

CalSiPhoS P16 – Exceptional plant available phosphate. But you get so much more.

Introduction

CalSiPhoS P16 is classified as a high grade plant available phosphate (P) composed of a mixture of monocalciumphosphate, dicalciumphosphate and magnesiumphosphate. This composition has been determined with extensive laboratory analyses and XDF and XRF scans. The composition and solubility parameters imply that almost 100% of all the P and all the other nutrients contained in **CalSiPhoS P16** are available for plant assimilation.

Phosphate source.

The source of P in **CalSiPhoS P16** is Phalaborwa-rock and apart from about 4 % all other raw materials are of South African origin.

No further effluent or byproducts are generated in the manufacturing process of **CalSiPhoS P16** which makes it an extremely environmental friendly product.

Typical composition of CalSiPhoS P16

	Test Method	Average analysis	Units	Act 36 Regulation
Total Nitrogen as N	ALFA 02/1	<0.1	% (m/m)	-
Total phosphorous as P	MDF 820	16.4	% (m/m)	16
Phosphorous (Citric acid soluble) as P	MDF 820	16.0	% (m/m)	14
Phosphorous (Water soluble) as P	MDF 820	12.7	% (m/m)	10
Calcium as Ca	MDF G97	15.9	% (m/m)	-
Silicon (Citric acid soluble) as Si	MDF G97	0.1	% (m/m)	-
Sulphur (SO ₄)	ALFA 10/1	3.9	% (m/m)	-
Magnesium as Mg	MDF G97	1.33	% (m/m)	-
Magnesium (Citric acid soluble) as Mg	MDF G97	1.26	% (m/m)	-
Fluoride as F	ALFA 13/1	0.42	% (m/m)	-
Arsenic as As	MDF 821	<1.0	mg/kg	< 50
Cadmium as Cd	MDF 821	<0.1	mg/kg	< 20
Chrome as Cr	MDF 821	63.1	mg/kg	< 1 750
Copper as Cu	MDF 821	11.4	mg/kg	< 750
Mercury as Hg	MDF 821	<0.5	mg/kg	< 10
Nickel as Ni	MDF 821	23	mg/kg	< 200
Lead as Pb	MDF 821	5	mg/kg	< 400
Selenium as Se	MDF 821	<1	mg/kg	< 15
Boron as B	MDF G97	13.6	mg/kg	-
Zinc as Zn	MDF 821	6.5	mg/kg	< 2 750
Manganese as Mn	MDF G97	300	mg/kg	-
Iron as Fe	MDF G97	700	mg/kg	-
EC @ 10 %		8.2	mS/cm	-
Moisture @ 105°C	Gravimetric	2.9	%(m/m)	
pH of 10% solution		3.6		

All supporting lab analyses for QC purposes are performed by Modderfontein Laboratory Services (Pty) Ltd. This lab is AgriLASA and ISO 9001 certified and all results are available from Global Phosphates (Pty) Ltd on request.

Unique features and benefits of CalSiPhoS P16

CalSiPhoS P16 has a very low salt index which renders it ideal to use larger amounts with in-row seeding or when planting potatoes or other tuberous types of crops.

CalSiPhoS P16 is especially suitable for in-row applications close to seeds (< 2cm) in low fertile soils to facilitate improved nutrient uptake through the process of diffusion without any adverse effects or the risk of fertiliser burn and contains at least 9 different essential plant nutrients.

CalSiPhoS P16 is an excellent source of P where large amounts of N-free fertiliser has to be placed in close proximity to seeds or crops during the planting process. P is an important component of all plant cells and sufficient plant available P will promote and improve early root development, plant growth and will improve water use efficiency.

CalSiPhoS P16 contains the three secondary nutritional elements calcium(Ca), magnesium(Mg) and sulfur (S) – all in soluble form and available to plants. 1000kg of **CalSiPhoS P16** not only supplies at least 160 kg plant available P but typically contains at least 210 kg of these secondary elements viz. 159 kg Ca, 12.6kg Mg and 39 kg of S.

CalSiPhoS P16 does not contain any N and therefore does not have any soil acidifying characteristics like other sources of P that contain N. This can limit the cost of liming to manage soil pH because **CalSiPhoS P16** also supplies Ca to the soil and plants. Ca is an essential nutrient of great importance to winter cereal crops, legumes, canola and potatoes.

Because **CalSiPhoS P16** does not contain any N it is an ideal source of plant nutrients for crops that are sensitive to the untimely release of nitrogen that has a negative effect on crop quality and crop color such as tobacco and citrus.

