

# **Pre-Feasibility Report**

**1. INTRODUCTION**

M/s. Ambic Organic proposed to manufacture Aluminum Phosphide technical, Zinc Phosphide technical and its formulation at Survey No. 717/4, at Post: Kathlal, Taluka: Kathlal, Dist: Kheda.

**2. Cost of Project**

The cost of the project is estimated around Rs. 5.0 crores.

**3. Production Capacity**

Production capacity is prescribe below:

| <b>Sr. No.</b>              | <b>Name of Product</b>                  | <b>Capacity (MT/Month)</b> |
|-----------------------------|---|----------------------------|
| <b>Technical Products</b>   |   |                            |
| 1                           | Aluminum Phosphide (79 – 82%)           | 150                        |
| 2                           | Zinc Phosphide (92 – 95%)               | 60                         |
| <b>Formulation Products</b> |   |                            |
| 1                           | Aluminium Phosphide (56-60% TC)         | 215                        |
| 2                           | Zinc Phosphide (80% TC)                 | 70                         |
| <b>By Product</b>           |   |                            |
| 1                           | H <sub>3</sub> PO <sub>4</sub> (56-60%) | 45                         |

**4. List of Raw Materials**

Details of raw material are given below:

| <b>Sr. No.</b>                           | <b>Name of raw materials</b> | <b>Total Consumption MT/Month</b> |
|--|------------------------------|-----------------------------------|
| <b>Technical Products</b>                |                              |                                   |
| <b>Aluminum Phosphide - 150 MT/month</b> |                              |                                   |
| 1  | Yellow Phosphorous           | 72                                |
| 2  | Aluminum Powder              | 79.5                              |
| 3  | Graphite powder              | 2.25                              |
| 4  | Saw dust                     | 4.5                               |
| 5  | Wax                          | 6.75                              |
| <b>Zinc Phosphide – 60 MT/month</b>      |                              |                                   |
| 1  | Yellow Phosphorous           | 16.0                              |
| 2  | Zinc Powder                  | 47                                |
| <b>Formulation Products</b>              |                              |                                   |
| <b>Aluminum Phosphide - 215 MT/month</b> |                              |                                   |
| 1  | Aluminum Phosphide           | 150                               |
| 2  | Paraffin Wax                 | 4.3                               |

|                                     |                    |       |
|-------------------------------------|--------------------|-------|
| 3                                   | Urea               | 34.83 |
| 4                                   | Black Carbon       | 0.645 |
| 5                                   | Ammonium Carbamate | 17.4  |
| 6                                   | Graphite           | 2.15  |
| 7                                   | Aluminium Stearate | 5.6   |
| <b>Zinc Phosphide – 70 MT/month</b> |                    |       |
| 1                                   | Zinc Phosphide     | 60.0  |
| 2                                   | Iron Oxide         | 10.0  |

## 5. Manpower

Total manpower requirement of the unit will be 25 nos.

## 6. Manufacturing Process

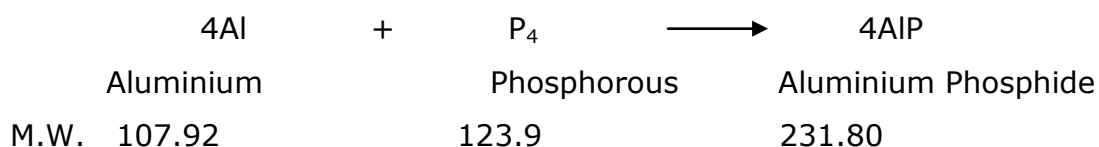
Manufacturing process is given below:

### 1. Aluminium Phosphide

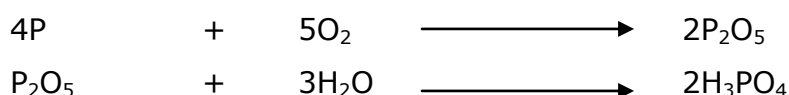
#### Manufacturing process:

Aluminium powder along with saw dust and graphite powder fed into the reaction pot. The lid is placed on the pot and is take for mixing. Yellow Phosphorous is then added gradually into reaction pot, keeping the inert gas blanketing and stirring. After the proper mixing is done, reaction pot is taken to the reaction chamber, where the reaction is carried out by removing inert blanketing. The Phosphorus is converting into  $P_2O_5$  producing Heat up to  $600^\circ C$  to start Aluminium Phosphide reaction. The  $P_2O_5$  generated during the reaction is scrubbed with water to form Phosphoric Acid. The Phosphoric Acid thus generated is re - circulated at scrubber to get higher concentration of Phosphoric Acid ( $H_3PO_4$ ). The tail gas scrubber is provided to scrub residual gas before discharging to atmosphere with high level stack. After natural cooling, reacted mass is wax coated in the rod mil and then formulated in the ribbon blender to give Aluminum Phosphide in powder form for the packing.

