Guidelines and Building Requirements For Factories And Services Facilities Buildings inside Industrial Estates

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Introduction

Industrial Estates Authority has issued a guide standards and the requirements of factories and support services in the industrial cities, The Commission finds that the directory included with this handbook, It is a summary of the main requirements and procedures to be followed when establishing factories in industrial cities.

That it should be noted that each of the owner (investor) and the designer and supervisor of the contractor are obliged to implement what came in the original directory, And as stated in this handbook for Aigne.
General Terms

- The factory must be licensed by the Ministry of Commerce and Industry or the Saudi Arabian General Investment Authority.

- Food, drugs, and cosmetics factories must be granted the license of the Ministry of Health and the SFDA; to assure product quality and its compliance with the general health standards. The SFDA website is to be reviewed to know health requirements in food factories and their staff (www.sfda-gov.sa).

- Factories with a potential of environmental pollution should be granted an environmental license from the PME.

- The requested area is granted according to the manufacturing and production requirements of the factory.

- The minimum level of modern equipment and machinery technology, and manufacturing methods is to be provided in the factory.

- Plots are appropriately allocated for each industrial project in the industrial city, after revising them by the SIPA. Future expansions are to be taken into consideration, if they are sufficiently justified.

- Land leasing priority in industrial cities is granted to industries that agree with the development required for the industrial renaissance of the KSA according to its five-year development plan.
- Plots are allocated for factories outside the industrial cities in case moving them is deemed necessary for implementing expansions to increase capacity, or introduce new products according to their licenses.

- The investor is to establish his factory on the allocated plot in the industrial city according to a contract with the SIPA, or with the private industrial city owner, according to the contract nature: leasing, selling, or usufruct. The factory owner is committed to the terms and requirements in the industrial cities concerning construction, operation, and maintenance.

- The SIPA may approve increasing the ratio, based on a documented proposal from the investor; proving the need of his factory.
Building Regulations
Land occupation
Take into account the occupancy rate in the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Area %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial buildings</td>
<td>45-50</td>
</tr>
<tr>
<td>Circulations, routes, recessions, parking areas, landscaped area, and loading &amp; unloading</td>
<td>15-30%</td>
</tr>
<tr>
<td>Warehouses (raw materials &amp; final product)</td>
<td>5-15%</td>
</tr>
<tr>
<td>Office buildings</td>
<td>Less than 5%</td>
</tr>
<tr>
<td>Facilities</td>
<td>Less than 5%</td>
</tr>
<tr>
<td>Future extension</td>
<td>25%</td>
</tr>
</tbody>
</table>

- Percentages might be modified according to specific factory requirements, so that the minimum level of industrial use should not be less than 45% of the area.
- Floor Area Ratio (built area to plot area ratio) must not exceed 2.
Recessions
Rebounds vary depending on the roads surrounding the plot, and explains the following figures of Rebounds required in each case.

Fig. Recessions and their utilization, plot on single road.
Occupancy rate of in-plant installations
Building occupancy ratio within the factory, is as follows:

<table>
<thead>
<tr>
<th>Plot area (m²)</th>
<th>Occupancy ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5000</td>
<td>%65</td>
</tr>
<tr>
<td>5000 - 10000</td>
<td>%70</td>
</tr>
<tr>
<td>10000 - 20000</td>
<td>%75</td>
</tr>
<tr>
<td>20000 - 30000</td>
<td>%80</td>
</tr>
<tr>
<td>More than 30000</td>
<td>%85</td>
</tr>
</tbody>
</table>

Fig. Recessions and their utilization, plot on two perpendicular roads.
**Heights**
The maximum height of production units is 20m, measured from the surrounding streets level, to the highest point in the hall ceiling.

The minimum height of production units is 6m, measured from the surrounding streets level, to the hall ceiling.

![Diagram showing maximum permissible height of production halls](image)

**Buildings**
Pre-engineered steel structures are preferred, as they provide calculated buildings, with less weight than normal steel buildings; easier to modify; and more accurate in calculating loads.

