ACE Group

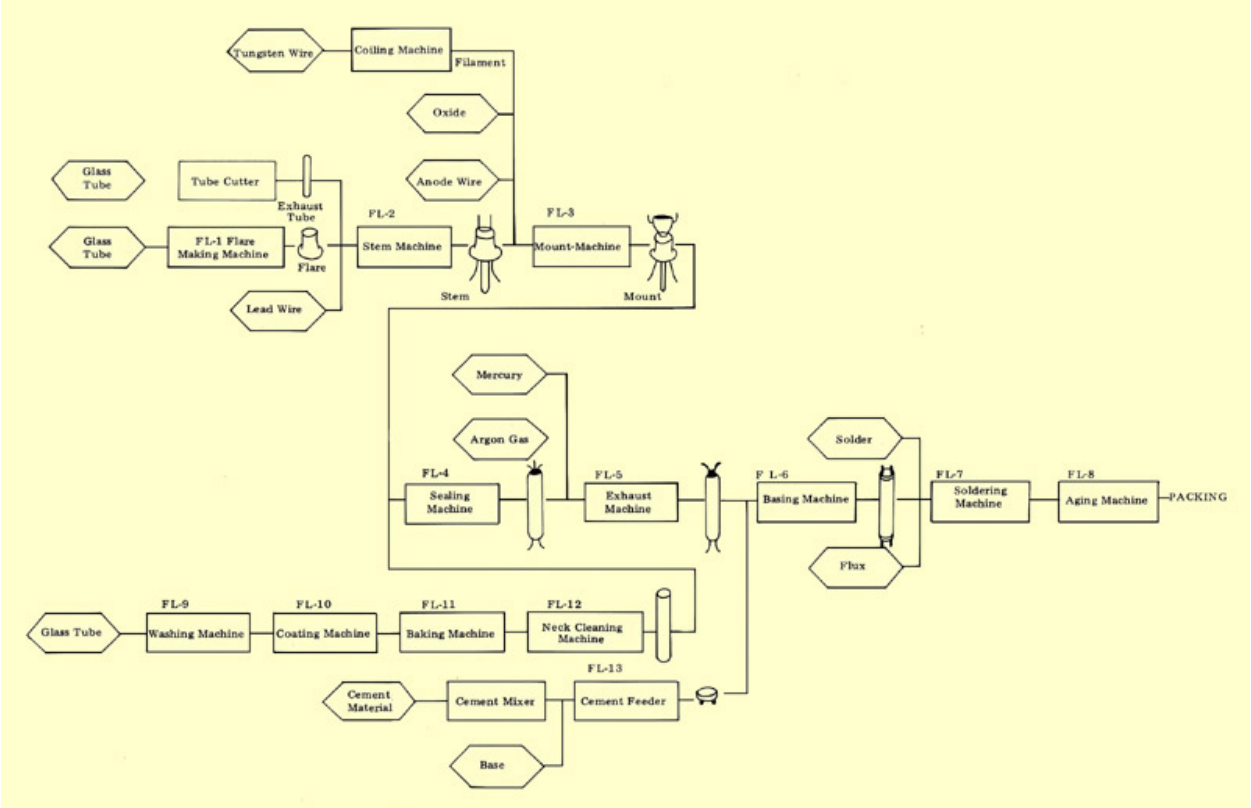
Saving Energy Lamp Making Plant

Cairo Rep. Office: ACE Group
3 Samir Moukhtar St., Ard Al Golf, Cairo – Egypt
Tel: +202 2690 3100/200, Fax: +202 2690 3500
E-mail: info@aceindustry.net
Website: www.aceindustry.net

ACE Group

1. General Process Description

1.1. Flow Chart



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2.2. Description Process

The production of fluorescent lamps is done in four stages. Most of the work is done by automatic machinery, so only a minimal number of workers are required. The four stages of production are:

(1) Mount Making

Three machines are used to make mounts. This machinery can be used to make stems for many types of lamps :

- **Flare Making Machine:**

A specially designed machine with 12 heads located around the edge of turntable flanges tubes of glass into flares. The flare is separated from the glass / tubing by a flame which polishes the surface of the glass as it cuts it.

- **Stem Making Machine:**

Exhaust tubes and lead-in wires from presorted hoppers are, along with the flares, fed into the stem making machine, which automatically forms the stems.

- **Mounting Machine:**

The stems are forwarded to the mounting machine, where oxidized, tungsten wire filaments are attached, thus completing the mount making process.

