



## News Release

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## Single Superphosphate Tests Commence

**BiFox Limited (BiFox or the Company)** is very pleased to announce that the company has commenced the preparation of the samples which will be shipped to the Florida Industrial and Phosphate Research Institute (**FIPR**) to refine and finalize the process to upgrade BiFox phosphate rock to Single Superphosphate (**SSP**), Partial Acidulated Phosphate Rock (**PAPR**) and Phosphoric Acid (**PA**) for international export market.

### Highlights

- 50kg. phosphate rock sample to be shipped from Chile to Florida to complete SSP and PA tests.
- SSP, PAPR and PA are potentially higher margin, value added product, which is expected to improve BiFox economics.
- SSP, PAPR and PA will appeal to a wider international customer based, improving the already excellent marketability of BiFox phosphate rock.

### Management Commentary:

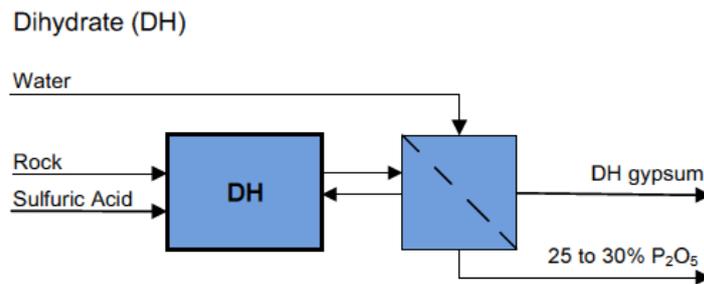
Commenting on the results of the FIPR testwork, BiFox Chairman, Chris West said: *"This is the next step in proving BiFox phosphate rock as a suitable feedstock for SSP and PA. SSP is a value add product which will significantly increase the Company's target market. PA is a particularly interesting potential value add product for BiFox, as the company has a significant database of successful, historical testwork conducted for PA. The Company also has a small PA plant in place on site, which may be upgradeable to suit a modern production facility. We're very excited to commence this testwork and move to the next steps of proving value add potential for BiFox rock."*

### Testwork Overview:

To run these tests, the Florida Industrial and Phosphate Research Institute (FIPR) FIPR will need a total of 50 kg of rock sample. Size for the phosphate rock would be 95% < 100 mesh (150 micron). This should be sufficient to produce acid for these tests. The phosphoric acid and SSP pilot tests will use locally available commercial sulfuric acid. For the DH phosphoric acid process operation, the recommended specification for the rock grind is 1% (max) +35 mesh (420 micron) and 60% (min) -200 mesh (74 micron).

