



July 2017

# Fertiliser and Stockfeed Acceptability Statement

## Rural Industry Certification and Accreditation Programs “Approved Suppliers”

Food processors and supermarket chains often require farmers and graziers to implement Quality Assurance (QA) programs, as part of food safety programs. Freshcare, the horticultural industry’s farm assurance program, is an example.

As part of such programs, farmers are required to seek quality assurances from their suppliers of services and materials, including planting materials, soil ameliorants, fertilisers, agricultural and veterinary chemicals and stockfeeds, and only source these from approved suppliers that meet agreed specifications.

This document covers those topics that farmers and graziers most commonly raise with fertiliser suppliers. It provides information on Incitec Pivot products and the company’s commitment to primary producers in the production of clean and safe food.

## Incitec Pivot Fertilisers

Incitec Pivot Fertilisers is an Australian fertiliser company that is committed to providing products and services that meet customer needs.

Manufacturing a wide range of fertilisers in Australia, Incitec Pivot Fertilisers also imports fertilisers from overseas, and sources them from other suppliers, in order to offer a comprehensive product range throughout eastern and southern Australia.

Some fertiliser products have dual uses as mineral supplements for livestock, i.e. ruminants such as cattle and sheep.

## Domestic Fertiliser Manufacture

Incitec Pivot Limited has a number of fertiliser manufacturing facilities in Australia.

DAP, MAP and Granulock<sup>®</sup> Z, a zinc enriched ammonium phosphate fertiliser, are manufactured at Phosphate Hill in north west Queensland using locally mined phosphate rock.

Anhydrous Ammonia (BIG N<sup>®</sup>), Urea, and granulated ammonium sulfate (Gran-am<sup>®</sup>) are manufactured in Brisbane.

Single superphosphate (SuPerfect<sup>®</sup>) is manufactured at Geelong and Portland in Victoria.

## **Fertiliser Imports**

Incitec Pivot Fertilisers supplements local production with imports of a number of fertiliser products including urea, calcium ammonium nitrate (Cal-Am), DAP, MAP, Muriate of Potash, Sulfate of Potash, urea ammonium nitrate solution (EASY N), compound and trace element fertilisers.

Imported fertilisers are sourced in compliance with the Fertilizer Australia Purchasing Code of Practice.

## **Regulatory Requirements**

In Australia, fertilisers and mineral supplements for livestock must meet certain standards and be labelled in accordance with State Acts.

Fertilizer Australia, the Australian fertiliser industry association, has also developed a “National Code of Practice for Fertilizer Description and Labelling” for use by members.

## **Compliance**

Incitec Pivot Fertilisers has set internal product specifications for domestically manufactured and imported fertilisers that meet regulatory requirements and comply with the Fertilizer Australia “National Code of Practice for Fertilizer Description and Labelling”, and meet market needs. The specifications take into consideration what products are readily available and are of good quality, at a competitive price.

Locally produced fertilisers are manufactured to these specifications. Routine laboratory analyses are performed at the company’s Production Control Laboratories at Phosphate Hill, Brisbane and Geelong to ensure these products meet specification. The Geelong Laboratory also services Portland.

With imports, a Specification Sheet is sought from the supplier, to check that it meets Incitec Pivot Fertilisers’ product specifications, prior to its importation.

Certificates of Analysis are sought, and routine samples are taken after arrival for laboratory analysis to check that products are within specification.

Fertilisers must meet analysis as far as their nutrient content is concerned, and be within the maximum limits set for impurities.

## **Certificates of Analysis (COA)**

Incitec Pivot Fertilisers does not provide a Certificate of Analysis for individual despatches of fertiliser (and products that have dual uses as stockfeed supplements) into the Australian agricultural market.

Certificates of Analysis are only provided for bulk export shipments of fertiliser.

Information on the nutrient content of Incitec Pivot products is shown on the product label.

## **Product Labels (Bag Tags)**

Incitec Pivot product labels provide information on:

- The analysis of the fertiliser, and the forms in which the nutrients are present.
- The maximum concentration of impurities.

For fertiliser that is supplied in 25 kg packs, the label information is either shown on the package, or affixed to the package at the time it is filled.