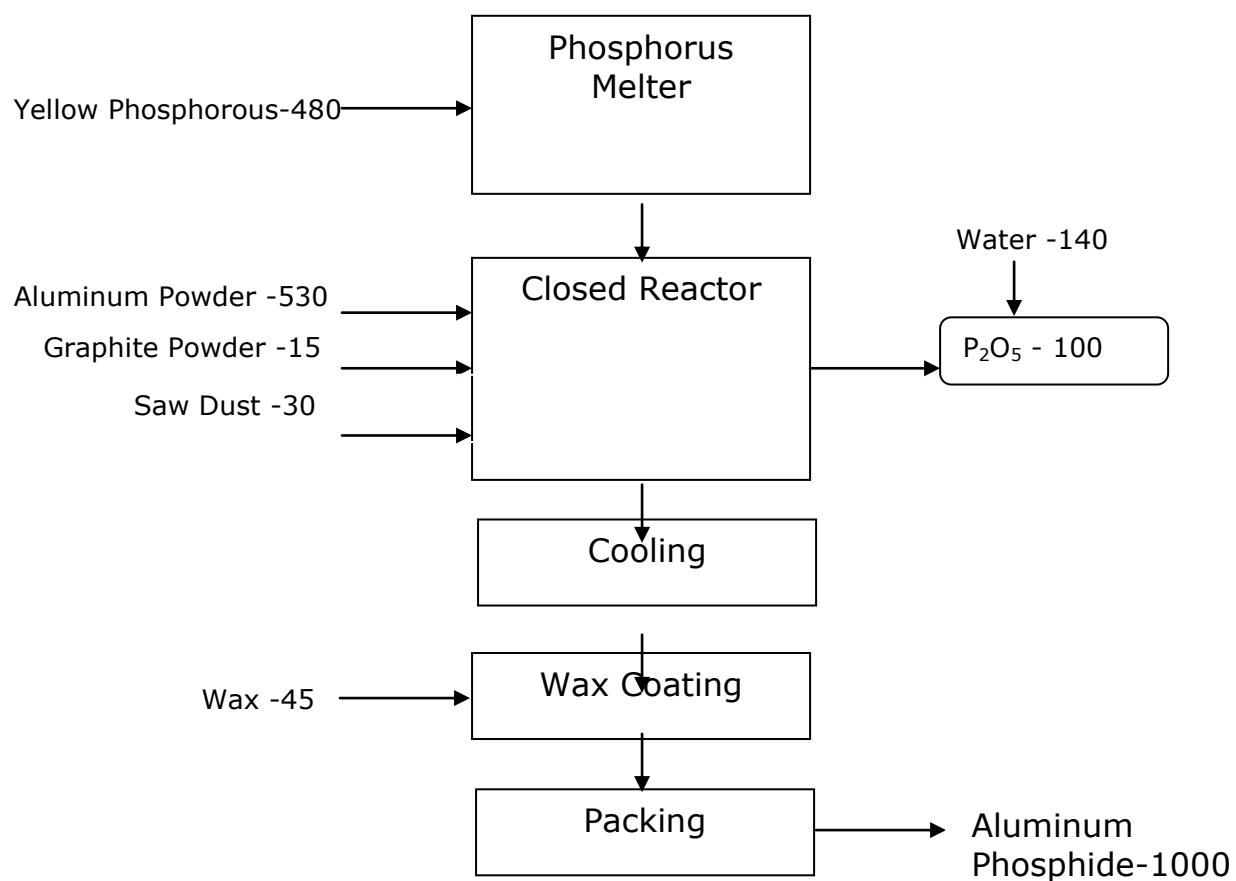
#### Chemical Reaction:



#### Reaction to form Phosphoric Acid:



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**Mass Balance:**

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**1100****1100**

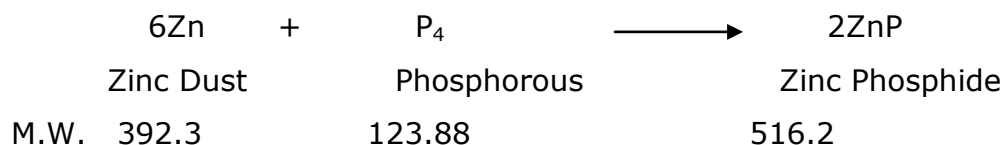
**Note:** Aluminium Phosphide contains impurities of Aluminium Oxide and ash of saw dust & Graphite.

