Technical Guidelines for Internal Plumbing Water Systems

Individual meter for each unit
Introduction:

The Electricity & Water Authority (EWA) is investing significant amounts of money as it strives to provide good quality water to all users in the Kingdom, both commercial and residential. On the other hand, the EWA is keen to preserve the national water resources by endeavoring to educate the public, in order to change behavior, through various continuous conservational & educational programs & campaigns. Furthermore the EWA regulates the usage of the water resources through the issuing of water regulations, which contribute to conserving and protecting of water from waste, contamination and misuse.

In view of this, the EWA has issued a comprehensive water regulations which contain rules, procedures and detailed measurements for domestic plumbing systems. Engineering/Consultant Offices will take the responsibility for the implementation of water regulations, particularly during the design stage and also during the execution of the projects.

This handbook of technical guidelines for internal plumbing water systems summarizes the most important points that are included in the water regulations.
1- **Water Connection Sizes:**

- The EWA will provide a suitable sizes of water connection for domestic, industrial & commercial customers, based on their requirement.

2- **Storage:**

- A main ground storage tank must be provided on the ground level and its inlet connection must not exceed a height of one meter, in order to ensure a continuous flow even during the restrictions periods or emergency maintenance of the main production plants.
- The distance between water meter and ground tank should not exceed 30 meters.
- Total storage capacity of ground and roof tanks should not be less than one-day consumption of the premises.
- It is preferable that all storage tanks should be white colour and shaded from sun rays.
- If the water requirement for the garden is more than 1 cubic meter a day, it is advisable to install a separate irrigation tank connected directly to the EWA supply line. The inlet pipe should be higher than the main domestic tank.

3- **Plumbing works:**

New constructions or major renovation projects, plumbing materials must comply with the relevant B.S. standards or its equivalents.
- When using rigid pipes such as copper, it have to be visible or run through channels for detecting water leaks or replacement or maintenance works and are not allowed to be buried or concealed. Only those which have a guaranteed life of 35 years can be buried.
- When using non-rigid pipes and inconspicuous, it has to be run through sleeves with inspection chambers to facilitate discovering the water leaks and replacing all the damaged pipes.
- Protection from direct sun rays should be provided, e.g. by sleeves, shade, insulations or white paint on external water pipes.
- It is advisable that all internal distribution should be by gravity flow with multiples outlets supply system.
- Over flow pipes should not be connected to the drainage and should be in conspicuous position where the discharge of water can be readily seen or noticed.
- As much as is practicable, minimize length of pipe from the water heaters to the taps.
- Internal supply system must be fed from water tanks. No draw off tap or directly supply from the direct line.
- The internal piping network must be hydraulically-tested for 24 hours under 10 Bars before use, in order to locate any expected water leakages.
- Control valves must be installed on all lines supplying all the utilities of the premises.
Proper Internal Domestic Connections

Provide shades for the ground and roof water tanks.

Minimize length of the pipe from the water heaters to the mixer taps.

Flush tank not exceed 6 litres.

Separate roof tanks with direct lines from the meter for garden.

Not exceed one meter above ground level.

Pumping is after the ground storage tank.

Use saving devices (aerators) for taps.

Drip irrigation system with timers.

The size of the garden tap should be \( \frac{1}{4} \)" dia.

Electricity & Water Authority
Electricity & Water Conservation Directorate
4- **Water Meter Locations**: 
- The engineering/consultant offices must earmark the location of water meters for each unit (Flat, Office, Villa, Shop) and the same should be clearly shown in the drawings in case of multi storey buildings.