For Flexible Intermediate Bulk Containers or FIBCs (Bulk Bags), a Bag Tag is inserted into the pouch on the Bag.

For liquid fertilisers in Intermediate Bulk Containers (IBCs), the label is attached to the IBC.

For bulk deliveries, a copy of the Bag Tag is attached to the Delivery Advice.

## **Blends**

With blends, some segregation of the ingredients may occur, which may lead to some variation from the stated analysis.

## **Sizing and Density**

Sizing and Density information is not shown on the product labels of fertilisers.

Data on the physical sizing and bulk density of Incitec Pivot products can be found on the Incitec Pivot Fertilisers website, under “Products”.

<http://www.incitecpivotfertilisers.com.au/Products/Bulk%20Density%20and%20Sizing>

## **Fertiliser Impurities**

Fertilisers contain various impurities. These are mostly derived from the raw materials used in their manufacture. Some impurities, such as biuret in urea, are formed during the manufacturing process.

Not all impurities are of concern. Where they are, fertiliser regulations may set Maximum Limits above which the product is deemed unsuitable for use and cannot be sold, and/or require the use of Label Warning Statements above specified concentrations.

Incitec Pivot fertiliser products and their labels comply with fertiliser regulations for impurities.

Some impurities may directly affect the health of plants or grazing animals.

Others, through regular fertiliser use, may accumulate in soils. If this in turn results in increased plant root uptake, it may affect the marketability of farm produce on domestic and international markets. There may be long term food safety and human health concerns.

Chief among the impurities for which regulatory controls have been set are:

- **Biuret** in urea and its cumulative effect on crop foliage when sprayed repeatedly during the growing season. This is of most concern in horticultural crops, particularly evergreen tree crops, such as citrus. Biuret is of no concern if the fertiliser is applied to the soil.
- **Fluoride (F)** in phosphorus fertilisers (>2% P) and its potential impact on grazing animals if ingested with forage following their application to pasture, or if used inappropriately as a direct mineral supplement for livestock;
- **Heavy Metal Impurities** (cadmium, lead and mercury) in phosphorus and metallic trace element fertilisers. Of particular concern is cadmium in phosphorus fertilisers, and its uptake by vegetables.

## Cadmium (Cd)

The Australia New Zealand Food Standards for cadmium in farm produce are most likely to be exceeded in root and tuber crops, e.g. potatoes, and leafy vegetables.

Typically, higher concentrations of cadmium are found in the roots, tubers of plants and leaves than in the grain and fruit (on a dry weight basis). Vegetable crops are also fertilised with higher rates of phosphorus than other crops.

Potato (and other vegetable) growers should choose fertilisers with as low a cadmium content as possible, certainly no more 150 mg Cd/kg P. If repeated applications of phosphorus are made at high rates, e.g. more than 100 kg/ha P per crop, it is desirable that fertilisers containing less than 100 mg Cd/kg P be used.

In Australia, the maximum allowable concentration of cadmium (Cd) in phosphorus fertilisers is 300 mg Cd/kg P. Incitec Pivot SuPerfect® (single superphosphate) is manufactured to this specification. It is primarily used on pasture.

SuPerfect® must not be used as the sole source of phosphorus when growing vegetables and in other risk situations where food standards for cadmium may be exceeded. Peanuts grown on sandy soils may also exceed the food standard for cadmium. Fertilisers with a lower cadmium content should be used in these circumstances.

As cadmium accumulates in soils, consideration not only needs to be given to the fertiliser used to grow crops most at risk of violating the food standards for cadmium, but also to that used in crops grown in rotation with them.

The high analysis phosphorus fertilisers marketed by Incitec Pivot Fertilisers, e.g. DAP and MAP, are low in cadmium compared to SuPerfect®.

The MAP and DAP produced at Incitec Pivot's manufacturing facility at Phosphate Hill in northwest Queensland, and that imported from overseas, typically contain less than 50 mg Cd/kg P.

Incitec Pivot MAP has a maximum label specification of 75 mg Cd/kg P. This allows for the occasional importation of product containing between 50 and 75 mg Cd/kg P (Max.).