(2) Glass Tube Preparation

- Glass tubes of the appropriate length are placed in the washing and coating machine. This machine uses hot water and hot air to wash and dry the glass tubes before the inner walls of the tubes are coated with fluorescent powder.
- After being coated with fluorescent powder the tubes are automatically unloaded onto a roller conveyor which transports them through an oven and the through a cooling chamber. As the tubes pass through the oven, the fluorescent coating is baked on to the tubes.
- As they pass through the cooling chamber, two end-cleaning machines automatically brush the fluorescent coating from the ends of the tubes. The conveyor then transports the tubes to the sealing machine for final assembly.

(3) Base Preparation

- The required portions of the ingredients needed to make the sealing compound are mixed together in a cement-mixing machine.
- The sealing compound is then dispensed into the bases of the lamps by an automatic filling machine. The bases are then forwarded to the basing machine for final assembly.

(4) Assembly

The mounts, glass tubes, and the cement filled bases are then assembled into finished products.

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3. Plant Description

This plant can produce 2.88 million fluorescent lamps per year. This figure is based on a schedule consisting of 300 eight hours shifts per year.

CFL-double/triple tube compact energy saving fluorescent lamp manufacturing plant instruction book

The plant is used for produce triple u type compact energy saving fluorescent lamps. The sealing type of the tube is stem seal type. Delivery time and prices of the plant will be changed according to buyer's different requests.

3.1. Capacity

3.1.1. Range of lamp

shape of lamp triple u type compact energy saving fluorescent lamp

- type CFL-2U/3U fig 3, 4 for your reference
- lamp's long 70-145mm, diameter of tube 12

3.1.2. Machine speed: index time 1,500pcs/hr (1pc/2.4sec)

3.1.3. Production process chart: CFL-2U/3U fig. 2 for your reference

3.1.4. 2-4.Brief machine layout: CFL-2U/3U fig. 1 for your reference

3.2. Raw materials

3.2.1. Outer tube

3.2.1.1 Materials: Low Sodium Lead free glass tube

3.2.1.2 Outer diameter: 12.2±0.2mm

3.2.1.3 Wall thickness: 1.0±0.1mm / 0.8±0.1mm

3.2.1.4 Length: 1000 mm ~ 1300mm

3.2.2. Exhaust Tube

3.2.2.1 Materials: Lead glass (21%Lead contained at least)

3.2.2.2 Outer diameter: 4.6 mm / 4.1±0.15mm x 75L±0.7

3.2.2.3 Wall thickness: 0.45±0.1 mm

3.2.2.4 Length: 75±0.7mm

3.2.3. Lead in wire

3.2.3.1 Material: Dumet wire (Cr6)

3.2.3.2 Diameter: 0.45 mm

3.2.3.3 Length: 62 mm

3.2.4. Filament

3.2.4.1 220V single π（5,7,9,13W）

3.2.4.2 220V doubleπ（10,13,18,26W）

3.2.4.3 Type: Triple coil (3 turns)

3.2.4.4 Structure:

4-2-1. OAL: 13.0±0.5mm

4-2-2. LL: 4.5±0.5mm

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4-2-3.CL: 4.0±0.5mm
4-2-4. CL DIA: 1.5 – 2.0 mm

3.2.4.5 Turgsten 38um: 4.38 ~ 4.47 mg / 200mm
Molybdenum: 60 um 240 um
3.2.5. Phosphors: Three band phosphors; AT, Y, EU
3.2.6. Emittor (Oxide): Carbonate suspension
3.2.7. Cane glass for beads mount m/c:
3.2.7.1 Materials: Lead glass(21% lead contained at least)
3.2.7.2 Outer diameter: Φ2~Φ2.5
3.2.7.3 Length: 1000 mm
3.2.7.4 Cane glass
3.2.8. Main Amalgam Φ2.30±0.10 mm
3.2.9. Sub Amalgam net
3.2.10. Mercury 99.999%
3.2.11. Argon GAS 99.999%
3.2.12. Base cement (percustomer's standard)
3.2.13. Base

3.3. Manpower Requirement

3.3.1. Direct operator: 8 person
3.2.2. Indirect operator: 2 person

3.4. Machinery & Equipment

The plant is composed of following machines：
Main machines -- per machine list as attached (according to customer's request becasue CFL-double type machinery is different from CFL-triple type's)

Top Fusion Machine	2/3sets
Washing & Coating Machine	1set
Baking Machine	1set
End Sealing Machine	1set
1st Stem Machine	1set
2nd Stem Machine	1set
Mounting Machine	1set
1st Sealing Machine	1set
2nd Sealing Machine	1set
Fusion Machine	1set
Exhaust Machine	1set
Aging Machine	1set
Flare Machine	

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Color of equipment

Color of equipment can be designated by buyer. Buyer shall supply his color sample.

