amount of potable water used throughout a home.

Performance target	Maximum consumption of potable water (litres/person/day)
17.K Compliance	125
Code for Sustainable Homes (Level 1/2)	120
Code for Sustainable Homes (Level 3/4)	105
Code for Sustainable Homes (Level 5/6)	80

1.2 The calculation method requires the use of water consumption figures provided from manufacturers product details. Before the assessment can be carried out, figures will need to be collected from manufacturers product information to determine the consumption of each terminal fitting, including:

a. WCs

i. Flushing capacity for the WC suite including consumption at full and part flush for dual flush WCs.

ii. Where multiple WCs are specified with various flushing capacities, the average effective flushing volume must be used as set out in section 2.5.

b. Bidets

i. Bidets are excluded from the Water Efficiency Calculator for new dwellings due to their minimal water consumption, and although there is insufficient research to quantify this consumption, anecdotal evidence shows that there is evidence that bidets often displace other water consumption rather than increase consumption.

c. **Taps**

i. Flow rate of each tap, at full flow rate in litres per minute measured at a dynamic pressure of 3±0.2 bar (0.3±0.02 MPa) for high pressure (Type 1) taps, or at a dynamic pressure of 0.1±0.02 bar (0.01±0.002 MPa) for low pressure (Type 2) taps (BS EN 200:2008, sanitary tapware, single taps and combination taps for supply systems of type 1 and 2. General technical specifications) including any reductions achieved with flow restrictions.

ii. Where multiple taps are to be provided (e.g. separate hot and cold taps) the flow rate of each tap will be needed in order to calculate an average flow rate in accordance with section 2.5.

iii. For 'click taps' and other taps with a 'water break', the manufacturer's stated full flow rate should be used to perform calculations (measured as described above). Do not use the flow rate at the break point. A factor for percentage of flow rate is already assumed within the use factor for taps. There is currently no research to provide a separate use factor for 'click taps' so a standard use factor is applied.

iv. Taps on baths should not be included in the calculation as the water consumption from bath taps is taken account of in the use factor for baths.

d. **Baths**

i. Total capacity of the bath to overflow, in litres (excluding displacement, this is already included in the use factor for baths).

ii. Where multiple baths are specified with various capacities, the average must be used as set out in section 2.5.

iii. Jacuzzis are not included in the water efficiency calculator as they are generally not filled on a daily basis and their water consumption over a year is minimal.

e. **Dishwashers**

i. Litres per place setting derived from the figures quoted on the EU Energy Label.

ii. Where no dishwasher is to be provided and therefore consumption figures are unknown, a figure of 1.25 litres per place setting must be assumed.

iii. Where multiple dishwashers are specified with various consumptions, the average must be used as set out in section 2.5.

f. Washing machines

i. Litres per kilogram of dry load derived from the figure quoted on the EU Energy Label.

ii. Where no washing machine is to be provided and therefore consumption figures are unknown, a figure of 8.17 litres per kilogram must be assumed.

iii. Where multiple washing machines are specified with various consumptions, the average must be used as set out in section 2.5.

g. Showers

i. Flow rate of each shower at the outlet using cold water ($T \leq 30^{\circ}$ C), in litres per minute measured at a dynamic pressure of 3±0.2 bar (0.3±0.02 MPa) for high pressure (Type 1) supply systems, or at a dynamic pressure of 0.1±0.05 bar (0.01±0.005 MPa) for low pressure (Type 2) supply systems (BS EN 1112:2008, Sanitary tapware. Shower outlets for sanitary tapware for water supply systems type 1 and 2. General technical specifications).

ii. Where multiple showers are specified with various flow rates, the average must be used as set out in section 2.5.

h. Water softeners (where present)

i. Percentage of total capacity used per regeneration cycle.

ii. Water consumed per regeneration cycle (litres).

iii. Average number of regeneration cycles per day.

iv. Number of occupants (based on two occupants in the first bedroom and one occupant per additional bedroom assuming 2 occupants in studio flats).

v. Water softeners that do not have a water consumption such as electromagnetic types, are not included in the calculation.

i. Waste disposal units (where present)

i. Where present, a standard consumption of 3.08 litres per person per day must be assumed.

j. External taps

i. Flow rates of external taps are not included in the calculation as a fixed allowance of five litres per person per day is assumed for external water use in 17.K. The Code considers water use as part of a separate issue Wat 2, External Water Use.