All the complete NPK blends on the Incitec Pivot Fertilisers product range that have been formulated for use in vegetable crops contain less than 150 mg Cd/kg P.

## Microbial Contaminants

Microbial contamination of farm produce, where it occurs, is often attributed to the use of untreated organic wastes, e.g. manures, close to planting or during the growing season. Freshcare guidelines stipulate that such materials should not be applied within 90 days of harvest, or 180 days of the intended harvest date where the harvestable part of the plant is grown in or in direct contact with the soil, has an edible skin and is generally eaten uncooked.

The provisions relating to microbial contamination do not apply to Incitec Pivot products as they are free of organic material.

The fertilisers marketed by Incitec Pivot Fertilisers are classified as inorganic. They are obtained/derived from:

- Naturally occurring ores, e.g. Muriate of Potash;
- The processing of mineral ores, e.g. the acidulation of phosphate rock, to improve the availability of nutrients for plant root uptake, e.g. superphosphate;
- Or are chemically synthesized, e.g. ammonia and urea.

Dried pelletized poultry manure is stocked at some Distribution Centres for use in blends manufactured on behalf of other companies. Poultry manure is not used in any of the blends listed on Incitec Pivot Fertilisers' product range.

## Pesticides

Maximum Residue Levels (MRLs) have been set for agricultural and veterinary chemicals in farm produce, to ensure that they are used as directed on the label.

The only agricultural chemicals added to Incitec Pivot Fertilisers' products are fungicides, e.g. Flutriafol, for the control of soil-borne fungal diseases in grain crops. These products are used as planting fertilisers for grain crops. When fungicide is added to fertiliser, it is designated on the product label.

Nitrification and Urease Inhibitors are added to some nitrogen fertilisers, e.g. Entec Urea, Green Urea NV. These inhibitors are not classified as Pesticides (Agricultural Chemicals).

## Allergens

An allergen is a substance that can cause hypersensitive immune response (allergic reaction) in some consumers. The reaction may potentially be life-threatening after exposure by ingestion, inhalation or contact with the skin.

Some people may develop allergies to certain foods or food ingredients including peanuts, tree nuts (e.g. cashews, almonds, walnuts), shellfish, finned fish, milk, eggs, wheat (and gluten), sesame and soybeans and their derivatives, and sulfite preservatives at concentrations above 10 mg/kg.

As part of their Quality Assurance programs, farmers are required to ensure farm produce is not cross contaminated with other known allergens.

Incitec Pivot Fertilisers' products do not contain any of the allergens listed above. Even if they did, their presence in soil-applied fertiliser is unlikely to cause contamination of farm produce (food).

People with sensitive skin may suffer irritation to the skin, eyes and nasal passages from direct contact with or exposure to fertiliser dust or mist while handling and applying fertilisers. These conditions are not classified as allergies.

## **Mineral Supplements for Livestock**

Some, but not all Incitec Pivot products may be used as non-protein nitrogen and mineral supplements for ruminants (cattle, sheep). These include:

- Urea (Granular Urea, Prilled Urea, Stockfeed Urea);
- Gran-am;
- Muriate of Potash.

The maximum concentrations of fluorine, cadmium, lead and mercury, the impurities most likely to be of concern when formulating stockfeed and mineral supplements, are detailed on the product labels of these products, and are within statutory requirements.

Incitec Pivot Prilled Urea and Stockfeed Urea have a smaller particle size than Granular Urea, so they dissolve more readily in water when preparing licks. Prilled Urea is available in north Queensland, Stockfeed Urea out of Brisbane (Gibson Island). Prilled Urea is imported. Stockfeed Urea is obtained by screening under-sized granules from Granular Urea at the time of its manufacture.

The granular phosphorus fertilisers marketed by Incitec Pivot Fertilisers, e.g. DAP, MAP, and SuPerfect®, must not be used as phosphorus supplements. These products are too high in fluorine (F) for direct mineral supplementation to livestock.

## **Storage Life and Use-By Dates**

Expiry dates are not applicable to the fertilisers marketed by Incitec Pivot Fertilisers with the exception of some products containing inhibitors, e.g. Green Urea NV.

Fertilisers do not change chemically with the passage of time. Their nutritive value remains unchanged.

