

Turf nutrition





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fertiliser selection

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Considerations in fertiliser selection

Considerations in turf nutrition

- Always soil test at least three times per year to determine nutrient loadings in the profile.
- Knowing your soil's CEC is essential when deciding which fertiliser technology to use. The lower your CEC value is then the more regular fertiliser applications need to be. Therefore your choice in fertiliser technology should be directed to CRF (Controlled Release Fertiliser), SRF (Slow Release Fertiliser) and SRK (Slow Release Potassium) formulations.
- The form of nutrients supplied should be investigated.
- Avoid fertilising when the turfgrass is under environmental stresses, particularly heat and moisture stress. Ideally fertilisation is about pre-conditioning the turfgrass plant prior to the onset of environmental stresses. By achieving a balanced bank of elements for the plant to draw on, this will limit pest activity and result in better recovery from disease, moisture/heat stress and insect damage.
- Have a good understanding of the site's soil profile in terms of its physical make up. For example percolation rates will determine the speed of water movement through the profile. High percolation rates will mean that fertiliser will also pass through the profile quickly; therefore one should be mindful as to the amounts and forms of actual fertiliser applied so it is not wasted in the drainage water.

The soil's nutritional and physical make up is vital in determining the capacity to grow quality turfgrass. Nutrition practices are all dependent on a number of factors including:

- Turfgrass species (C4-C3)
- Height of cut
- CEC (Cation Exchange Capacity), the capacity for a soil to retain and exchange cations (Ca, K, Mg, Na)
- Environmental factors
- Above all, the main question for turf managers is what surface are you trying to achieve?

Turf grass species

C4 grasses (warm season) and C3 (cool season grasses) have differing photosynthetic pathways. Generally, C4 grass types have a minimum optimum temperature of 27°C for shoot growth and a minimum optimum temperature of 24°C for root growth. C3 grasses have a minimum optimum temperature of 15°C for shoot growth and a minimum optimum temperature of 10°C for root growth.

Therefore applications of fertiliser outside of these optimums should make up in part the decision on amounts of actual NPK applied.

Height of cut

Cutting turf below its preferred mowing height causes the plant's carbohydrate supplies to become depleted. This will reduce root growth and result in smaller, shallower root systems.

Eventually, the plant may become more susceptible to environmental stresses.

However let's face it, to maintain an acceptable putting surface, playing field, bowling green or high end sports arena, the height of cut is always well below the plants natural growing height.

Although turfgrasses can withstand low mowing heights, extra efforts are required in nutrition to maintain quality by continuously topping up carbohydrate reserves (energy from nutrition).

Considerations in fertiliser selection



CEC

Knowing your soil's CEC is essential in deciding which fertiliser technology to use.

The industry is littered with unsubstantiated claims on fertiliser longevity, absorption and performance. The best way to determine soil nutrition is not to guess but by performing a soil test.

The crucial information is the level of elements, particularly K, Ca, Mg, and soil pH.

For example, a soil CEC of less than 1.5 means that the soil has little capacity to maintain and exchange cations such as K, Mg, Ca and Na. Therefore, in a sand profile a CEC reading of less than 1.0 means regardless of how much K you apply, the soil cannot bank these elements for a later date. Cations are generally very leachable in low CEC soils. In cricket wicket soils where the CEC can be higher than 45, larger amounts of cations can be applied as the capacity for that soil to hold onto these elements is greater.

Ultimately the lower your CEC value, the more regular fertiliser applications need to be. Therefore your choice in fertiliser technology should be directed to CRF, SRF and SRK formulations that are homogeneous in nature and release continuously over an extended period.

The form of nutrients supplied should also be investigated.

For example, if your site uses treated water and/or has heavy soils prone to compaction, the use of potassium sulphate or slow release potassium is a better choice than potassium chloride, which will contribute to salinity and over time will be detrimental. Under high evaporative conditions, salt crystals will form and scorch the turf.

Environmental factors

Being custodians of the land, so to speak, we must all be mindful to use practices that are environmentally responsible in producing the turf surfaces required by the end user (golf courses, stadiums, racecourses, etc.). For example, a site on a sand belt which may have natural aquifers beneath will require the nutritional needs to be monitored to avoid high nutrient loading leaching into underground waters.

Selecting fertilisers that have slow or controlled release mechanisms will assist in limiting phosphate and nitrogen leaching.

Foliar feeding that limits the need to irrigate following an application of fertiliser will also assist in reducing risk of leaching.

Testing of drainage water after and before rain can act as a handy tool to determine nutrient loading leaving the site.