1.3 In some cases rain and greywater recycling may be used as a means of reducing water consumption to achieve higher water efficiency performance levels. This may be needed where options for improving the efficiency of terminal fittings (taps, WCs etc.) has been maximised and further savings are still needed in order to meet the higher levels of the Code for Sustainable Homes. Rainwater recycling may also be used as a means of reducing surface water runoff and has potential to contribute to achieving Code issue Sur 1. The details required to determine the savings that can be made using these systems are as follows:

a. Greywater

i. Manufacturer or system designer details on the percentage of used water to be recycled, taking into account the storage capacity of the system.

ii. The volume of recycled water collected from waste bath, shower and wash-hand basin, dishwasher and washing machine usage, with the volume collected calculated in accordance with Table 1 or Tables 4.3, 4.4 and 4.5.

iii. The consumption of fittings where greywater is to be used in accordance with Table 1 which can include WCs and washing machines or Tables 4.1 and 4.2 where greywater is just being used in a proportion of fittings.

b. Rainwater (in accordance with BS8515)

i. Collection area

ii. Yield co-efficient and hydraulic filter efficiency

iii. Rainfall (average mm/year)

iv. Daily non-potable water demand

1.4 Large water consuming installations such as swimming pools and jacuzzis where the water is replaced over a greater time interval do not need to be included as part of the water calculations for 17.K or for the Code. The Code does however assess such fittings as part of Issue Wat 2, External Water Use.

Section 2

2. Calculation tables

2.1 Figures from manufacturer product details should be entered into Table 1 below to calculate the consumption of each fitting in litres per person per day. Where there are multiple fittings of the same type that have various flow rates or capacities (e.g. hot and cold taps with different flow rates), Table 2 should be used to determine the average flow rate or capacity of such fittings. The consumption of water softeners in litres per person per day is calculated using Table 3. All values throughout the Water Efficiency Calculator for new dwellings should be rounded to two decimal places with the exception of the total water consumption figures for 17.K and the Code which should be rounded to one decimal place.

2.2 The total calculated use, resulting from Table 1, is the total consumption of all water consuming fittings per person. To calculate the litres of water consumed per person per day (l/p/d), any savings from grey or rainwater need to be deducted from the total calculated use using figures from tables 4.6 and 5.5. The l/p/d figure is then multiplied by a normalisation factor to determine the total water consumption per person. The resulting figure is used to determine compliance with the Code for Sustainable Homes and 17.K water targets.

2.3 To calculate the total water consumption for 17.K, an additional allowance for external water use is added on to the total water consumption. This figure is set at 5 litres per person per day. The allowance for external water use is only applied to 17.K as external water use is assessed separately in the Code for Sustainable Homes as part of Issue Wat 2, External Water Use.

2.4 The normalisation factor is used to bring the consumption calculated by the Water Efficiency Calculator for new dwellings in line with typical UK water consumption. Typical UK water consumption is 150 litres per person per day. Using typical UK fittings (e.g. a 6 litre WC), the Water Efficiency Calculator for new dwellings calculates typical UK water consumption as 163.5 litres per person per day. The normalisation factor adjusts the water calculator by a factor of 0.91 to bring the calculated use with typical fittings into line with UK consumption. This adjustment aligns predicted average and actual average usage. Please note; the calculator cannot be used to calculate actual use due to the impact of user behaviour.

Table 1: The water calculator for new dwellings

Installation type	**Unit of measure**	**Capacity/ flow rate (1)**	**Use factor (2)**	**Fixed use (litres/ person/ day) (3)**	**Litres/ person/day = [(1) x (2)] + (3) (4)**
WC (single flush)	Flush volume (litres)		4.42	0.00	
WC (dual flush)	Full flush volume (litres)		1.46	0.00	
	Part flush volume (litres)		2.96	0.00	
WCs (multiple fittings)	Average effective flushing volume (litres)		4.42	0.00	
Taps (excluding kitchen/ utility room taps)	Flow rate (litres/minute)		1.58	1.58	
Bath (where shower also present)	Capacity to overflow (litres)		0.11	0.00	
Shower (where bath also present)	Flow rate (litres/minute)		4.37	0.00	
Bath only	Capacity to overflow (litres)		0.50	0.00	
Shower only	Flow rate (litres/minute)		5.60	0.00	
Kitchen/utility room sink taps	Flow rate (litres/minute)		0.44	10.36	
Washing machine	Litres/kg dry load		2.1	0.00	
Dishwasher	Litres/place setting		3.6	0.00	
Waste disposal unit	Litres/use	If present = 1 If absent = 0	3.08	0.00	
Water softener	Litres/person/day		1.00	0.00	
	(5)	**Total calculated use (litres/person/ day) = (Sum column 4)**			