## 2. Zinc Phosphide

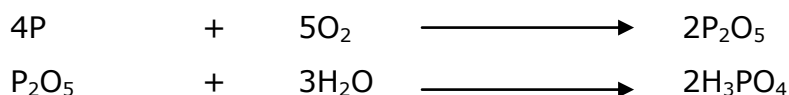
### Manufacturing process:

Zinc Dust/Zinc Dross is taken into the reactor. Phosphorous is added gradually at control condition. The reaction between Zinc Dust & Phosphorous takes place in the reaction Vessel to form Zinc Phosphide which is an exothermic reaction. The reacted Phosphorus is converted into  $P_2O_5$  which is scrubbed in absorption tower to form phosphoric acid as a byproduct.

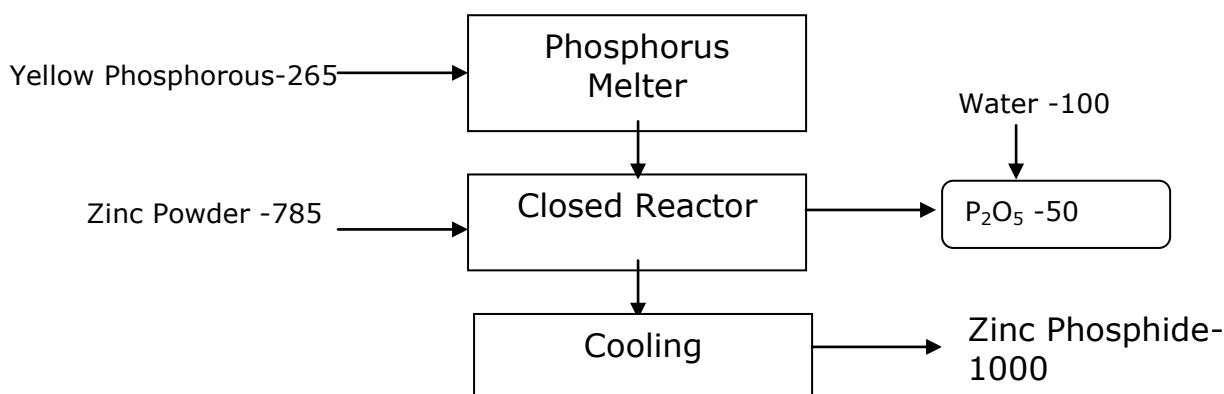
### Chemical Reaction:



### Reaction to form Phosphoric Acid:



### Mass Balance:



1050

1050

**Note:** Zinc Phosphide contains impurities of Zinc Oxide.

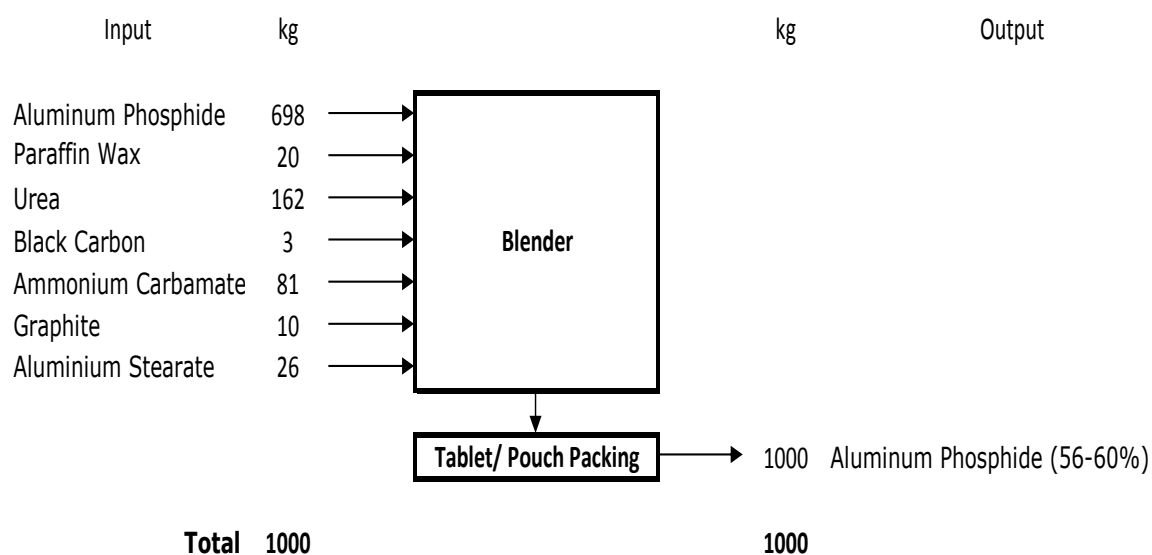
### 3. Aluminium Phosphide (Formulation)

