# A NEW PHOSPHINE GENERATOR FROM AUSTRALIA

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## Description

This new patented phosphine generator has been developed in Australia as a source of phosphine for the SIROFLO®, SIROFUME® and SIROCIRC® active fumigation techniques. It consists of a reaction vessel surrounded by a heated water jacket.

Aluminium phosphide tablets are prepared for use by infiltrating them with silicone oil in a vacuum chamber to remove all air inside the aluminium phosphide preparation. The pre-treated tablets are submersed in a layer of silicone oil in the reaction vessel. The inert silicone oil prevents the aluminium phosphide from reacting with moisture in air and ensures a controllable and stable reaction between the aluminium phosphide and added water.

When water containing a wetting agent is added to the reaction vessel, it reacts with the aluminium phosphide to produce phosphine gas.

## Mode of Operation

The commodity and the size of the storage to be fumigated determine:

- the amount of aluminium phosphide added to the reaction vessel
- the rate at which water is added to the reaction vessel
- the concentration of phosphine produced and the rate at which it is released into an air stream passing through the reaction vessel.

These operations are regulated by a control system, based on a PLC to stage the operation of the apparatus and monitor its operation during the fumigation. A feed-back loop allows the rate of water addition to be ‘fine tuned’ by monitoring the phosphine concentration in the air stream and adjusting the water flow to achieve the desired concentration.

In the event of any failure (including a power failure) the apparatus goes into a fail safe mode during which the water flow is terminated and the air path through the reaction vessel is sealed to prevent phosphine from escaping into the work area. The sealed reaction vessel is then i) flooded with carbon dioxide to ‘quench’

the remaining phosphine and ii) the operating system is locked out to prevent the apparatus restarting when the power supply is re-established.

**Advantages of this generator**

1. It can be operated using any source of aluminium phosphide tablets.
2. It overcomes the potential flammability problems inherent in conventional aluminium phosphide preparations and some other phosphine generators that use such materials as feed-stock.
3. During normal operation of this generator, the fully-reacted waste products are contained within the reaction chamber and are removed at the completion of the fumigation for safe disposal at an approved site.
4. It has the advantages of 'cylinderised' phosphine without the costs associated with transporting cylinders.

**Conclusion**

The generator may be installed permanently at a site where there is a continuous requirement for phosphine fumigation or it may be mounted on a trailer where there is a requirement to carry out fumigation treatments at a number of different sites.

Further information is available at: http://phosphine.com/fum-aer/index.shtml