The space between any two buildings is no less than 5m, fig. (4).

![Diagram showing spaces between buildings](image)
**Partitioning Walls**
Factory walls must be built from blocks of 2m height minimum from the ground, as in Figure.

![Building blocks](image)

Fig. Building blocks of 2m height minimum from the ground.

**Floors**
Floors need to be designed to suit the use of the plant so as to facilitate cleaning and care of, with interest by commas, and the separation of the rules of machinery, as is shown in the annex.

![Floor models](image)

Fig. Floor models
Factory Facades
Paying attention to different facades design. The optimum area of the outer openings (windows) is 15-25% of the wall area.
In the production hall; windows are not to be less than 1m wide and 1m high.
Light colored materials should be used in façade finishing, as they suit hot climate environments.
Finishing materials of the facades are to be modern building materials that meet beauty requirements in the industrial city, such as stainless steel, aluminum, glass, concrete, or coated blocks.
No air conditioning units are allowed to appear in the outer facades.

Fig. Attention to designing outer facades of the factory
Fences
Due to the specifications of the fence approved by the Board and described in the manual and set out in the shape of the facility.

Fig. Fence model approved by the SIPA
Gates and Entrances
Is applied to the requirements set forth in the forms attached below.

Fig. Entrances from side streets

Main street 40m

Entrance

Entrance

Side road 20-30m
Fig. (10) Entrances from main streets, when there are no facades on the side street.

In case façade is more than 30m wide

Road 20-30m

Gate

6m

6m

Gate

Fig. Factory gate dimensions if façade is more than 30m wide

In case façade is not more than 30m wide

Secondary gate

3m

Main gate

5m
Fig. Factory gate dimensions if façade is not more than 30m wide

**Advertising Signs**
The factory is obliged to put a sign of its name according to the SIPA model, as in Figure.
**Pavements**
Pavements, no less than 60cm wide and 15 cm high from the surrounding roads levels, should be made around the production halls.
**Office Buildings**

- The office building must be separated from the production zone.
- It is forbidden to use the office building as accommodation for workers.
- The location of the office building is to be in the front side facing the main road.
- High administration building ground floor and three roles of a maximum of 16m.
The office building facades are to be of distinguished architectural style.
Employees’ facilities
- The minimum level of facilities in production halls is: a praying space, a dining hall, water closets, a buffet, a dressing room, a first-aids room; provided that they suit the number of workers present.

- The following criteria are to be met: one washing basin/15 persons, a closet/15 persons, a cold water fridge/60 persons, an ablution tap/15 persons, and a wardrobe for each worker.

- It is totally forbidden to have accommodation for workers or staff within the factory boundaries, except for the guard’s room.

Open Spaces and Landscaping
The front court is used for landscaping. A minimum of 5% of the plot area is used for open spaces. Planning the site as shown in the Annex.
Fig.: Landscape of open spaces around production halls

**Parking Areas**

Provide the number of positions set forth in the attached table.

Table: Car parking rates according to factory usages.

<table>
<thead>
<tr>
<th>Rate</th>
<th>Usage within factory</th>
</tr>
</thead>
<tbody>
<tr>
<td>One car/160-200m2</td>
<td>warehouses area</td>
</tr>
<tr>
<td>One car/120-160m2</td>
<td>production halls area</td>
</tr>
<tr>
<td>One car/40m2</td>
<td>Office buildings area</td>
</tr>
</tbody>
</table>

Take into account the dimensions of the positions set forth in the form attached. 5.5m for a 45° parking, and a 3.5m for route-parallel parking, fig.(19).
45° Parking

Perpendicular Parking

Route-Parallel Parking
Fig.: Car parking dimensions

**Loading & Unloading Zones**

- A portion of the space is allocated for loading & unloading according to the factory needs.
- The loading & unloading zones are to be determined on the layout.
- The loading area is to have appropriate dimensions.