5- **Gardening**: 
Although the Electricity & Water Authority (EWA) is not responsible for the supply of water for gardening/irrigation purposes, EWA is recommending the following:
- It is advisable that the size of the garden tap should not exceed 1/2” diameter.
- Drip-irrigation system with timers must be provided for controlling water consumption.
- It is advisable that lawns areas should be restricted in size or to be totally avoided, as these areas demand high water consumption. Instead, paving the areas with bricks / tiles is advisable with pockets planted with drought-tolerant trees. It must be ensured that the irrigation is set to occur in the early morning or late evening.
6- Water Appliances:

- Flow rates shall not exceed the following values:

<table>
<thead>
<tr>
<th>Fittings</th>
<th>Maximum Flow at Outlets (Litres/minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sink Basin / Bib Taps</td>
<td>8</td>
</tr>
<tr>
<td>Wash Basin Taps</td>
<td>6</td>
</tr>
<tr>
<td>Bath Taps</td>
<td>12</td>
</tr>
<tr>
<td>Shower Taps</td>
<td>10</td>
</tr>
</tbody>
</table>

- The volume of flush tanks must not exceed 6 liters. Dual-flushing mechanism is preferable, controlling valves must be installed on the inlet lines.
- Single lever types mixers must be used in public places. Single lever types mixers are preferable in normal domestic premises.
- Urinal systems must be flushed only after use, either manually or by electronic sensor.
7- **Water Re-use**:

- If the capacity of air-conditioning units is more than 100 tons, it is advisable that the piping network shall be appropriately designed at the planning stage, so that the condenser drain water can be re-used as an alternative source for flushing system & gardening purposes.

- It is advisable in industrial premises, such as laundries, car washing services, garment factories, etc, to re-use the water after suitable treatment.

- In major projects, gray water shall be treated and re-used for gardening and flushing purposes. To facilitate this, there shall be two separate water supplies and two drainage systems with standby fresh water supply in case of gray water supply outage.

- It is advisable to re-use rejected water from the domestic desalination units by diverting it to a separate ground tank and to be used for flushing and cleaning purposes.

8- **Water Regulation System Implementations**:

The implementation of water regulations in two stages is consistent with the procedure for obtaining building permit and facilitates the form process.
1. Planning Stage:
The Electricity & Water Conservation Directorate (EWCD)/Water Conservation Section (WCS) will receive water distribution directorate conditions form with relevant documents from Water Distribution Directorate and shall verify and ensure that all conditions are in compliance with water regulations system and technical guidelines for internal water plumbing system. The Form will be endorsed and sent back to Water Distribution Directorate for giving temporary water connection to the premises.

2. Construction stage:
A site visit will be conducted by EWCD/WCS after receiving “Water Regulations System Implementation form” from Engineering/Consultant offices to ensure proper implementation of water regulations systems and thereafter a site meeting will be held with the site engineers of engineering/consultant offices to confirm the important technical aspects. After approval, the water regulations system Implementation form will be sent to water distribution directorate for further action.

(A) Role of Engineering/consultant Offices:
The Engineering/consultant offices shall abide by the regulations and conditions stated in water regulations system during the preparation of the drawings and shall ensure the correct implementation of the system during construction stage.

(B) Electricity service connection shall not be provided to the premises unless water regulations system Implementation form has been endorsed by EWCD/WCS.
9- Violations:

Any person works on or renew plumbing installations shall hold responsibility for the water regulations implementation and violation of these regulations will make the customers or the contractors or engineering/consultant offices liable to penalties as stated by EWA.

- It is strictly forbidden direct pumping and consider as a breach to rules and regulations of EWA and water regulations, as it causes contamination of the water to the network and shortage of water to the neighboring premises.

- No cross-connections of domestic and non-domestic supplies are allowed (i.e. the domestic water system should not be connected to the T.S.E, bore-holes, etc), to avoid contamination of the authority water.

- Tampering, removal and shifting of water meters by unauthorized persons.

- Illegal draw off tapping (by-pass) before meter.

Dear customer ...

In view of our concern to offer the best services for you, here are important contact telephones to call us in case of any enquiry:

Hotline: 80008002.
Fax: 17576591.
E-mail: water.conservation@ewa.gov.bh