

Overview of the North American Phosphate Industry:

Phosphate fertilizers are used worldwide to sustain and improve crop yields, which are required to meet the needs of both a growing world population and annual depletion of soil nutrients.

Phosphates being mined and processed for profit occur in two types of rock: igneous and sedimentary. The Martison deposit is igneous and is similar to deposits being mined in Kapuskasing Ontario by Agrium, and in Brazil and South Africa. However, sedimentary ore supplies some 80% of the world's phosphate needs. Florida is the dominant source of this type in North America, where the fine-grained concentrated apatite product is called "phosrock".

There is growing demand by chemical plants for phosphate from igneous sources, because of its low cadmium content. Cadmium is a toxic element. Restrictions on the cadmium content of both phosphate fertilizers and animal feed phosphates are a growing major concern, especially with European processors of phosphate concentrates and importers of finished phosphate products.

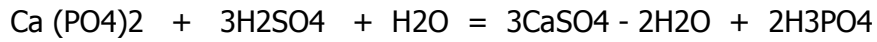
Most of the phosphate production is processed to fertilizer and shipped directly to consumer markets. The significant players in the industry are fully integrated i.e. they mine and beneficiate the ore, process the product to fertilizer and market it on a regional and global scale. For this reason, the most important factor to controlling supply in the fertilizer market is ownership of phosphate reserves.

Since the largest U.S. reserves are in Florida, Idaho and North Carolina, the major U.S. producers are based in the same areas. Rising costs, diminishing grades and the costly and time consuming permitting process for new mines in Florida have raised concerns within the industry regarding Florida's ability to sustain production in the long term and compete with alternative sources of phosphate ore.

Agrium is the only phosphate producer in Canada. Agrium manufactures fertilizer at its Redwater plant near Edmonton, Alberta and supplies all of its phosphate concentrate needs from the Kapuskasing mine in Ontario, approximately 110 kilometers SE of Martison. Agrium's Redwater plant produces about 700,00 tonnes of monoammonium phosphate (MAP) per annum. Canada consumes about 1.15 million tones of MAP per year leaving a deficit of about 500,000 tonnes per year; most of which is supplied by the Florida producers.

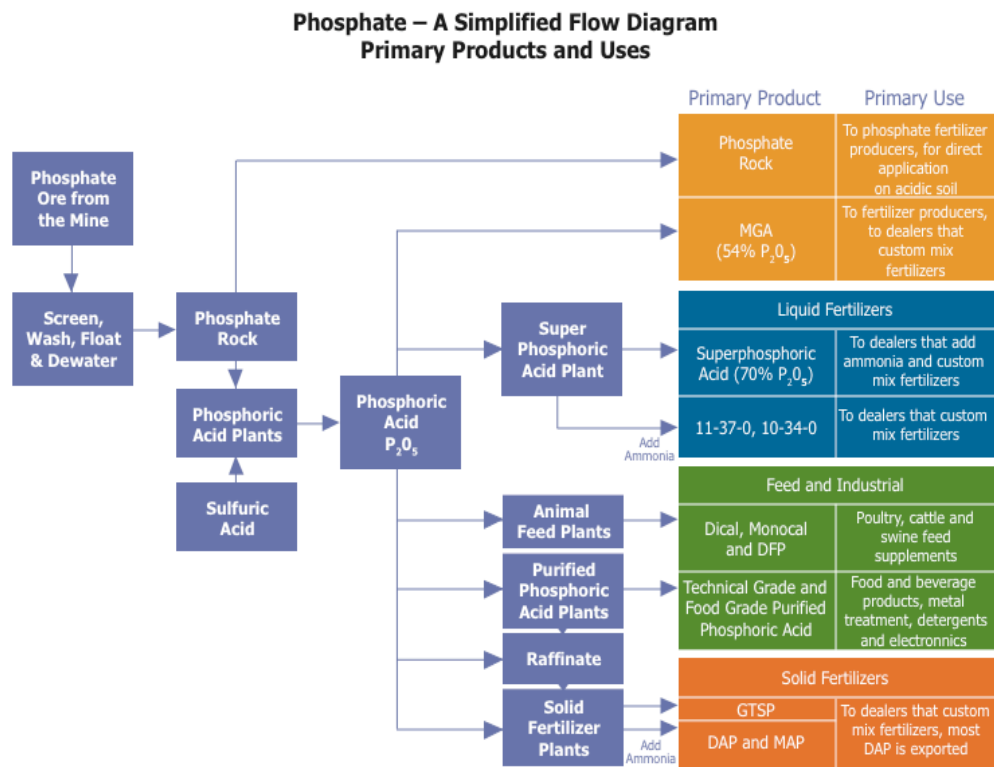
The starting point for the manufacture of most phosphate products is phosphoric acid. It is made by the acidulation of phosphate concentrate (phosrock) using sulphuric acid and filtering out the resulting calcium sulphate (gypsum), leaving phosphoric acid containing 25% to 40% P_2O_5 , depending on the process being employed. Thus access to low-cost sulphuric acid is also very important in the process. Acidulating one tonne of phosphate rock concentrate requires .85 to .90 tonnes of sulphuric acid.

Chemical Reaction:



Phosphate Rock + Sulphuric Acid + Water = Gypsum (hydrated) + Phosphoric Acid

Note: Gypsum is a waste product



Source: PotashCorp

Diammonium phosphate (DAP), the most widely used fertilizer, is made from phosphoric acid by interaction with anhydrous ammonia. The same reaction of the phosphoric acid and ammonia can also produce monoammonium phosphate (MAP), which is more suitable to Canadian soil conditions. The end results are the same for DAP and MAP i.e. supplying phosphorous to the soil for use by the crops. Merchant grade phosphoric acid (MGA), super phosphoric acid (SPA) are concentrated forms of phosphoric acid which

also find common use as fertilizers, animal feed and maybe further upgraded by solvent extraction to purified acid for the Industrial Markets.

Due to a variety of end products, each with a different phosphate content, the industry has adopted the phosphorous pentoxide (P_2O_5) content as the unit of measure or yardstick for all phosphate material from ore to final product. This may be viewed as a measure of the relative nutrient value of the product. In the following table, the P_2O_5 content of four common fertilizer products is indicated:

	DAP	MAP	MGA	SPA
% P_2O_5	46%	52%	54%	70%