The S contained in **CalSiPhoS P16** is in the sulphate form (SO₄) which is plant available. S is an essential building block of amino acids and sufficient S improves plant resistance to diseases. S-shortages can become a factor on soils with depleted (< 1%) carbon levels. S plays a major role in legume plants for the production of protein and oils and for N fixation by Rhizobium bacteria.

Plant uptake of Mg by crops can amount up to 15 tot 25 kg/ha/yr and the citric acid soluble Mg in **CalSiPhoS P16** can make a major contribution towards this requirement.

CalSiPhoS P16 contains more than a kilogram of plant available silica (Si in citric acid soluble form) per ton of product. Latest research results indicate that increased plant Si levels stimulate plant growth vigour, root elongation and an increase in chlorophyl levels in leaves. The combined influence of these factors enable plants to improve their resistance to stress, diseases, drought and adverse soil conditions. It is also known that increased Si levels lead to stronger plant cell walls which leads to improved water use efficiency and less plant lodging due to stronger stems.

CalSiPhoS P16 contains the following five trace elements. Iron (Fe), zinc (Zn), copper (Cu), manganese(Mn) and boron. (B).

CalSiPhoS P16 Contains low levels of fluorine (F) and, together with other potential harmful heavy metals, are well below the allowable levels prescribed by the regulations of Act 36 of 1947. These elements are monitored on a continuous basis by external accredited laboratories.

All nutrients in **CalSiPhoS P16** are distributed homogeneously through the product matrix and is present in every granule of the product. These nutrients will not separate during the application process and will all be available to the plant during germination and the growing process.

The chemical composition of **CalSiPhoS P16** is unique in that all physical and chemical components are compatible with all forms of soil life and promotes a healthy soil biome.

Quality management

Representative samples from incoming raw materials are collected and analysed daily. Raw materials are graded as per analysis and final products are formulated accordingly to minimize variation and to ensure that product specifications and legal requirements are met. The first of several mixing processes of raw materials during a curing process of at least six weeks, is started as soon as possible after receipt to ensure a homogeneous product before products are granulated.

Quality control samples are taken on a continuous basis during production. Daily samples are analysed on site to ensure conformance to benchmarks. These samples are pooled and sent to external accredited laboratories for weekly, monthly, and quarterly analyses to ensure independent oversight on quality. Monthly and quarterly analyses are more comprehensive.

Analysis of P levels and particle size distribution is done daily on the final product to ensure conformance.

Traceability

All products are identified with batch numbers and each batch can be traced to a date of production with a corresponding retention sample and a chemical lab analysis.

Physical characteristics.

CalSiPhoS P16 is a hard, dry, dust free and free flowing, roundish, oval granule with a light grey colour.

Granules are sieved to a standard size of > 2mm and < 4mm during granulation and the product consists of about 32 million granules per ton.

Bulk density of **CalSiPhoS P16** as packed is ± 1.05 ton/cubic meter.

During the manufacturing process **CalSiPhoS P16** granules are dried to a moisture level of < 3% and are treated with a binding agent to ensure the following beneficial characteristics:

Granules are virtually dust free.

CalSiPhoS P16 granules are hard and stable and do not break up during storage, handling and transport. This makes the product ideal for storage and mixing with other fertilisers.

Granules have a very low hygroscopic nature and absorb very little moisture during storage in a cool dry environment and this mostly eliminates storage compaction.

Granules are free flowing as reflected in the angle of repose of 30 -33 degrees.

Granules are hard and free flowing, and this facilitates very effective application even at low application rates due to their size (2mm – 4mm in diameter) and big numbers per unit weight ($\pm 32\ 000$ /kg) when broadcast with spreaders or when applied in row with seeds during the planting process.

Packaging.

CalSiPhoS P16 is available in the following packaging options:

Loose bulk **or** 1000kg bulk bags **or** 500kg bulk bags **or** 40 x 50kg bags in 2 ton Slingbags.

All bags are laminated or lined to prevent water ingress during transport or storage and have proven to be durable during normal loading and offloading activities.

Recommended application.

NB! CalSiPhoS P16 must not be used in mixtures that contain UREA!

NB! CalSiPhoS P16 can cause eye irritation. Prevent contact with eyes and wear appropriate eye protection when handling.

CalSiPhoS P16 should be used and applied to crops as per the recommendation of a suitably qualified agronomist, soil scientist or plant nutritionist.

CalSiPhoS P16 is proudly a Global Phosphates (Pty) Ltd product – Since 2009.

CalSiPhoS Registration: Fertilizer Group 1, Registration No. K9442, Act 36 of 1947.

References.

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Prof. Andries Claassens, Personal communication.

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