**Levels of Inner Road Network**

Taken into consideration elevations shown in the figure attached.

Fig.: Relation between the interior roads level and the front road level.

**Natural & Artificial Lighting**

- Production halls should be day lighted unless otherwise specified by the factory functions. The lighting openings
should have sufficient area, not less than 10% of the space area.

- The factory is obliged to illuminate the inner road network with lighting fixtures of a weather resisting type, and appropriate power for the factory nature, needs, and operation.

**Natural Ventilation**
- All office, service, and labor buildings must be naturally ventilated to prevent air pollution.
- Variation of natural ventilation means: windows, and ceiling openings according to the building type (office, facilities, production hall), and the nature of space usage.

**Air Conditioning**
- All establishments within the factory must be centrally conditioned, with a programmed-control operation system.
- All air conditioning design specifications and general requirements are to be met; whether in the general specifications, the Saudi code, or other accredited codes such as the ARI or the ASHRAE.

**Electricity**
- A room is to be provided for the electric transformers of the grid, according to the grid specifications. The room design is to be verified by the electricity company. Any modifications required by the company are to be made in the design phase, before starting construction.
- Take into account the rates of use of electrical energy in the following table.

<table>
<thead>
<tr>
<th>Industrial activities</th>
<th>Rate of electric power consumption (KVA/m2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>2/50m2</td>
</tr>
<tr>
<td>Textiles &amp; readymade clothes</td>
<td>3/50m2</td>
</tr>
<tr>
<td>Wood, wood products &amp; furniture</td>
<td>2/50m2</td>
</tr>
<tr>
<td>Paper, printing &amp; publishing</td>
<td>2/60m2</td>
</tr>
<tr>
<td>Chemicals &amp; plastics</td>
<td>2/60m2</td>
</tr>
<tr>
<td>Building materials, ceramics &amp; glass</td>
<td>4/100m2</td>
</tr>
<tr>
<td>Basic metal industries</td>
<td>6/75m2</td>
</tr>
<tr>
<td>Metal products, machinery &amp; equipment</td>
<td>4/60m2</td>
</tr>
<tr>
<td>Storing &amp; refrigeration reservoirs</td>
<td>3/30m2</td>
</tr>
</tbody>
</table>

**Communications**

- Each plot is connected to phone cables (min. 5 lines). Connection is to be done by the telecommunications company.

- Coordination with the communication service provider in the industrial city is to take place.

**Potable Water**

- Potable water is to be used for its specified production purposes, not for filling & sale, cooling, or washing. Hence, using such water and their annual quantities; are to be determined.
- There is to be coordination with the industrial city operator.

- The initial estimates of potable water and fire water are to be calculated according to the following guides:
  - High requirements factories: 200m$^3$/acre/day.
  - Low requirements factories: 25m$^3$/acre/day.
  - Labor needs: 30L/person/day.

- The initial estimates of factory industrial water needs are set to 30-40m3/acre/day.

- Water needed for irrigation within factories is estimated to be 10mm/day/m2.

- Water is to be pure, colorless, scentless, tasteless, cool, and favorable.

**Sanitary and Industrial Draining System**

- The factory is obliged to construct an internal sanitary drainage network. It is to be connected to the local network with connections of min. 150mm in diameter. This is to be done by the sanitary and industrial draining water operator within the industrial city. The network is to be supplied with a primary treatment system for industrial waste. Water must be compatible with the environmental criteria set in the SIPA guide, before draining to the local network.

**Rainwater drainage**

- Separate network for draining rainwater is to be constructed and connected to the street level.
The Environmental Criteria and Industrial Safety Conditions

- Should take into account Air Quality Standards, Air Pollution, Noise, Smelly Substances, Toxic & Harmful Substances, Flash and Flare, Radiation and Radioactive Substances, Vibrations, Water Pollution, And other. Under the general system of the environment of the Presidency of Meteorology and Environment Protection.
- Must comply with the standards and requirements for fire-fighting of the civil defense and anti-fires in factories and buildings attached to it.

