EWP - Water (Potable)

SCORE POTENTIAL **1-10**

AIM OF CREDIT

To recognise efficient potable water use associated with building operations thus reducing the burden on potable water supply and wastewater systems.

CREDIT CRITERIA

Potable Water Performance	A score of 1-10 may be awarded for percentage improvements in water efficiency compared to benchmarks.

Performance period
Performance period relates to the continuous time period during which a credit is measured or data is collected. For Energy Water Performance (EWP) certification, the performance period is the most recent 12-month period of operations preceding the submission for certification.

The end of the performance period data set should not be older than 3 months at the time of submission.

Note: The energy and water data need not be from the exact same period, provided the point above applies.

Collect metered water consumption data for the last 12 months of the building's operation.
Water consumption data for the past 12 months must have been collected in order to demonstrate compliance with the credit criteria. This data will be used to measure against benchmarks, for which points will be awarded.

Sources of acceptable data

- Water consumption data collected for the building must be verifiable with sources such as Municipal accounts, or
- Metering data signed off by independent metering contractor, or
- Metering data signed off by Facilities Manager if monitored in-house

Collected water data must cover the water use associated with the whole building. If there are any missing accounts or data points, the missing data point may be interpolated for completeness, using the average of the known information except when the missing data point is the first one or the last one of a series. A maximum of 3 months in the 12 month period may be interpolated.

Water use must include all building water consumption; this could include but not be limited to:

- Occupant amenity water (toilets, kitchenettes, etc.)
- Heat rejection water (cooling towers / evaporative cooling)
- Outdoor taps, wash-down areas, etc.
- Tenant consumption (restaurant kitchens etc.)
- Irrigation of landscaping serving the building being certified
- Pools, water features, etc. servicing the building
- Sports field irrigation only if the building being certified services the said sportsfield

'Water' refers to potable water servicing the building from municipal sources. Recycled / reused water and rainwater must not be included in the metered water consumption for this credit. Borehole Water used for anything other than irrigation is not considered to be a sustainable water source for the purposes of this credit and as such it must be included in the metered water consumption.

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Municipal Accounts
Data from utility accounts (as opposed to metered data) will only be accepted if no more than 3 months of data in the 12 month period is estimated.

Compliance Path
For the purposes of this certification, there is only one option for Compliance Path.

EWP COMPLIANCE PATH: GBCSA EWP WATER BENCHMARKING TOOL (office buildings):

EWP is the GBCSA's Energy Water Benchmarking Tool which can be accessed on the GBCSA's website (https://www.gbcsa.org.za/other-tools/energy-water-benchmark/).

The EWP Tool caters currently for office buildings only and, this tool must be used to benchmark your office building's performance.

The building is positioned on a 10 level scale based on its performance relative to the benchmark. The level achieved in the benchmarking tool is then translated into the number of points scored under this credit (out of 12). The points are only relevant when pursuing a Green Star SA – Existing Building Performance rating.

The output from in the "water results" tab of the EWP Tool will indicate the score from 1-10 under the EWP tool and the number of points available when targeting a Green Star SA – Existing Building Performance rating.

If the building is part of an office park or precinct and its landscape is irrigated through a shared irrigation system, then the water consumption portion for the irrigation can be adjusted on a pro rata basis according to the GLA of the building compared to the total GLA off all buildings part of the office park. If an alternative approach to apportionment is proposed, this must be submitted as an alternative for approval to the GBCSA prior to submission for certification.