Table 1: The water calculator for new dwellings *(continued)*

Installation type	Unit of measure	Capacity/ flow rate (1)	Use factor (2)	Fixed use (litres/ person/ day) (3)	Litres/ person/day = [(1) x (2)] + (3) (4)
	(6)	Contribution from greywater (litres/person/day) from Table 4.6			
	(7)	Contribution from rainwater (litres/person/day) from Table 5.5			
	(8)	Normalisation factor			0.91
	(9)	Total water consumption (Code for Sustainable Homes) = [(5) – (6) – (7)] x (8) (litres/person/day)			
	(10)	External water use			5.0
	(11)	**Total water consumption (Building Regulation 17.K) = (9) + (10) (litres/person/day)**			

2.5 Consumption from multiple fittings

Where terminal fittings with varying flow rates and capacities are specified (e.g. hot and cold taps with different flow rates, two types of showers etc.), the average consumption should be calculated as set out below in Table 2:

a) Enter the full flow rate or volume of each type of fitting into column (a) of the relevant section of Table 2.

b) For taps, where there are separate hot and cold water taps, the flow rate of each tap should be entered separately as two tap types to calculate the average flow rate.

c) Calculate the total consumption per fitting type.

d) Calculate the average flow rate/volume of the fittings detailed.

e) Enter the flow rate/volume of the fitting with the highest flow rate/volume into box (F) with the exception of WCs, where this step is not relevant.

f) Calculate the proportionate flow rate/volume by multiplying the highest flow rate/volume by a factor of 0.7 with the exception of WCs, where this step is not relevant.

Where the average flow rate/volume is lower than the proportionate flow rate/volume, the proportionate figure must be entered into Table one. The proportionate figure limits the flow rate/volume that can be specified to a proportion equal to 70 per cent of the highest flow rate/volume. This reduces the benefit of specifying ultra low fittings to bring the average flow rate/volume down, where such ultra low fittings may not be acceptable to dwellings occupants.

The figure which is the greater of the average or proportionate flow rate/volume should be used. This is so that, where the average flow rate/volume is significantly lower than the highest flow rate/volume specified, the calculation sets a limitation for what figure can be assumed.

Table 2: Consumption calculator for multiple fittings for new dwellings

2.1 Taps (excluding kitchen sink taps)			
Tap fitting Type	**Flow rate (litres/min) (a)**	**Quantity (No.) (b)**	**Total per fitting type (c) = (a) x (b)**
1			
2			
3			
4			
Total (Sum of all quantities) (d)			
Total (Sum of all totals per fitting type) (e)			
Average flow rate (litres/min) (e)/(d)=			
Maximum flow rate (litres/min) (f)			
Proportionate flow rate (litres/min) [(f) x 0.7]=			

Table 2: Consumption calculator for multiple fittings for new dwellings *(continued)*

2.2 Baths

Bath fitting type	Capacity to overflow (litres) (a)	Quantity (No.) (b)	Total per fitting type (c) = (a) x (b)
1			
2			
3			
4			
Total (Sum of all quantities) (d)			
Total (Sum of all totals per fitting type) (e)			
Average capacity to overflow (e)/(d)=			
Highest capacity to overflow (litres) (f)			
Proportionate capacity to overflow (litres) [(f) x 0.7]=			

2.3 Taps (Kitchen/Utility room sink)

Tap fitting type	Flow rate (litres/min) (a)	Quantity (No.) (b)	Total per fitting type (c) = (a) x (b)
1			
2			
3			
4			
Total (Sum of all quantities) (d)			
Total (Sum of all totals per fitting type) (e)			
Average flow rate (litres/min) (e)/(d)=			
Highest flow rate (litres/min) (f)			
Proportionate flow rate (litres/min) [(f) x 0.7]=			

Table 2: Consumption calculator for multiple fittings for new dwellings *(continued)*

2.4 Dishwashers

Type of dishwasher	Litres per place setting (a)	Quantity (No.) (b)	Total per fitting type (c) = (a) x (b)
1			
2			
3			
4			
Total (Sum of all quantities) (d)			
Total (Sum of all totals per fitting type) (e)			
Average litres per place setting (e)/(d)=			
Highest litres per place setting (f)			
Proportionate litres per place setting [(f) x 0.7]=			