- The application of specifications and standards: Take into account the application code and specifications of the Saudi Organization for Standardization and Metrology in all construction, In the case of non-existence of codes used and specifications approved.

- ISO Certificate: The factory is to seek granting an ISO14000-14001 certificate for environmental management systems, in order to make more progress and improvements in environmental protection.

Application for building license

1- Documents required for application

- letter forwarded to the director of the industrial city administration.

- copy of the plot contract.

- copy of the commercial record.

- copy of the industrial license.
- An origin and a copy of the consultant’s contract. He is to be accredited by the SIPA.

- Pledge by the consulting firm for layouts and designs.

- Pledge by the consulting firm for supervising construction activities.

- Copy of the site plan, certified by the SIPA, providing a CD that includes the layout and other drawings.

- Drawings approval letter from the SIPA.

- Check the files department for information updates, to make sure that there is no financial obligations of the factory (rent, fines, etc).

2- Obtaining the License

- When the documents are complete, the license is issued by the industrial city administration.

- The owner should sign the building license.

- The instructions of the license are to be followed during construction and at renewal.

3- Procedures of Approving the Site Plan by the SIPA

- Present one copy of the site plan for initial approval of the site plan (first presentation). Documents must be accompanied by an obligation letter from the designing firm. The letter is to be signed and sealed by the firm.
The firm license is to be attached, signed and sealed by the firm owner.

- After approving the site plan, 4 complete copies of the factory drawings should be presented (drawings+2 AutoCAD CDs). After approving the drawings, a notice is forwarded to the factory, with an approved copy of the drawings. If there are notes concerning the site plan, the factory owner is informed to fulfill the notes and represent the documents in their final form. All other copies, with notes, are delivered to the factory owner.

- The final drawings: the design firm is to prepare the final drawings according to the criteria & provisions of this guide.

- When the final drawings are presented, the firm should write the following on the drawings (The presented drawings of the factory are the full responsibility of the design firm, without any obligations by the SIPA).

- The drawings should indicate:
  
  - The factory name, according to the industrial license.
  - The plot number and the SIPA code number of the industrial city intended for establishing the factory.
  - Name of the design consulting firm.
  - Name & number of the drawing.
  - Scale.
  - The firm seal for verifying the drawing.

- The drawings should be in a proper form including writings and notes in Arabic or English.
- For expansions, indicate the relationship between the existing factory and the expansion: architecture, industry, structure, sanitation, industrial safety, electricity, services, etc.
- Present drawings of the used machinery.
- feasibility study must be presented, if the invested capital exceeds 30 million SR.

4- Requirements of Approving the Site Plan
- copy of the industrial license.
- copy of the sketch approved by the industrial city administration.
- copy of the plot allocation notice (valid).
- cheque for the sum of drawings revision fees, paid to the SIPA.
- The site plan according to the criteria & provisions of building factories.

Procedures of Obtaining the Civil Defense License
(Source: The Industrial City Administration)

1- Documents presented by the owner or the leaseholder
- letter from the referring governmental body.
- copy of the ID.
- copy of the commercial record.
- copy of the building space
- copy of the site sketch.
- The owner’s phone number.
- 5cm file for factories and warehouses.
- The lease contract or the ownership deed.

2-The documents required presenting drawings of the safety company

- Three copies of the drawings indicating:
  - Plot number, municipal division, establishment name, type of activity, and the owner’s name.
  - The drawings must be certified by the company and an authorized consulting firm.
  - All needed details are to be clarified.

- The pump curve should be signed and sealed by the consultant.

- The specifications table should include: the extinguishing system, the alarm system, and the pumps.
- delegation letter from the owner to the safety company.
- files-renewal notice by the company.
- written pledge that the drawings are the same as on the ground.

Note: all letters are to indicate dates, and should be signed by the general director with his name written.
Appendix (2) shows the license form of the GDCD obtained from the website (www.998.gov.sa).