To summarise, for EWP Compliance Path, the following procedure must be followed:

1. Collect 12 months of water consumption data
2. Benchmark office building using the EWP Tool (ensure that detailed inputs are completed, accounting for vacancy)

EWP Compliance Path Resources:

Resource	Description	Location
EWP Tool	Use to benchmark building performance	http://www.gbcsa.org.za/other-tools/energy-water-benchmark/
EWP Submission Templates (Energy & Water)	Use to submit project on Certification Engine	Certification Engine
EWP Technical Document	Provide details on how to tackle EWP Tool	This document.
EWP Guidelines	Provide additional guidance / details on how to use benchmarking tool	http://www.gbcsa.org.za/other-tools/energy-water-benchmark/

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EWP COMPLIANCE PATH POINTS:

For projects that follow through with a Green Star SA – Existing Building Performance rating, points are available from a EWP Benchmarking score of 5 and up. The table below illustrates how points are awarded based on % improvement on a EWP Benchmarking score of 5.5.

% Improvement over EWP score 5.5	WAT-1 Points
-12,0%	0,5
-7,1%	1
-2,3%	1,5
2,6%	2
7,5%	2,5
12,3%	3
17,2%	3,5
22,1%	4
26,9%	4,5
31,8%	5
36,7%	5,5
41,5%	6
46,4%	6,5
51,2%	7
56,1%	7,5
61,0%	8
65,8%	8,5
70,7%	9
75,6%	9,5
80,4%	10
85,3%	10,5
90,2%	11
95,0%	11,5
100,0%	12

DOCUMENTATION REQUIREMENTS / EVIDENCE

Submit all evidence and ensure it readily confirms compliance; also complete online submission template/check list. Applicants must provide all documentation that supports their claims and calculations.

Criteria	Documentation
All	Completed Submission Template
EWP Compliance Path	• **Completed GBCSA 'EWP' Tool** Benchmarking Calculator (Offices) ○ Detailed input page to be completed and vacancies to be accounted for. • **12 consecutive months of water consumption data** (utility bills or meter readings signed off by contractor or facilities person responsible for meter readings)

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Submit all evidence in the GENERAL folder and ensure it readily confirms compliance. Applicants must provide all documentation that supports their claims and calculations.

The following evidence is required in the General Folder to be assessed by Assessors: Energy Variance Factors such as:

Criteria	Documentation
Confirmation of building area (GLA)	• **Statement of confirmation** from the Building Owner Representative
Confirmation of number of occupants	• **Statement of confirmation** from the Building Owner Representative
Confirmation of occupancy hours	• **Statement of confirmation** from the Building Owner Representative
Confirmation of building address (linked to postal code)	• **Statement of confirmation** from the Building Owner Representative

ADDITIONAL GUIDANCE / RESOURCES

Water consumption reduction

To ensure optimum water use efficiency the following aspects can be considered.

a. Analyze water consumption
   - Water account structuring
   - Staff encouragement and possible incentive programme to ensure responsible water use behavior
   - Water leak detection
   - Water meter / sub meter installations
   - Load investigation / record keeping
   - Low pressure regulators

b. Reduce water consumption by installing:
   - Low flow shower heads and taps
   - Low flush or waterless toilets
   - Moisture sensor irrigation
   - Water saving appliances
   - Dual water systems

c. Re-use by installing:
   - Irrigation integration
   - Grey water collection
   - Rain water collection
   - Mechanical water use
   - Fire system water use

d. Recycle by installing
   - Black water recycling
   - Grey water recycling

- Irrigation water recycling
- Condensation recovery
- Non-potable water use

e. Monitor by implementing:
   - Education programmes
   - Water reduction strategies
   - Development of strategies
   - On site specific water balance
   - Assess local authorities

Example of Simplified Normalising Method
Scaling factors are often employed to normalize variables to allow direct comparison between the baseline data and data of the building being rated. The typical formula for calculating scaling factors is shown below.

$$\textbf{Scaling factor}_{\textbf{Variable}} = \frac{\textbf{Value for Operating Variable for building to be rated}}{\textbf{Value for Operating Variable for Benchmark Buildings}}$$

Example – Operating hours
Benchmark Buildings = 80 hours

Building being rated = 85 hours

The calculation of scaling factor for Operating Hours will be:

$$\textbf{Scaling factor}_{\textbf{Operating Hours}} = \frac{\textbf{85}}{\textbf{80}} = \textbf{1.0625}$$

This scaling factor can then be multiplied (or divided, depending on the application) to the comparison values to adjust it for comparison purposes. In some cases, the scaling factor will be applied to a portion (percentage) of the result due to the fact that the factor does not influence the total water consumptions but only a portion. When this is applied, the logical methodology of why the scaling factor is applied to a certain percentage of the result is required.