#### Manufacturing process:

Technical Grade Aluminium Phosphide is mix with ingredients like Wax, Urea, Graphite, Ammonium Carbamate, Aluminium stearate in blender to produce Aluminum Phosphide formulation product which have around 56-60% of purity of technical products. This product is then taken for packing as per customer requirement.

#### Mass Balance:

#### Mass Balance of Aluminium Phosphide



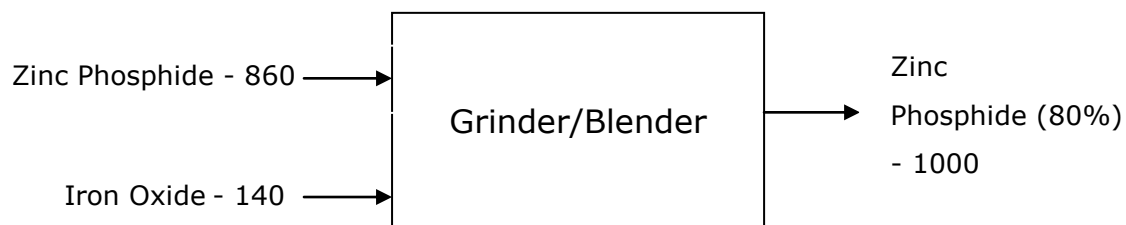
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#### 4. Zinc Phosphide (Formulation)

##### Manufacturing process:

Zinc Phosphide Technical & Iron Oxide is grinded & material is formulated to the desired quality. The formulated product is packed into containers as per customer requirement.

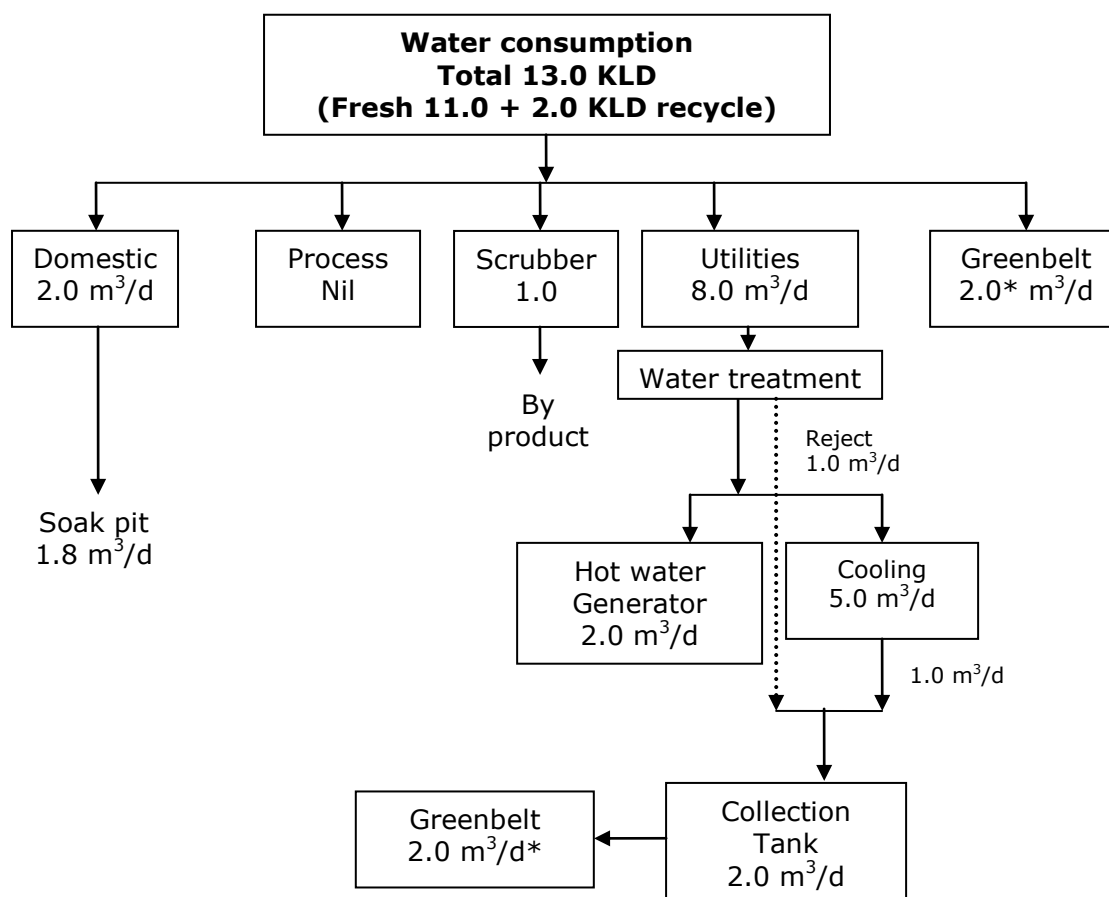
##### Mass Balance:



## 7. Water balance:

Water balance diagram is given below:

**Water Balance Diagram**



## 8. Source of Pollution

### Details of Air Pollution

The main source of emission will be flue gas emission from the burning of fuel and process emission from stack attached to reaction vessel. Proper Stack height will be provided in order to achieve norms prescribed by statutory authority. The details of stacks are given below:

| Sr. No.            | Stack attached to                      | Fuel Used  | Consumption rate | Stack Height (m) | APCM           | Pollutants  |
|--------------------|--|------------|------------------|------------------|----------------|---|
| Flue Gas stacks    |  |            |                  |                  |                |   |
| 01                 | Boiler (Hot water Generator)           | Agro waste | 350 kg/day       | 11               | Cyclone        | SPM < 150 mg/Nm <sup>3</sup><br>SO <sub>2</sub> < 100 ppm<br>NOx < 50 ppm |
| 02                 | D G Set (Stand by) (25 kVA)            | HSD        | 10 lit/hr.       | 11               | --             |   |
| Process gas stacks |  |            |                  |                  |                |   |
| 01                 | Reaction vessel of Aluminium Phosphide | --         | --               | 11               | Water Scrubber | H <sub>3</sub> PO <sub>4</sub> < 10 mg/Nm <sup>3</sup>                    |

|    |                                   |    |    |    |  |  |
|----|-----------------------------------|----|----|----|--|--|
| 02 | Reaction vessel of Zinc Phosphide | -- | -- | 11 |  |  |
|----|-----------------------------------|----|----|----|--|--|

### **Source of wastewater**

No wastewater generated from the process. Only reject of water treatment and bleed off of cooling tower will be generated and it is collected in collection tank. There is no need of water treatment and it is directly utilize for greenbelt development. Domestic wastewater generated from toilets (approximately 1.8 kl/day) will be disposed in septic tank and soak pit.

### **Source and disposal of Hazardous wastes**

Details of Hazardous waste generation are given below:

#### **Details of Hazardous Generation and Disposal**

| Sr. No. | Name of waste                      | Category as per HWM rules, 2016 | Quantity                             | Disposal method  |
|---------|------------------------------------|---------------------------------|--------------------------------------|--|
| 1       | Used oil                           | 5.1                             | 0.2 kl/yr.                           | Collection, storage, transportation & disposal by selling to registered re-refiners. |
| 2       | Discarded containers/ Drums/liners | 33.1                            | 200 nos./month<br>2.0 MT<br>kg/month | Collection, storage, transportation & disposal by selling to registered recyclers.   |

### **9. Funds for pollution control measures**

The management is quite conscious of its responsibilities for maintaining clear environment. Adequate funds are provided for the pollution control measures as a part of the overall project financing.

### **10. Monitoring facilities**

Company is ready to carry out any kind of monitoring proposed by pollution control board from time to time through outside agency.

### **11. Conclusion**

On the basis of information presented in pre-feasibility report on pollution control measures and after its implementation, there will be no emission from the plant beyond the norms specified by the Board as per the provisions of Water (Prevention and control of Pollution) Act, 1974 and Air (Prevention and control of Pollution) Act, 1981.