List	Color
Equipment original color	
safety cover	
gas piping	yellow
air piping	
high pressure air	white
low pressure air	white
clean air	white
oxygen	black
argon gas	gray
nitrogen gas	green
water	light blue
heating	heat-proof silver
control box (outer)	light blue
control box (inner)	yellow-gray
operation box and middle box	light blue
cable slot	standard
commercial parts	standard

The others parts shall be handle by black dyeing treatment.

3.5. Inspection & testing equipment

3.5.1. Trial test：After confirming the following items, the equipment shall be delivered.
3.5.2. Machine instruction book and test record
3.5.3. Movement of machine：Confirm movement of the equipment per following items：
3.5.3.1 confirm the running speed of the equipment
3.5.3.2 tube loading and unloading devices
Quantity and variety of the devices will be negotiated by both parties.
3.5.4. Heating running test without any materials
Confirm the equipment without any abnormal matters after running one hour constantly

3.5.5. Acceptance

After delivery and adjustment, acceptance will be made
3.5.5.1 Confirm machine instruction book and conference records
3.5.5.2 Confirm the equipment without any abnormal matters after hot running one hour

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without any materials

3.5.5.3 trial-produce

- Range of trial operation

washing and coating machine～aging machine

- Variety of trial operation
- Mercury and amalgam each one

type of tube for trial operation will be negotiated by both parties

- Checking period：two hours constantly run (2,000pcs)

good lamps rate = quantity of good lamp x 100≧80%

input lamps

- Input quantity is equal to input tubes at washing and coating machine.

Bad tubes which are created by bad materials, fluorescent powder liquid problems and skills of buyer's operators will be deducted from the input quantity.

3.5.6. definition of good tubes

shape and size of tubes are meet the request of drawings of instruction book tubes which can be lighted by aging machine and tubes which can not be lighted by aging machine but can lighted by tesla coil (tubes' life, lumen, know how...etc. will not be included)

3.5.7. parts for producing different size of tubes

The equipment is used for producing some different size of tubes. Buyer can choose only one size of tube for test. The parts which are used for producing the rest size of tubes will be confirmed only. There is not any test will be made for the tubes.

3.5.8. Others

1st fusion machine, 1st stem machine, 2nd stem machine, mounting machine, washing and coating machine, end cleaning machine and baking machine will be made hot running test separately only. The test result of above machines will up to the standard.

3.6. Utilities

3.6.1. Natural gas

Calorie...8,700Kcal/Nm^3±1% max.

Necessary pressure 3000mmAq±30mmAq (at the inlet on machine)

3.6.2. Low pressure air (oil-less, dry and clean air)

Necessary pressure...2,500mmAq ±50mmAq (at the inlet on machine)

Allowable foreign materials contained:

- oil...less than 1PPM
- humidity...Pressure dew point below 5℃
- dust...less than 20μ

3.6.3. Oxygen

Necessary pressure... 2.0Kg/cm^2±0.1Kg/cm^2 (at the inlet on machine)

Purity... 99.99%

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Allowable foreign materials contained:
Water ...less than 10PPM

3.6.4. High pressure air (oil-less, dry air)

Necessary pressure...5～7 Kg/cm^2 (at the inlet on machine)
Allowable foreign materials contained:
- oil...less than 30mmg/m^3
- water...Pressure dew point below 5℃
- dust...less than 20μ

3.6.5. Clean air(oil-less, dry, clean air)

Necessary pressure... 5～7 Kg/cm^2 (at the inlet on machine)
- oil...less than 1PPM
- water...Pressure dew point below 5℃
- dust...less than 10μ

3.6.6. Argon gas

Necessary pressure...2.0 Kg/cm^2 ±0.1Kg/cm^2 (at the inlet on machine)
Purity... more than99.999%

3.6.7. Nitrogen

Necessary pressure...2.0 Kg/cm^2 ±0.1Kg/cm^2(at the inlet on machine)
- Purity...more than 99.999%
- Oxygen contained should be less than 10 PPM

3.6.8. Water

Necessary pressure... 2 ～3 Kg/cm^2 (at the inlet on machine)
- Temperature... around 20℃
- Component of water shall be negotiated.