It is understood that not all factors have a linear relationship with performance, but this simplified method is acceptable for the purpose of this tool.

BACKGROUND

Water is essential for life. In a lot of cases this water is used unconsciously and unnecessarily. In a water scarce country this is going to weight heavy on the future. The saving and conservation of water is therefore essential.

Rainwater, Grey water & Blackwater
Collecting rainwater from roofs and other impervious surfaces can add to the amount of sustainable water available for use in buildings. Retail centres with large roof areas are particularly well suited for rainwater collection.
Grey water can be recovered from sinks and showers, washing machines, cooling towers and other water sources that do not contain food or human waste. This water can be stored for irrigation and toilet flushing but needs to be used within a short period following collection to avoid having extensive

treatment requirements. In locations where on-site black water treatment is generally not permitted, projects should consider contacting local authorities to discuss the benefits of on-site water treatment for the project and local infrastructure.

Water Efficiency Labelling Scheme

The South African Government, through the Department of Water Affairs (DWA), is currently working with the South African National Standards to introduce the Water Efficiency Labelling and Standards (WELS) Scheme that involves the introduction of national mandatory water efficiency labelling and minimum performance standards for domestic water-using devices.

Landscaping Water Efficiency

Potable water demand can be reduced through the installation of water-efficient irrigation systems (such as sub-soil or drip irrigation) or through the use of sustainable water for landscape irrigation.

A 'xeriscape garden' is defined as a water-conserving garden, or garden requiring no additional watering. Where a 'xeriscape garden' has been installed, provisions must be made to remove any irrigation system within twelve months and ensure that the landscape will not receive watering after that time. Evidence will include, but will not be limited to, a report from the landscape architect confirming why the design can be classified as 'xeriscape'.

Heat Rejection

The use of water based heat rejection systems that consume huge amounts of water through cooling towers is wide spread because of the high Water efficiency of such systems.

Minimising or eliminating the use of potable water in heat rejection systems or completely eliminating the need for mechanical cooling in buildings can achieve significant savings in both Water and water. The use of non-chemical dosing (such as ionisation, UV treatment, etc.) can save water by avoiding more frequent flushing of cooling tower water systems.

Laundry Equipment

The typical laundry utilises a washer technology called washer-extractors. This type of machine ranges in size from about 16 kg up to 1 766 kg in the largest laundries. The name washer-extractor is used because after each portion of the wash cycle (soak, suds, pre-wash, wash, rinse, or finish) an extraction imparting centrifugal force removes the water and detergent contents from the wash wheel to the drain. Other equipment found in large industrial laundries are tunnel washers (or continuous batch washers), which is an industrial laundry machine designed for heavy loads. Tunnel washers are inherently water-efficient; water is used several times before being sent to the drain. Average water consumption of this type of equipment is 16 litres per kilogram of laundry, which is 2/3 of the typical washer extractor.

Water recycling in laundry processes can be done quite easily. The last rinse water used in an industrial washer can be reused as a pre-wash for the next wash cycle. Larger commercial and industrial laundries have been utilising this technology for decades. For smaller laundries it is not common practice due to the high upfront cost. However in recent year, washing machine manufacturers have been designing systems that are less expensive and require less space.

Most commercial washer-extractors can be retrofitted with a tank to save the final rinse water, which can then be reused as pre-wash in the next load. It is possible to cut the potable water consumption by 30% by reusing water from the final rinse cycle for the next load.