Solid fertilisers may change physically, which can make them difficult to apply. Fertilisers may absorb atmospheric moisture, causing them to cake. They are also prone to pressure setting in storage.

Some granular fertilisers store better than others. Fertilisers that have a low Critical Relative Humidity, such as Cal-Am, are most likely to absorb moisture. Blends have poorer storage characteristics than straights. Fertilisers that are prone to absorbing atmospheric moisture, caking and setting should be ordered as required, and used quickly. They should not be stored for extended periods of time.

Incitec Pivot liquid fertilisers such as Urea Ammonium Nitrate Solution (EASY N) do not deteriorate over time. Nutrients are not lost in storage. Salting out may occur at low temperatures or if water is lost from the fertiliser solution through evaporation.

The packaging of solid fertilisers may degrade over time. Woven polypropylene (WPP) fertiliser packs deteriorate if exposed to sunlight.

## **Withholding Periods**

Withholding Periods do not apply to fertilisers, like they do to pesticides. With agricultural and veterinary chemicals, failure to comply with the label may result in residues in farm produce, e.g. fruit, vegetables, meat and dairy products, exceeding the Maximum Limits. This may result in the produce being rejected, and being withdrawn from sale.

This will not happen with fertilisers. Fertilisers supply nutrients in forms that occur in nature. They supplement the soil in supplying nutrients in forms readily available for plant uptake. There are no laboratory tests to detect their use.

Withholding periods for fertilisers are of a precautionary or advisory nature, and are primarily intended to protect the health of grazing animals.

In crops, fertilisers are not normally applied in the final weeks before harvest. It is too late to expect a crop response to fertiliser if applied at this stage.

Pasture and forage crops, however, may be grazed within days or weeks of applying fertiliser. In some instances, it may even be impractical to remove stock and spell the paddock.

## **Animal Health**

The health of livestock may be affected in two ways after applying fertiliser.

Firstly, there may be direct ingestion of recently applied fertiliser, as a result of fertiliser granules or dust lodging on the leaves of the pasture or forage crops,

Secondly, plant concentrations of nutrients taken up from the soil by plant roots may remain high for several days or weeks after the application of fertiliser, depending on when and how much rain (or irrigation) is received, and how quickly regrowth occurs.

Animal health may be directly affected by the fertiliser and the nutrients and impurities it contains, or indirectly as a result of induced imbalances, deficiencies and toxicities.

The risks are not high, but there are circumstances where the use of fertiliser has temporarily affected the health of grazing animals, e.g. fluorosis from the fluorine present as an impurity in phosphorus fertilisers, or induced copper deficiency where molybdenum has been applied.

In other cases, the use of fertilisers has resulted in sudden death. This is more likely to occur where nitrogen fertilisers are applied.

Urea poisoning has occurred where clumps of urea fines have fallen from the spreader and subsequently been ingested by cattle.

Nitrate poisoning has occurred where stock have had access to fresh green pick, in which nitrate has been taken up from the soil, but not yet assimilated into protein in new plant growth. Nitrate poisoning is most likely to occur where little other forage is on offer.

If practical, it is best to remove animals from areas being fertilised, and not to readmit them until after rain is received or irrigation applied, and regrowth occurs, i.e. for three to four weeks. This minimises the risk of direct ingestion of fertiliser (by washing fertiliser residues from the leaves), and nitrate poisoning of grazing animals from young regrowth.

## **Spelling Paddocks from Grazing after applying Nitrogen Fertiliser**

It is best to wait for three to four weeks after applying nitrogen fertiliser before grazing.

Stock may be able to be reintroduced to the paddock within a couple of weeks where rapid growth occurs. Where growth is slow, it may be best to wait for a month or more.

High nitrate concentrations in the young shoots during the early stages of regrowth may result in nitrate poisoning and the sudden death of grazing animals.

Nitrate concentrations fall as plant growth occurs, due to dilution and the conversion of nitrate to protein.

## **Spelling Paddocks from Grazing after applying Phosphorus Fertiliser**

Phosphorus fertilisers, such as Incitec Pivot SuPerfect (single superphosphate) and DAP, contain fluoride (F) as an impurity. This is derived from the fluorapatite (phosphate rock) used in their manufacture. If ingested directly, excess fluoride in the diet can induce fluorosis in livestock.

