

WET APPLICATION METHOD

- The activated carbon can be applied using a knapsack.
- The enriched activated carbon is mixed with water in the sprayer tank just before the beginning of the application.
- This type of activated carbon typically adsorbs less ethylene than the granule type.
- A 250 mg dose of 2.5 % enriched activated carbon powder per plant ensures the success of the treatment.
- In a typical situation, 62.5 grams of powder are mixed with 15 litres of water in the sprayer tank for about 250 plants.
- Main hurdle in this method lies in the correct dosing of every plant.
- The application must be accurately calibrated.

- The typical calibration of procedure consists in applying a known quantity of water on a fixed number of plants, i.e. 3 litres of water on 50 plants. The operator must reach this objective with suitable accuracy.



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OPERATION AND SAFETY GUIDE FOR ACTIVATED CHARCOAL ETHYLENE ENRICHMENT UNIT



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Safety Instructions

1. Ethylene cylinder must be **handled with care** and suited device to avoid shocks and consecutive explosion risk.
2. Ethylene cylinder must be **strongly fixed**, i.e. to a wall, in operation to avoid fall.
3. Ethylene cylinder must be **kept outside** or in a very well ventilated room to avoid ethylene accumulation in the atmosphere caused by unexpected leakage.
4. Ethylene cylinder **main valve must be kept closed** when the enrichment unit is not in operation.
5. Enrichment unit must be installed in a **well-ventilated area** because of ethylene releases in the atmosphere.
6. **Avoid any source of ignition** near to enrichment unit. Do not smoke, start engines or electrical motors, operate electrical switches or any possible spark source.
7. **Do not breathe pure ethylene.** Ethylene is a non-toxic gas in usual concentration when operating the enrichment unit. When you smell the ethylene odour, there is no risk for your health.
8. When **unexpected ethylene odour is detected, close all vanes and seek for the leakage origin and repair.** Use soapy water to check leakages on lines.

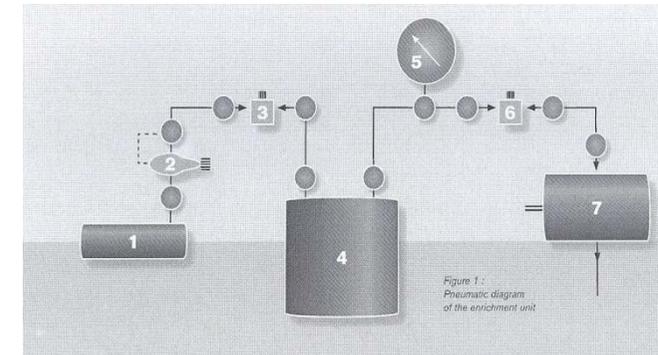
General Instructions and Maintenance of the Unit

1. Use the recommended tools for the right job
2. An opened bag of Activated Charcoal should be well protected to avoid moisture absorption.
3. Enriched bottle should be cork quickly after opening pressure chamber.
4. Outside of Pressure Chamber should be cleaned and oiled after the days operation to avoid rusting.

Operating Instructions

1. Weight the containers you are intended to use for one enrichment cycle.
 2. Fill the containers with activated carbon. The recommended dose is 250 mg/plant and application rate is 60 ml/plant. For a 15 litres knapsack treatment, fill the container with 62 grams of activated charcoal. This is intended to treat approximately 250 pineapple plants.
 3. Check for the weight of the prepared containers.
 4. Close the tank tightly
 5. Switch on the vacuum pump.
 6. Open the vacuum valve on the tank.
 7. Check vacuum and wait until -0.095 MPa or 0.95 bars relative vacuum.
 8. Close vacuum valve and vacuum pump.
 9. Open main ethylene cylinder valve.
 10. Open secondary ethylene cylinder valve located on the flow meter.
 11. Increase pressure in the tank up to 1 bar (0.1 MPa) and close the ethylene supply.
 12. Wait for 5 – 10 minutes for the enrichment of the activated carbon to occur.
 13. Release pressure in the tank using the vacuum valve.
 14. Open the tank and close the recipients tightly. They may collapse because of the ethylene adsorption, it's an expected phenomenon.
 15. Close all valves. Do not forget ethylene cylinder valves.
- ### CALCULATIONS
16. Calculate the amount of ethylene stocked in the activated carbon as the difference of weight of the containers before and after enrichment process. Take care to minimise errors, i.e. using a 1 gram resolution scale and weighting a minimum of 500 grams.

17. Calculate the amount of charcoal in the containers by removing the empty container weight from the filled container weight.
18. Calculate the enrichment rate percentage dividing the amount of ethylene stocked by the amount of charcoal. Check with usual standard. Norit W20 should be enriched 5% in weight.



Key Elements:

- 1 - Ethylene cylinder (eg. N25 or 17 Kg)
- 2 - Pressure Regulator designed for ethylene use
- 3 & 6- Gas Valves
- 4 - Low Pressure tank used as an enrichment chamber
- 5 - Tank pressure gauge
- 7 - Explosion-proof vacuum pump