Large Kitchens

Inefficient use of water in kitchen operations is usually a result of equipment design and/or behavioural patterns. The main types of water using equipment found in kitchens are dishwashers, sinks, woks, steamers, pre-wash spray rinse units, ice-making machines and garbage disposal units.

Dishwashers

Substantial savings can be made with a new dishwasher; newer models use less water, also different type of dishwashers has different flow rates. Below are the most common ones with their average water consumption.

Type	Description	Litres per rack
Under counter	A machine with an overall height of 1 meter or less, in which a rack of dishes remains stationary within the machine while being subjected to sequential wash and rinse sprays, and is designed to be installed under food preparation workspaces.	13 ltr/rack
Single Tank Door	A machine in which a rack of dishes remains stationary within the machine while subjected to sequential wash and rinse sprays. This definition also applies to machines in which the rack revolves on an axis during the wash and rinse cycles.	8.4 ltr/rack
Tank conveyor	A washing machine that employs a conveyor or similar mechanism to carry dishes through a series of wash and rinse sprays within the machine. Specifically, a single tank conveyor machine has a tank for wash water followed by a final sanitizing rinse and does not have a pumped rinse tank.	6.0 ltr/rack
Multiple Tank conveyor	A conveyor type machine that has one or more tanks for wash water and one or more tanks for pumped rinse water, followed by a final sanitizing rinse.	4.1 litre/rack

Source:

http://www.Waterstar.gov/index.cfm?c=comm_dishwashers.pr_crit_comm_dishwashers

(See Table: WAT-1.1: Description of types of dishwashers.)

Commercial Car Wash Facility

Commercial Car Wash Facilities use large amounts of water. The amount of potable water to wash cars varies depending on the method used from bucket and hand wash to open hose spray and industrial high pressure conveyor carwash system.

One of the largest car rental companies of South Africa has invested in reducing and recycling the water used to wash the vehicles. They procured a conveyor bay type of wash system which washes a car within 45 seconds. It further included the construction of underground water filtration and recycling facilities that filters the waste water and reuses it in the wash cycle. Rainwater is also collected and used for car washing. Potable water is only used for the final rise, minimising potable water use to the bare minimum. All interventions saved the company approximately 100 million litres of water annually.

Laboratories

In meeting their large cooling and process water demands, most laboratories use significantly more water per square metre than standard commercial buildings (US EPA, 2005). As an example, the Australian National University has estimated that 45% of the 750 million litres of water used annually are consumed in its laboratories, compared to 25% used in accommodation and 15% in irrigation (ANU,

2008). This demand arises from space cooling requirements, water used in the activity of the laboratory and equipment cooling (the focus of this credit).
Single-pass or once-through systems are commonly used to cool a broad range of scientific and medical equipment from CAT scanners to mass spectrometers. These systems circulate water, typically directly from the public water supply, once through the piece of equipment and then discharges directly to the sewer. These systems are the most water intensive cooling methods used in laboratories; consuming approximately 40 times the water required by cooling towers to remove the same heat load (US

Source: GREEN STAR SA – PUBLIC & EDUCATION BUILDING v1 2013 TECHNICAL MANUAL

REFERENCES

GBSA benchmarking tool
The GBCSA's Water & Water Benchmarking Tool for office buildings (currently in PILOT) for the building type. See **http://www.gbcsa.org.za/other-tools/Water-water-benchmark/**

Water Efficiency Guide: office and public buildings, Australian Government, Department of The Environment and Heritage, 2006, ISBN 06425 52878

Best Practice – How to achieve the most efficient use of water in commercial food service facilities. **www.Waterstar.com**

South African Weather Service. www.weathersa.co.za

South Africa Department of Water Affairs. www.dwa.gov.za

Water Efficiency South Africa. www.waterefficiency.co.za

TECHNICAL CLARIFICATIONS AND ERRATUM

There are currently no Technical Clarifications or Errata issued for this credit.