

Minerals



Acceptance Guidelines for Raw Materials in a Feed Factory





Calcium carbonate

General description

Calcium carbonate (CaCO₃) is obtained directly from limestone quarries, dried and ground.

General aspect

Limestone occurs in fine, medium, medium, or large particles. The color depends on the original limestone quarries and varies from white to black colour.

Observation

Normally quarried stone is more than 95% pure CaCO₃ and in some cases, the percentage can be as high as 99%. To avoid eventual caking problems in the silos, moisture analysis is recommended to be included in the quality control checks. Calcium carbonate can contain various amounts of other minerals and impurities, depending on its origin and the purity of the source. Consequently, along with determining calcium content, HCl insoluble ash, Fe, and Mg content must also be determined. Analysis of product solubility in 0.2 N HCl may also be considered as an indirect measure of its in vivo digestibility. Handling calcium carbonate in the feed factory is very easy. Calcium carbonates present very demonstrates very high density and consequently it is necessary to store it in silos with a strong structure that will be able to tolerate the weight. To avoid the inconvenience of dust generation during the discharge of fine calcium carbonate, it is recommended to use pneumatic discharge in storage silos.

General controls and acceptance requirements

Parameter to analyse	When	Parameter to analyse	Values			
			Normal	Reclaims	Decline	
Humidity (%)	Before Unloading	Basic	1		>3	
Impurity (%)					2	
Calcium (%)			38		<36	
Magnesium (%)		Extended		0.3		
Lead (ppm)				<20		
Arsenic (ppm)				<15		
Iron (mg/kg)				620		
Fluorine (ppm)				<350		
Mercury (ppm)				<0.3		
Cadmium (ppm)				<2		
Solubility in HCl (%)					>98	



Mineral phosphate

General description

Mineral origin phosphorus is an additive to animal feed, which contains calcium and phosphorus from inorganic compounds. It comes from phosphate rock processed in different ways, directly or indirectly, resulting in various products on the market.

Feed phosphates used in animal nutrition include Mono Calcium Phosphate (MCP), Mono Dicalcium Phosphate (MDCP), Dicalcium Phosphate (DCP), and Tricalcium Phosphate (TCP).

General aspect

Fine grained flowing powder of light grey colour.

Observation

Quality control of mineral phosphates include analysis of granulometry, humidity, colour, and impurities content. Rock phosphate can contain several heavy metals that may be detrimental to animals. Fluorine is probably the most common element that may negatively affect an animal. Heavy metals that should be constantly monitored are fluorine, cadmium, and arsenic. Rock phosphate can also contain vanadium which can impact eggshell quality. To reduce the dust and waste produced in the feed factory, phosphates should be managed using pneumatic transporting. Minerals phosphates are hygroscopic product and it must be stored in dry conditions to avoid caking problems. Phosphates are detrimental to the pelleting process because they create significant friction at the pellet die.

General controls and acceptance requirements

Parameter to analyse	When	Parameter to analyse	Values				
			Normal	Reclaims	Decline		
Humidity (%)	Before Unloading	Basic	<1				>2
Phosphorus ¹ (%)			>20	>21	>22		
Calcium ¹ (%)			27	21	17		
Fluorine (ppm)		Extended	<2000				
Cadmium (ppm)			<10				
Arsenic (ppm)			<10				
Vanadium (ppm)			<7				
Solubility in citric acid (%)			>93				

¹Values for DCP anhydrous, MDCP hydrated, and MCP hydrated.