Logging test results also shows due diligence to local government authorities.

► Scotts soil testing services

Scotts soil testing services are available for all turf situations such as golf and bowling greens, amenity turf, fairways, sports fields and recreational turf.

Scotts' full nutrient test provides you with results on pH, EC, Phosphorus, Calcium, Potassium, Sodium, Organic Matter and Trace Element levels in your soil. Interpretation of Scotts soil tests is provided automatically with calculated recommendations from a researched set of guidelines that are considerate of soil type, grass species and maturity of turfgrass sward.

Scotts interpretation provides a complete summary of amendments and additives required to balance soil chemistry so that Scotts fertilisers work as intended, every time.

For true and accurate recommendations pertaining to tests results on an individual basis contact Scotts Australia or your local Scotts distributor who will have access to your results and be able to provide you with one-on-one service.

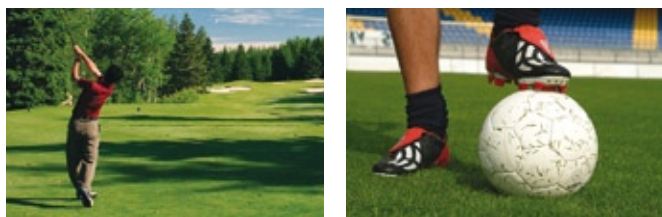
To organise your Scotts soil tests contact your local Scotts distributor who will assist you and provide a Scotts soil sample bag and Soil Analysis request form.

► Scotts Fact

A soil pH reading can be influenced by a number of factors, such as:

- Lime applications or sulphur-based fertilisers
- After applying organic matter
- Increased microbial activity
- When testing the soil only and not the thatch

A good tip is to take pH readings in winter when microbial activity is low. It is also advisable to take readings from both the thatch and the soil, as lime can be caught in the thatch after application and give a false high reading. As a general rule, maintain your pH between 5.5 and 6.5.



Sierrablen®

A complete range of fertilisers for tees, fairways and sports fields

Today's professional turf managers face a potentially bewildering choice of different fertiliser options. Scotts has found that a comprehensive choice is essential to meet the various needs of Australian and New Zealand turf managers so we offer one of the widest range of turf treatments available. The product range has been designed to help the turfcare professional select the right type of nutrient treatments, tailored to the specific needs of the turf.



Scotts offers you a complete range of fertilisers for tees, fairways and sports fields under the name Sierrablen. The Sierrablen products have been developed on the basis of two advanced Scotts coating techniques: resin coating, and/or Poly-S dual biodegradable coating of sulphur and a polymer. The resin and Poly-S coating guarantees continuous release of nutrients.

The principle of both coating technologies is based on moisture penetrating the granule and the nutritional elements being dissolved immediately after application of the fertiliser. They are released gradually over a period from 2-3 or up to 8-9 months, depending on the chosen Sierrablen analysis.

With controlled release of the nutrients, the turf grass receives the nutrients it requires every day. The thickness of the coating and the temperature advantage of controlled release fertilisers is that volatilization and the leaching of nitrogen and other nutrients is considerably lower than conventional fertilisers, thereby increasing efficiency and protecting the environment.

Sierrablen Mini: Poly-S and/or resin coated granules for close mown turf

Description	Analysis	Longevity (mths)	Application rate	Particle size	Scotts code
Super K Greens	0+0+37	5-6	20-30g/m ²	0.85-2.0mm	83045A
Fine Hi N	22+2+8	5-6	35-50g/m ²	0.85-2.0mm	8692
NPK Sportsturf	25+2+10	2-3	20-30g/m ²	0.85-2.0mm	4212
Nitrogen	38+0+0	2-3	15-20g/m ²	0.85-2.0mm	4170

Sierrablen: Poly-S and/or resin coated granules

Description	Analysis	Longevity (mths)	Application rate	Particle size	Scotts code
Turf Starter	16+11+10	2-3	25-35g/m ²	1.8-4.0mm	4280
NPK Turf + TE	18+0+15	2-3	20-30g/m ²	1.8-4.0mm	4175
Sportsturf + Fe	25+1+8	4-5	20-30g/m ²	1.8-4.0mm	4201

► Scotts Fact

Sierrablen is a controlled release fertiliser which, over a period of several months, delivers gradual nutrient release to the turf.

The name Sierrablen dates back to the 1970s before The Sierra Company became part of The Scotts Company. Sierra and Scotts combined to become a global leading turf nutrition company.

