

COMPARISON OF RATE OF RELEASE OF PHOSPHINE FROM SOME
PHOSPHINE GENERATORS UNDER CONSTANT RELATIVE
HUMIDITY (75%) AND FOUR TEMPERATURES

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There is little data on the influence of temperature and the availability of water on the rate of gas production by commercial preparations used to generate phosphine. The rate of phosphine production by five materials - Magphos Tablets (Mg_3P_2), Celphos T (PA1), Phostoxin T (PA1), Celphos Pellets (PA1), and Phostoxin P (PA1) - was studied at temperatures of 15, 20, 25 and 32°C and 75% relative humidity.

Trials were carried out in a 1 m³ chamber and the evolution of phosphine was measured by a passive electrochemical cell at hourly intervals. This technique provides an accurate estimation of the reaction curve.

Results show important differences in the rate of reaction between materials at the different conditions. The respective times required by Magphos Tablets, Celphos T, Phostoxin T, Celphos Pellets, and Phostoxin P to reach 90% decomposition were:

- 22, 38, 42, 21, 21 h at 15°C (Total available water 9.7 g/m³)
- 17, 29.5, 30.5, 18, 17 h at 20°C (Total available water 13 g/m³)
- 12, 24.5, 25, 15, 13 h at 25°C (Total available water 17.4 g/m³)
- 10, 19, 20.5 h at 32°C (Total available water 25.4 g/m³); no results for pellets.

It can be concluded that magnesium phosphide tablets and aluminum phosphide pellets have the same rate of release, which is twice the speed of aluminium phosphide tablets. Differences among the aluminum phosphide generators were small.

