4 WATER [W]

4.1 GENERAL

4.1.1 Scope

1 The Water category consists of factors associated with water consumption and its associated burden on municipal supply and treatment systems.

(a) Impacts: Environmental impacts resulting from water consumption and unsustainable practices include:

(i) Water depletion

(b) Mitigate Impact: Factors that could mitigate environmental impact and lower demand on water include:

(i) Specifying efficient plumbing fixtures

(ii) Creating a system for the collection and storage of rainwater

(iii) On-site treatment of water for later reuse

(iv) Designing a landscaping plan that minimizes the need for irrigation.

The recommended criteria is Water Performance Coefficient (WPC) [W.1]

4.1.2 Reference

1 The following documents are referred to in this section:

Global Sustainability Assessment System (GSAS) - V2.1 2013, International Mechanical Code, IMC 2015, KAHRAMMAA Energy and Water Conservation Code 2016.

4.2 WATER CONSUMPTION [W]

4.2.1 Scope

1 The Water consumption will be measured for the following categories of buildings listed in table 1:

Table 1: Building Typologies

Commercial
Governmental
Education
Mosques & other religious buildings
Light Industry
Health Centres
Railways Buildings
Sports

4.2.2 Description

1 Minimize water consumption in order to reduce the burden on municipal supply and treatment systems.

4.2.3 Measurement Principle

1 The Engineer shall demonstrate conservation in the use of water in relation to the baseline and targets outlined in the Water Consumption Calculator.

4.2.4 Measurement (WPC)

1 The Engineer shall determine cumulative water consumption [Water Performance Coefficient (WPC)] using the Water Consumption Calculator. Cumulative water consumption is determined by several input parameters including:

(a) The project site area and the number of full time staff, students, or residents and visitors occupying the building

(b) Specifications for plumbing fixtures

(c) Landscaping and irrigation plan

(d) Rain and storm water collection and reuse plan

(e) Grey and black water treatment and reuse plan

2 Based on input parameters provided by the project, the application conducts multiple calculations to determine the building's estimated water consumption. Three estimated calculation values, Water Consumption for occupants ($WC_{cal\_occupant}$), Water Consumption for irrigation ($WC_{cal\_irrigation}$), Water Supply from reuse strategies (WS_{cal_reuse}) are computed by the calculator. The annual net water demand is calculated by subtracting water supply (WS_{cal_reuse}) from the summation of water consumptions ($WC_{cal\_occupant}$ + $WC_{cal\_irrigation}$). Then, the net water demand is compared against the summation of the two reference water consumption values ($WC_{ref\_occupant}$ + $WC_{ref\_irrigation}$) to generate the Water Performance Coefficient (WPC).

$$WPC = \frac{WC_{cal\_occupant} + WC_{cal\_irrigation} - WS_{cal\_reuse}}{WC_{ref\_occupant} + WC_{ref\_irrigation}}$$

3 For each building type, the equations to calculate reference values apply to all buildings regardless of operating duration, occupancy density and site area. A different reference value will be calculated for project buildings with varying site and operational characteristics, and the resulting WPC will therefore be applicable across the entire spectrum of each building type.

(a) The Referenced Water Consumption for Occupants is:

$WC_{ref\_occupant}$ = A x Operating Hours x Occupants

Where:

Operating Hours = 8 (hours per day) x 20 (days per month) x 12 (months per year)

Occupants = The total number of full time employees per day + the total number of visitors per day

(b) The Referenced Water Consumption for irrigation is:

$WC_{ref.,irrigation}$ = B x 365 (days per year) x 24 (hours per day) x Site Area (m^2)

Reference values A and B can be found for the different typologies in the following table:

Table 2: Reference values A and B

	A	B
Commercial & Governmental	0.006519	0.000034
Education	0.008423	0.000001
Mosques & other religious buildings	0.003888	0.000002
Light Industry	0.005355	0.000004
Sports	N/A	N/A

These typologies have multiple occupant reference values which are listed in further detail in the following sections.

4 Education

(a) Additional input parameters required:

(b) Number of staff and students occupying the building

5 Mosques:

Additional input parameters required:

* Number of worshippers visiting the mosque, both on a daily basis and during times of full occupancy.

(a) The Referenced Water Consumption for Occupants is:

$WC_{ref\_occupant}$ = A× No. Operating Hours_d × No.Occupants_d) + (No. Operating Hours_f x No. Occupants_f)

Notes:

(i) Where 'No.Occupants_d' is the number of daily worshippers, 'No.Occupants_f' is the number of occupants during full occupancy.

(ii) 'No.Operating Hours_d' are normalized as 6 (hours per day) x 30 (days per month) x 12 (months per year)

(iii) 'No.Operating Hours_f' are normalized as 2 (hours per day) x 30 (days of Ramadan) + 52 (Friday prayers per year)

6 Light Industry

Additional input parameters required:
Number of full time employees and visitors occupying the building

4.2.5 Score*

The minimum Requirement values by QCS for Water Performance Coefficient shall be:

Note : (*) minimum QCS's requirements unless other values specified by the relevant authority

1 COMMERCIAL & GOVERNMENTAL

Table 3: minimum score for commercial Typology

WPC(X) Value	0.87 < X ≤ 1.0

2 EDUCATION

Table 4: minimum score for Education Typology

WPC(X)	0.85 < X ≤ 1.0

3 MOSQUES

Table 5: minimum score for Mosques Typology

WPC(X)	0.89 < X ≤ 1.0

4 LIGHT INDUSTRIES

Table 6: minimum score for Light Industry Typology

WPC(X)	0.84 < X ≤ 1.0

5 HEALTH CENTRES

Table 7: minimum score for Health Centres Typology

WPC(X)	0.84 < X ≤ 1.0

6 RAILWAY TEMINALS

Table 8: minimum score for Railways Typology

WPC(X)	0.84 < X ≤ 1.0

7 SPORTS FACILITIES

Table 9: minimum score for Sports Typology

WPC(X)	0.0 ≤ X < 0.5

END OF PART