Shell Sulphur Solutions

SHELL THIOGRO

MAP-S/DAP-S/NPK-S fact sheet for fertilizer producers

FACT SHEET

At Shell we understand the importance of safety in manufacturing operations; our new technology is backed by many years of experience in safely handling sulphur.

- Proven technology to produce sulphur-enhanced MAP-S, DAP-S and NPK-S utilising a Shell patented process which incorporates micronized elemental sulphur into customised fertilizer formulations with sulphate sulphur
- Provides phosphate fertilizer producers with opportunity to manufacture a variety of differentiated sulphur ammonium phosphate based product offerings
- Sulphur particle size in the range of 5-200 microns
- Easily adapts to existing process infrastructure
- Flexible campaigns to augment current MAP/DAP and NPK production.

Key Markets for Shell Thiogro MAP-S/DAP-S and NPK-S

- Regions not economically served by low grade sulphate based fertilizers such as ammonium sulphate or SSP
- Sulphur-deficient regions which are exposed to high levels of leaching
- Crops such as corn, canola (rapeseed), sugarcane and cereals which require sulphur throughout the growth cycle.

Shell Thiogro Technology Process Advantages

- Patented process introduces both forms of sulphur: elemental and sulphate into phosphate based fertilizers
- Can be used in conjunction with almost any MAP/DAP and NPK production process (PN and/or PCR) with initial low capital cost for installation and without any substantive change in operating conditions
- Technology supported by extensive research and development at recognised global fertilizer research facilities
- Easy to control and operate
- Process can accommodate a wide range of raw materials
- Technology reduces safety risks compared to other options
- Can be added to existing installations as a new section of the plant and operated on-demand
- Minimal or no additional personnel required with possibility of full automation
- Elemental sulphur in the form of discrete particles is evenly distributed through the granule providing more surface area for bacterial conversion of elemental sulphur to sulphate.

Shell Thiogro Product Advantages

- An excellent source for plant nutrient sulphur to generate crop yield increases and other benefits associated with supply of sufficient sulphur
- Effective and balanced release of sulphur through the entire crop growth cycle
- Flexible formulations adaptable to specific climatic and soil conditions
- Excellent physical qualities which minimise dusting
- Premium product able to cost-effectively compete with other sulphur fertilizer products
- Opportunity for product differentiation in competitive markets.

Some MAP-S/DAP-S and NPK-S product examples:

- 11-40-0 12S (66.7% ES + 33.3% S-SO_4)
- 12-42-0 10S (6ES + 4S-SO_4) or 13-33-0 15S (50%ES + 50%S-SO_4)
- 17-40-0 8S (5ES + 3S-SO_4)
- 12-24-12 12S (8ES + 4S-SO_4) or 15-15-15 5S

Typical formulations from agronomic recommendations and soil requirements will target a P_2O_5:S ratio range of two to four. These formulations will include sulphate sulphur which is beneficial for early crop development before oxidization of elemental sulphur to sulphate takes place. The remainder of elemental sulphur becomes a "slow release" form of sulphur, which is available during the full growth cycle of the crop.

Final formulas, average sulphur percentage (usually 4-12%) and physical characteristics are defined and design based upon producer's specific requirements, including market opportunity, quality of raw materials and plant design.

For further information

please contact your local representative or;

www.shell.com/sulphur/thiogro

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