2.5 Washing machines

Type of washing machine	Litres per kg dry load	Quantity (No.) (b)	Total per fitting type (c) = (a) x (b)
1			
2			
3			
4			
Total (Sum of all quantities) (d)			
Total (Sum of all totals per fitting type) (e)			
Average litres per kilogram of dry load (e)/(d)=			
Highest litres per kilogram of dry load (f)			
Proportionate litres per kilogram of dry load [(f) x 0.7]=			

Table 2: Consumption calculator for multiple fittings for new dwellings *(continued)*

2.6 Showers

Shower fitting type	Flow rate (litres/min) (a)	Quantity (No.) (b)	Total per fitting type (c) = (a) x (b)
1			
2			
3			
4			
Total (Sum of all quantities) (d)			
Total (Sum of all totals per fitting type) (e)			
Average flow rate (litres/min) (e)/(d)=			
Highest flow rate (litres/min) (f)			
Proportionate flow rate (litres/min) [(f) x 0.7]=			

Where more than one type of WC is provided, the average effective flushing volume is calculated using the Table 2.7 below. The average effective flush volume should then be entered into Table 1 in the row 'WCs (multiple fittings)'.

2.7 WCs

WC type	Effective flushing volume* (litres) (a)	Quantity (No.) (b)	Total per fitting type (c) = (a) x (b)
1			
2			
3			
4			
Total (Sum of all quantities) (d)			
Total (Sum of all totals per fitting type) (e)			
Average effective flushing volume (litres) (e)/(d)=			

* The effective flushing volume for dual flush WCs is calculated as follows.
= (Full flushing volume (litres) x 0.33) + (part flushing volume (litres) x 0.67)

2.6 Ion exchange water softener

Ion exchange water softeners use water in order to clean the resin that is used to absorb the mineral content of the dwellings water supply. This cleaning process is referred to as the regeneration cycle which occurs on a frequency dependent on the type of water softener specified and the hardness of the water. The water calculator looks at the water consumed per regeneration cycle that is beyond a level of good practice. The good practice level has been determined at a level of water consumption as a percentage of the water softeners total capacity which is set at 4 per cent.

The figure entered into the calculator is the volume of water consumed beyond this level of good practice to promote the use of more efficient water softeners. Where the water softener achieves a percentage that is equal to, or lower than this good practice benchmark figure, zero can be entered into Table 1 of the calculator for water softeners. The following formula is used to determine the litres of water consumed per person per day that is beyond the good practice level of 4 per cent.

Litres of water consumed per person per day beyond the 4 per cent good practice level:

$$= [1 - (4/(a))] \times ((b) \times (c))$$

(a) = % of total capacity* used per regeneration

(b) = Litres of water consumed per regeneration

(c) = Average number of regeneration cycles per day

*the total capacity is the volume of water that flows through the water softener between regeneration cycles. This volume is dependent on the hardness of the water and the total capacity used in this calculation needs to reflect the hardness of water specific to the geographic location of the specific development. This figure should be determined from manufacturer's product details.

To calculate the litres of water consumed per person per day beyond the 4 per cent good practice level, enter details of the water softener into Table 3 below. Where the result indicates zero or a negative figure, zero should be entered into Table 1 for water softeners. The number of occupants entered into the table should be based on two in the first bedroom and one in each additional room. Studio flats should be measured for two occupants.

Table 3: The water softener consumption calculation for new dwellings		
Total capacity used per regeneration (%)	**(a)**	
Water consumed per regeneration (litres)	**(b)**	
Average number of regeneration cycles per day (No.)	**(c)**	
Number of occupants served by the system (No.)	**(d)**	
Water consumed beyond 4% (litres/day) [1-[4/(a)]] x [(b) x (c)] = (e)		
Water consumed beyond 4% (litres/person/day)	**[(e)/(d)] =**	

2.7 Greywater calculations

2.7.1 Greywater demand calculation

Where all WCs and/or washing machines are being supplied with greywater, the consumption values should be copied from Column 4 of Table 1 and entered into Table 4.6 to calculate the greywater savings.

Where greywater is only being supplied to a proportion of fittings such as just to one WC or washing machine, the proportion is calculated by entering details into Tables 4.1 and 4.2 below.