License Renewal

- The following factory documents should be presented:
  • A letter forwarded to the director of the industrial city administration.
  • A copy of the commercial record.
  • A copy of the industrial license.
  • Checking the files department for information updates, making sure that there is neither financial obligation of the factory (rent, fines, etc) nor violations.
  • A copy of the construction supervisor’s contract.
  • A copy of the consultant report of achievements.
  • A copy of the factory reports issued by the industrial city administration.

- Letter is forwarded to the GDCD for inspection.
- The GDCD grants approval of no violations.
- The license is renewed by the industrial city administration.

Coordination with the Electricity Company

- During construction, the electricity room specifications are obtained from the company, to be executed.
- After finishing the internal connections of the factory, the investor applies to the industrial city administration for connecting electricity.

- Based on the previous application, the industrial city administration forwards a letter to the electricity company for connecting electricity.

- The electricity company requests the GDCD approval of the internal connections, and a certificate of safety & security.

- The electricity company should estimate the necessary loads.

- The investor pays the required fees.

- Based on the GDCD & the industrial city approvals; the electricity company connects electricity, according to the estimated loads, by one of its authorized contractors.

**SIPA Procedures in Monitoring Factories**

The industrial city administration pays regular visits to factories by which a visit report is issued including:

- Factory data.
- Plot data.
- Production data.
- Factory production lines data.
- Residential area data.
- Internal expansions of the factory.
- Violations.
- The production method.
- Documentation media.
- Attachments :( sketch of the factory & adjacent factories, a copy of the lease contract, a copy of the industrial license, etc).
- Comparing the current production with that mentioned in the license.
- Safety & security

**The Consulting Firm Supervisory Duties**

- The investor signs a design contract with a SIPA authorized firm. This firm is to prepare all designs and drawings indicated in chapter 4 of this guide (Design phases of factories & relevant service buildings). Thus the consulting firm is held responsible for all designs.

- The investor is to sign a supervisory contract with a SIPA authorized firm, to supervise construction. This contract should indicate the type of supervision, the fees, contact methods, expertise, and the firm supervisory staff.
  - Regular daily supervision.
  - Visit supervision.
- The consultant is to write construction reports:
  - Monthly reports.
  - Completion percentage reports, for license renewal.
  - A final report, when the factory construction is finished.

- The consultant is fully responsible for applying the technical building specifications during construction.

- The consultant is obliged to take part in an inspection committee, for issuing a certificate of construction completion.

- The supervising consultant is obliged to see that the following is done:
  - Sticking to the provisions & regulations of this guide.
  - Monitoring the contractor’s activities in the site.
  - Monitoring the application of in-site health, professionalism & the environmental systems, such as OHSAS18001, and ISO14001.
  - Checking the compliance of works with the designs & drawings approved by the SIPA.
  - Checking that the contractor performs all construction details.
  - Sticking to traditions followed in construction sites.
  - Making sure the regulatory procedures of the industrial city administration are followed by the factory.
• Doing progress reports frequently.

10- Tables to be prepared in the layout drawing presented to the SIPA.

Table (1): Factory Data

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Production Capacity</th>
<th>Work Days</th>
<th>Number of Workers</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table (2): List of machinery and industrial devices (Factory demand of electricity)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description And Model</th>
<th>Amount</th>
<th>Electricity Load</th>
<th>Production Capacity Kg/Hr-M³/Hr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>K Watt/ Unit</td>
<td>Volt/ Phase/ Cycle</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table (3): Air quality standards