3.6.9. Power

3.6.9.1 Input power

AC 220/380V±2.5% max., 60/50Hz, 3 phase, 3 wires

3.6.9.2 Control circuit

DC24V (reduce pressure of transformer for control box)

3.7. Plant site planning

There are no rigid restrictions regarding the location of the plant site, but the plant will operate more successfully if the following conditions are considered:
(1) Convenient transportation
(2) Abundant suppliers of labor and materials

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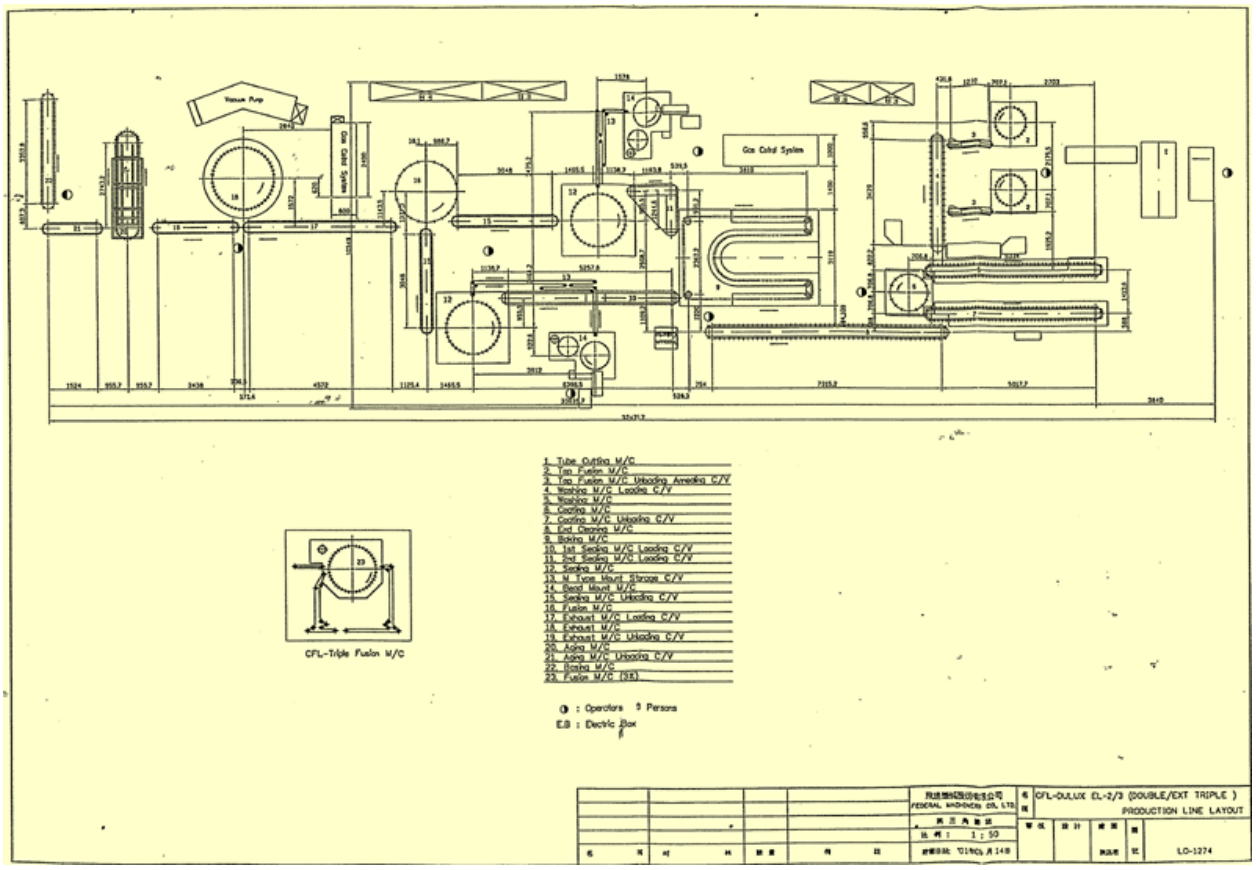
3.8. Area of land and building

Office	6m x 5m
Warehouse	8m x 8m
Factory Building	40m x 12m
Total	574m^2

3.9. Plant Layout



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