It is recommended that pasture not be grazed for three weeks or until rain or irrigation is received after topdressing with phosphorus fertilisers. Stock can be readmitted within three weeks if rain (or irrigation) has been received to wash fertiliser residues from the leaves.

There is no need to wait until regrowth occurs, as is recommended with nitrogen fertilisers.

## **Spelling Paddocks from Grazing after applying Molybdenum (Mo)**

Molybdenum is often applied to legume based pastures as molybdenum fortified superphosphate, e.g. SuPerfect Mo 0.025%.

In the weeks after application, plant levels of molybdenum may be high, either as a result of the fertiliser lodging on the leaves, or uptake of molybdenum by plant roots from the soil.

Elevated concentrations of molybdenum in the pasture may induce copper deficiency in grazing animals. This is most likely to occur on sandy soils low in copper.

It is advisable to spell paddocks for up to four weeks after applying molybdenum.

## **Continually Grazed Set Stocked Pastures**

If the paddock cannot be de-stocked and spelled, e.g. on small holdings and acreage blocks, and fertiliser is required, it should be applied when rain is expected or before irrigating, and conditions (soil moisture, temperature) are favourable for regrowth.

Do not apply in drought, and when there is little forage on offer to grazing animals. Stock should have access to a good body of standing feed.

This minimizes, but does not eliminate the risk to grazing animals.

## Advice

Farmers not only want to know that products they are buying are suitable for the intended use, they are also looking for advice on how to use them.

Incitec Pivot Fertilisers operates a soil, plant tissue and water analysis laboratory. The Nutrient Advantage service is certified by the Australasian Soil and Plant Analysis Council (ASPAC) and accredited by the National Association of Testing Authorities (NATA).

Incitec Pivot Fertilisers is a Fertcare<sup>®</sup> accredited organisation. The company's agronomists and sales advisory staff are Fertcare<sup>®</sup> accredited.

## The “Nutrient Advantage” Soil, Plant Tissue and Water Analysis Service

Incitec Pivot Fertilisers has Australia's oldest commercial soil testing service, with antecedent companies having operated laboratory services since 1963.

The Nutrient Advantage Laboratory is located at Werribee in Victoria. It is equipped to process in excess of 100,000 soil, plant tissue and water samples per year.



The laboratory is independently audited and accredited by the National Association of Testing Authorities (NATA) for compliance to the Australian and international standard AS ISO/IEC 17025.



In order to meet a requirement of NATA accreditation the laboratory regularly participates in inter-laboratory proficiency studies coordinated by the Australasian Soil & Plant Analysis Council (ASPAC). The Nutrient Advantage Laboratory is certified by ASPAC as meeting the proficiency criteria for a wide range of soil and plant nutritional assays.

Management and staff at the Nutrient Advantage Laboratory are committed to generating high quality analytical results in a timely fashion in order to support fertiliser application recommendations.

The “Nutrient Advantage Advice” Decision Support System is used to report laboratory results and recommend nutrient rates and products to customers.

The company's agronomists developed this software program. It is based on many years of research, consultation with Government researchers and advisers, and experience.

## **Fertcare®**

The Fertcare® program is a joint initiative between the Australian Fertiliser Services Association (AFSA) and Fertilizer Australia.

This national training and accreditation program aims to ensure that farmers receive consistent and quality advice on using fertilisers for optimum production, protection of the environment and food safety.

Incitec Pivot Fertilisers is Fertcare® accredited organisation.

Key staff in the sales and Distribution teams are Fertcare® accredited. Company Agronomists undertake Fertcare® training soon after being appointed to an advisory position.

Fertcare® accredited advisers are independently assessed and audited. This helps ensure that the detailed plant nutrition advice that they provide, based on soil and tissue testing, takes account of environmental and food safety issues and is based on the best available science.

## **Further Reading**

Agritopics on “Heavy Metals in Fertiliser and Agriculture” and “Managing Cadmium in Vegetables” are available, in which these issues are discussed in more detail.

Various other Agritopics are also available, including those on the nutrients that are important in plant nutrition.

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