<table>
<thead>
<tr>
<th>Elements</th>
<th>Max. Permissible Organic Limits</th>
<th>Expected Factory Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>0.3 particle per million at any location</td>
<td></td>
</tr>
<tr>
<td>Flammable minutes</td>
<td>80 micro g/ m³ at any location</td>
<td></td>
</tr>
<tr>
<td>Photochemical oxidizers</td>
<td>0.15 parts per million, more than twice per location</td>
<td></td>
</tr>
<tr>
<td>Nitrogen oxides (such as nitrogen dioxide)</td>
<td>100 micro g/m³ at any location</td>
<td></td>
</tr>
<tr>
<td><strong>Carbon monoxide</strong></td>
<td>The average concentration of carbon monoxide per hour during a 30-days period is not to exceed 40ml/m³ more than twice at any location.</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Hydrogen Sulphide</strong></td>
<td>Not to exceed 40 microgram/m³ (0.03 parts per million) at any location.</td>
<td></td>
</tr>
<tr>
<td><strong>Fluorides</strong></td>
<td>Don’t exceed (1) microgram/m³ (.001 part in million) at any location</td>
<td></td>
</tr>
<tr>
<td><strong>evaluation</strong></td>
<td>Not polluted</td>
<td></td>
</tr>
</tbody>
</table>
### Table (4): Standards of air pollution

<table>
<thead>
<tr>
<th>Element</th>
<th>Max. permissible organic limits</th>
<th>Expected factory rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total suspended particles</td>
<td>43 n g/ joule (0.1 lb/ MBTU)</td>
<td></td>
</tr>
<tr>
<td>Sulfur dioxide</td>
<td>1 microgram/ joule (2.3 lb/ MBTU)</td>
<td></td>
</tr>
<tr>
<td>Nitrogen oxides for oil burning facilities</td>
<td>130 n g/ joule (0.3 lb/ MBTU)</td>
<td></td>
</tr>
<tr>
<td>Nitrogen oxides for gas burning facilities</td>
<td>86 n g/ joule (0.2 lb/ MBTU)</td>
<td></td>
</tr>
</tbody>
</table>

### Table (5): Standards of drainage pollution

<table>
<thead>
<tr>
<th>Element</th>
<th>Max. permissible organic limits (mg/l)</th>
<th>Expected factory rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oils and grease</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Total solid suspended substances</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>COD</td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>TOC</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Vinyl</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>CL</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>SO₄</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Alkaline</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>NH₄</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>PO₄</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td>Not polluted</td>
<td></td>
</tr>
</tbody>
</table>
Table (6): Noise standard of factory

<table>
<thead>
<tr>
<th>Max. permitted rate</th>
<th>Noise rate of the factory</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 DB</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
</tr>
</tbody>
</table>

Table (7): Standard of toxic and harmful material of the factory

<table>
<thead>
<tr>
<th>Max allowed concentration rate</th>
<th>Factory rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>5% concentration</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
</tr>
</tbody>
</table>

Table (8): Vibration standards of the factory

<table>
<thead>
<tr>
<th>Frequency (cycle/s)</th>
<th>Displacement (inch)</th>
<th>Expected factory rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10</td>
<td>.0008</td>
<td></td>
</tr>
<tr>
<td>10-20</td>
<td>.0005</td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>.0003</td>
<td></td>
</tr>
<tr>
<td>30-40</td>
<td>.0002</td>
<td></td>
</tr>
<tr>
<td>40-50</td>
<td>.0001</td>
<td></td>
</tr>
<tr>
<td>More than 50</td>
<td>.0001</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table (9): Factory water needs

<table>
<thead>
<tr>
<th>Type</th>
<th>Rate</th>
<th>Expected demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potable water</td>
<td>25-100 m³/hectare/day</td>
<td></td>
</tr>
<tr>
<td>Workers needs</td>
<td>30L/person/day</td>
<td></td>
</tr>
<tr>
<td>Irrigation water</td>
<td>10mm/day/m²</td>
<td></td>
</tr>
<tr>
<td>Industrial water</td>
<td>30-40m³/hectare/day</td>
<td></td>
</tr>
<tr>
<td>Total need</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table (10): Drainage water exiting the factory

<table>
<thead>
<tr>
<th>Type</th>
<th>Rate</th>
<th>Expected amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitary drainage</td>
<td>80% of the total water-consumption</td>
<td></td>
</tr>
<tr>
<td>Total need</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>