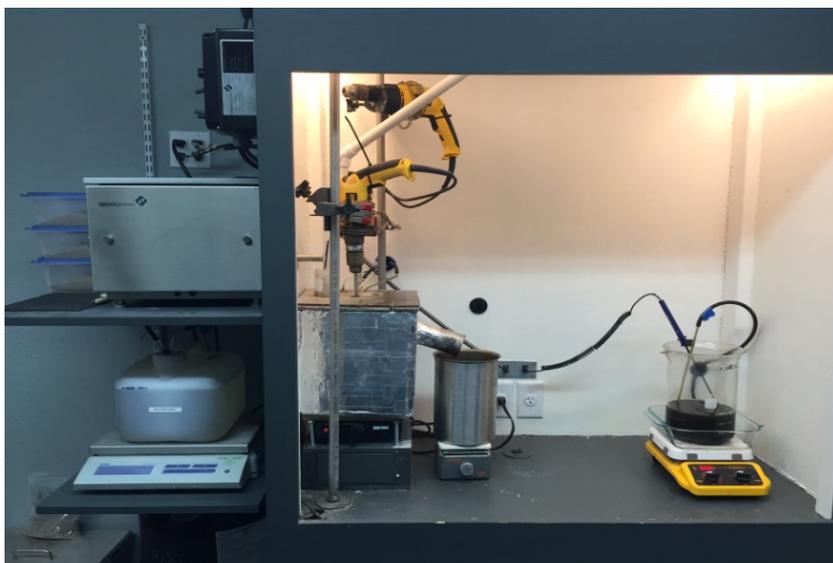
## Task 1- Phosphoric Acid Pilot Test

In the wet phosphoric acid process, phosphate rock reacts with sulfuric acid to produce phosphoric acid and calcium sulfate, also called gypsum. Wet acid process routes are categorized in terms of the form of the calcium sulfate produced. Dihydrate is calcium sulfate with two molecules of water ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) and hemihydrate is calcium sulfate with half a molecule of water ( $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ ). The dihydrate (DH) process is the standard process and is the most widely used. In the DH process, phosphoric acid is produced at a concentration of 25 to 30%  $\text{P}_2\text{O}_5$  and a recovery of 94 to 96%  $\text{P}_2\text{O}_5$ .



**Figure 1 – DH Process**

Rock is fed to the reactor where sulfuric acid and return acid from the filter are added. Slurry from the reactor is fed to a filter where the product acid is separated from the DH gypsum. The pilot plant can process between 0.5 and 2 kg/h of phosphate rock and if a 3 day continuous run is made, it can provide the most important data required for the design of a new plant. In this case, only an 8 hour run is proposed simply to provide sufficient acid for the PAPR pilot tests. Figure 2 shows the phosphoric Acid Reaction System



**Figure 2. The phosphoric Acid Reaction System.**

After the reaction and filtration steps, the product acid will be evaporated to a concentration of approximately 50%  $\text{P}_2\text{O}_5$ .

## **Task 2- PAPR Test Program Using Phosphoric Acid**

The manufacture of PAPR involves the reaction of phosphate rock with phosphoric acid. Several batch tests will be made to determine the operating conditions that achieve the desired grade and minimize raw materials cost (i.e., the highest rock / acid ratio). A test will be also made to determine reactivity of the phosphate rock. Usually for the production of SSP, the rock will be finely ground to 80% < 200 mesh (75 microns).

## **Task 3 – Partially Acidulated SSP Test Program**

The manufacture of SSP involves the reaction of phosphate rock with a small amount of sulfuric acid (typically about 60-70% H<sub>2</sub>SO<sub>4</sub>). The protocol and variables for the SSP pilot tests will be the same as for PAPR.

## **Task 4 – Fully Acidulated SSP Test Program**

The manufacture of SSP involves the reaction of phosphate rock with stoichiometric amount of sulfuric acid. The protocol and variables for the SSP pilot tests will be the same as for PAPR.

The products generated from Tasks 2-4 will be analyzed for total P<sub>2</sub>O<sub>5</sub>, water soluble P<sub>2</sub>O<sub>5</sub>, citric soluble P<sub>2</sub>O<sub>5</sub>, Insol, CaO, MgO, Fe<sub>2</sub>O<sub>3</sub>, and Al<sub>2</sub>O<sub>3</sub>. The following conclusions will be provided based on these results:

- The grade of PAPR (or SSP) that can be made.
- The rock grind that will be required. Low reactivity rocks typically require more grinding.
- The acid/rock ratio that will be required.
- The diluted concentration of the sulfuric acid that will be required.
- The degree of conversion of total P<sub>2</sub>O<sub>5</sub> to available P<sub>2</sub>O<sub>5</sub> over 7, 10 and 14 days.

## **Tasks 5. Granulation Tests on the PAPR**

Due to the nature of the type of batch testing, the PAPR, the partially acidulated SSP and the fully acidulated SSP produced in the reaction tests will not be in granular form. Two granulation methods are proposed as follows:

- Running the cured material through a small rolling drum to round the particles.
- Running the cured material through a steamed, pan granulator.

The material produced from either (or both) of these methods would then be screened to produce the targeted size range.

The hardness and the sphericity of the products will not likely be as good as would normally be produced by a commercial granulator system.

## **Tasks 6. Granulation Tests on the Partially Acidulated SSP**

The protocol and variables for the partially acidulated SSP granulation will be the same as for PAPR.

## **Tasks 7. Granulation Tests on the Fully Acidulated SSP**

The protocol and variables for the fully acidulated SSP granulation will be the same as for PAPR.

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**-ENDS-**

**For further information, please contact:**

Chris West

Chairman