

## **APPENDIX A2: CALCULATION OF THE VOLUME OF YOUR RAINWATER TANK, ACCORDING TO THE USE OF RAINWATER**

In this document you can calculate the volume of your rainwater tank in according to the use of rainwater.

The average use of rainwater per person per day is:

Toilettes:	43 liter =	36 %
Bath/shower:	39 liter =	33 %
Washing:	16 liter =	13 %
Dishwasher:	8 liter =	7 %
Cleaning:	5 liter =	4 %
Garden:	5 liter =	4 %
Drinking and cooking:	3 liter =	3 %

The largest use of tap water are the toilettes, an can be perfectly replaced by rainwater.

Here you find the calculation of how big your tank should be.

### Calculation of the roof surface

- The horizontal roof surface in m<sup>2</sup> = A
- The correction for the inclination and orientation\* x roof cover\*\* x filter\*\*\* = B
- Corrected surface in m<sup>2</sup> = A x B = C

\* Inclination:

Inclination	North east	North west	South west	South east
30 °	0,75	1	1,25	1
35 °	0,70	1	1,30	1
40 °	0,64	1	1,36	1
45 °	0,57	1	1,43	1
50 °	0,48	1	1,52	1
> 55°	0,45	1	1,55	1

\*\* Roof cover:

Type of roof	coefficient
Flat roof with gravel	0,60
Flat roof with bitumen	0,70 tot 0,80
Flat roof with slates or pans	0,75 tot 0,90
Inclination roof with slates or pans	0,90 tot 0,95
Inclination roof with glazed pans	0,90 tot 0,95
Inclination roof with bitumen	0,80 tot 0,95

\*\*\* Filter:

For the filter you have to calculate the loss. For a self-cleaning filter is this 0,90 and for a cyclone filter 0,95.

The average rainfall is 800 mm/m<sup>2</sup>/year. This is equal to 800 l/m<sup>2</sup>/year. Multiply this by C, and you have the average amount of rainwater entering in the tank.

Example:

The horizontal roof surface of 200 m<sup>2</sup>, so A = 200  
 A roof of 45° direction north east, covered with slates, and a self cleaning filter =  
 $0,57 \times 0,90 \times 0,90 = 46,17$  so B = 0,4617

Corrected surface =  $A \times B = 200 \times 0,4617 = 92,34$  so C = 92,34  
 $92,34 \text{ m}^2 \times 800 \text{ l/m}^2/\text{j} = 73.872 \text{ l/j}$

Calculation of water usage

Consumption post	Usage/person/day	Number of persons	Usage = liter x persons
Toilettes	43 liter	(ex 4)	(= 172)
Washing	16 liter		
Cleaning	5 liter		
Garden	5 liter	(ex 4)	(= 20)
Total usage for the family per day			(= 192)
Total usage per year (x 365)			(= 70.080)

Determination of the volume of the tank

Calculate the average of the volume of rainwater entering the tank and the volume needed.  
 Example  $(73.872 + 70.080)/2 = 71.976$

Multiply by 0,058 (is 21 days reserve divided by 365 days)  
 $71.976 \times 0,058 = 4.175$  liter. This is the minimum volume of the tank.

Savings to tap water

Multiply the total usage of rainwater per day in m<sup>3</sup> (in our example 70,08 m<sup>3</sup>) with the price per m<sup>3</sup> of tap water.