Table 4.1: The greywater demand calculations for new dwellings – WCs

Effective flushing volume (litres) (a)	**Number of fittings present (b)**	**Quantity using greywater (c)**	**Greywater demand (d) = (a) x (c)**
Total fittings consumption (e) = Sum of (b)		Total Greywater demand (f) = Sum of (d)	
Average greywater demand from WCs		$= \frac{(f)}{(e)} \times 4.42$	

Table 4.2: The greywater demand calculations for new dwellings – washing machines

Litres per kg (a)	**Number of fittings present (b)**	**Quantity using greywater (c)**	**Greywater demand (d) = (a) x (c)**
Total fittings consumption(e) = Sum of (b)		Total Greywater demand (f) = Sum of (d)	
Average greywater demand from washing machines		$= \frac{(f)}{(e)} \times 2.1$	

2.7.2 Greywater supply calculations

Where greywater is to be collected from all fittings including the shower, bath and wash hand basin taps, the total water consumption of the fittings calculated in Table 1 represents the total greywater collected, the sum of the consumption figures for fittings from which greywater is collected (from column 4 of Table 1) should be entered into Table 4.6. Where greywater is only being collected from a proportion of fittings, such as just some of the taps, the following calculation should be followed which should then be entered into Table 4.6.

Table 4.3: The greywater collection calculations for new dwellings – taps

Litres per minute (a)	**Number of fittings present (b)**	**Quantity using greywater (c)**	**Greywater supply (d) = (a) x (c)**
Total fittings consumption (e) = Sum of (b)		Total greywater demand (f) = Sum of (d)	
Average greywater supply from taps		$= \left[\frac{(f)}{(e)} \right] \times 1.58 + 1.58$	

Table 4.4: The greywater collection calculations for new dwellings – showers

Litres per minute (a)	**Number of fittings present (b)**	**Quantity using greywater (c)**	**Greywater supply (d) = (a) x (c)**
Total fittings consumption(e) = Sum of (b)		Total greywater demand (f) = Sum of (d)	
Average greywater supply from showers (where bath present)		$= \frac{(f)}{(e)} \times 4.37$	
Average greywater supply from showers (shower only)		$= \frac{(f)}{(e)} \times 5.60$	

Table 4.5: The greywater collection calculations for new dwellings – baths

Litres per minute (a)	Number of fittings present (b)	Quantity using greywater (c)	Greywater supply (d) = (a) x (c)
Total fittings consumption(e) = Sum of (b)		Total greywater demand (f) = Sum of (d)	
Average greywater supply from baths (where shower present)		$= \frac{(f)}{(e)} \times 0.11$	
Average greywater supply from baths (bath only)		$= \frac{(f)}{(e)} \times 0.50$	

2.7.3 Greywater savings

Where greywater is to be reused within the dwelling, the savings from greywater can be calculated by entering the following details into Table 4.6 below:

a) Calculate the water to be recycled from Table 1 and/or using the method set out in section 2.7.2 where just a proportion of fittings are being collected from.

b) Determine the percentage of greywater collected to be recycled based upon manufacturers or system designer details of the system specified.

c) Determine the water demand of the fittings to be provided with greywater which can include WCs and washing machines depending on the quality of the treated water. This is determined from the WC and washing machine consumption from Table 1 or Tables 4.1 and 4.2 in section 7.2.1.

d) Multiply the volume of water to be recycled with the percentage of recycled water (determined in b. above) which will determine the actual volume of greywater available. Where the greywater supply is greater than the demand, the greywater savings are equal to the demand. Where the demand is greater than the greywater supply, the savings are equal to the supply.

e) Enter the greywater saving figure from Table 4.6 into Table 1.

Table 4.6: The greywater collection calculation for new dwellings				
Bath, shower and wash hand basin usage (litres/person/ day)	**Percentage of used water (a) to be recycled (%)**	**Greywater available for use (litres/ person/day)**	**Greywater demand (litres/ person/ day)**	**Greywater savings (litres/person/ day)**
		(c) = (a) x [(b)/100]	**(from Table 1 or 4.2 and 4.3)**	Where (c) is greater than (d), (e) = (d), otherwise (e) = (c)
(a)	**(b)**	**(c)**	**(d)**	**(e)**

Where a communal greywater system is to be provided supplying more than one home, Tables 4.1 – 4.5, can be used in the same way. The figures entered into Table 4.6 need to be entered on an individual dwelling basis and not using figures to reflect the communal system as a whole. The percentage collected figure will, however, need to be based on manufacturer or system designer details of the communal system specified.

2.8 Rainwater calculations

2.8.1 Rainwater collection volume

Where rainwater is to be used, the following calculation method should be followed entering the relevant details into Table 5.1 or Table 5.2 below to calculate the rainwater collection volume.

For Table 5.1 using the Intermediate approach from BS8515:

a) Calculate the volume of water collected using the collection area, yield coefficient and hydraulic filter efficiency and average rainfall with guidance from BS8515:2009.

b) Calculate the daily rainwater collection per person in box (d) by entering the collection area, yield co-efficient, hydraulic filter efficiency and rainfall and calculating as set out below.

c) Enter the number of occupants into box (e) which can be based on two occupants in the first bedroom and one occupant in each additional bedroom. A studio flat should be measured for two occupants.

d) Where a communal rainwater system is to be provided supplying more than one home, Table 5.1 can be used in the same way calculating the total volume collected for the communal system and dividing it by the total number of occupants served by the system. This figure should then be entered in Table 5.5.

Table 5.1: The rainwater collection calculation for new dwellings – BS8515 Intermediate approach		
Collection area (m^2)	**(a)**	
Yield co-efficient and hydraulic filter efficiency e.g. 0.7	**(b)**	
Rainfall (average mm/year)	**(c)**	
Daily rainwater collection (litres)	**[(a) x (b) x (c)]/365 = (d)**	
Number of occupants	**(e)**	
Daily rainwater per person (litres)	$\frac{(d)}{(e)} = (f)$	

For Table 5.2 using the detailed approach as described in BS8515, enter details of the total daily rainwater collection (litres) and the number of occupants to calculate the daily rainwater per person (litres) and enter into the following table:

Table 5.2: The rainwater collection calculation for new dwellings – BS8515 Detailed approach		
Daily rainwater collection (litres)	**(a)**	
Number of occupants	**(b)**	
Daily rainwater per person (litres)	$\frac{(a)}{(b)} = (c)$	

The calculation detailed above in Table 5.2 is sufficient for evaluating the principles of the proposed system in the proposed development however, for sizing of storage capacity and all other design and installation details, BS8515 should be followed.

2.8.2 Rainwater demand calculations

Where all WCs and/or washing machines are being supplied with rainwater, the consumption should be taken from Table 1 and entered into Table 5.5 to calculate the rainwater savings.

Where rainwater is only being supplied to a proportion of fittings such as just to one WC or washing machine, the proportion is calculated using Table 5.3 and 5.4. This rainwater demand can then be entered into Table 5.5 to calculate the rainwater savings.

Table 5.3: The rainwater demand calculations for new dwellings – WCs

Effective flushing volume (litres) (a)	**Number of fittings present (b)**	**Quantity using rainwater (c)**	**Rainwater demand (d) = [(a)] x (c) (b)**
Total fittings consumption (e) = Sum of (b)		Total Rainwater demand (f) = Sum of (d)	
Average rainwater demand from WCs		$= \frac{(f)}{(e)} \times 4.42$	

Table 5.4: The rainwater demand calculations for new dwellings – washing machines

Litres per kg (a)	**Number of fittings present (b)**	**Quantity using rainwater (c)**	**Rainwater demand (d) = (a) x (c)**
Total fittings consumption (e) = Sum of (b)		Total Rainwater demand (f) = Sum of (d)	
Average rainwater demand from washing machines		$= \frac{(f)}{(e)} \times 2.1$	

2.8.3 Rainwater saving calculations

Enter the total volume of rainwater collected per person per day from Table 5.1 or Table 5.2 depending on the BS8515 approach followed. Enter the total consumption of fittings using rainwater (demand) from column 4 of Table 1, where rainwater is to be used in all WCs and/or washing machines. Where rainwater is only being used in a proportion of fittings, enter the total demand of WCs and washing machines from Table 5.3 and Table 5.4. This figure should then be entered into Table 1 to calculate the internal water consumption.

Table 5.5: Rainwater saving calculations for new dwellings

	Litres per person per day
Rainwater collected (a)	
Rainwater demand (b)	
Rainwater savings* (c) = (a)/(b) * (b)	

**where the amount collected (a) is greater than the demand (b), the rainwater savings (c) are equal to the demand (b)*

Section 3

References

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