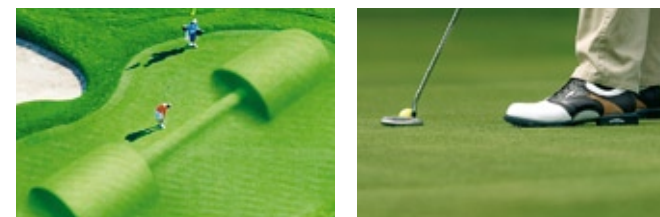
► Scotts Environmental Tip – Fertilising responsibly

Reduce leaching and increase efficiency of plant uptake of nutrients by:

- Fertilising based on regular soil testing to determine nutrient reserves
- Identifying the deposit or flow on point where drainage and leachate water may be directed. If there is a possibility of deposits into sensitive areas one should be mindful of the forms of N and P loading within the site
- The use of CRF and SRF type products has been proven to reduce nutrient leachate and possible off site contamination.

Sierraform® GT

Slow release potassium – a body building course for your greens



Unique slow-release potassium

Sierraform GT is an improved version of the familiar Sierraform. Its unique dual effect combines both slow-release nitrogen and slow-release potassium. The strength of slow-release potassium is that it's released throughout the effective period, whenever the grass plant needs it. Leaf analysis has shown a significant difference between Sierraform GT and fertilisers that do not contain slow-release potassium. The result is a stronger grass plant that's more resistant to cold, heat, drought and intensive wear – all year round.



Key features and benefits

- Dual effect thanks to slow-release nitrogen and slow-release potassium
- Maintains a higher bank of 'available K' in the sand/soil profile
- Small, physically uniform granules for even spreading, quick dispersion and minimal mower pick up
- Chemically uniform NPK + TE contained in every granule
- Optimum protection against stress: cold, heat, drought and wear. Proven increased efficiency of turf water consumption
- Guaranteed even growth and even colour
- Safe to use (no scorching) and virtually no leaching
- Slow release fertiliser mechanism not affected by mechanical cultivation techniques (aeration etc.)
- Disease activity is reduced. Recovery from disease is accelerated.

Taking the lead through innovation

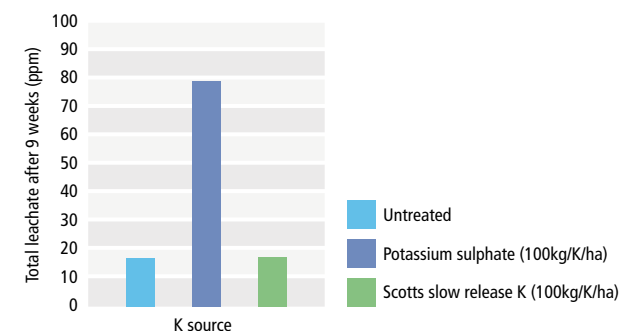
Scotts is constantly occupied with the development and improvement of its products. Scotts products give you the confidence that you are using the latest technology and that you are profiting fully from the most up-to-date insights in the field of fertilisation. Sierraform GT is a further-developed variant of Sierraform and is also based on the dosed release of nutrients. With Sierraform GT, you can choose various different analyses, all with a longevity of around eight weeks (dependent on environmental conditions).

The complete Sierraform GT program

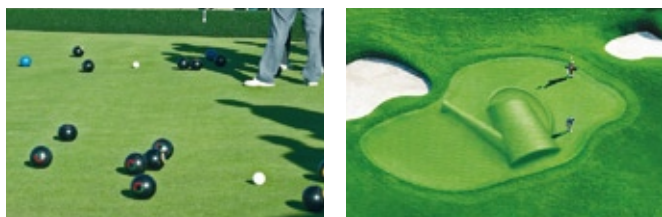
Product & Scotts code		Analysis	Mg	Cu	Fe	Mn	Mo	Zn
Spring Start 4014T	Activates spring green-up	16+0+13.3			1.0	0.3		
Momentum 4015T	Matches nutrient input during periods of strong growth	22+2.2+9.1	1.2	0.02	0.5	0.1	0.001	0.02
All season 4121T	Ensures well-balanced NK nutrients with less P	18+2.6+14.9	1.2	0.02	0.5	0.1	0.001	0.02
NK 4258T	NK fertiliser without P	19+0+15.8	1.2	0.02	0.5	0.1	0.001	0.02
Anti Stress 4105T	Optimum protection against stress	15+0+21.6			1.0			
K-step 4102T	Increased surface density and leaf turgidity	6+0+22.4	1.2	0.025	0.7	0.15	0.001	0.025
Pre Seeder 4085T	Ideal during grow-in and establishment	18+9.6+4.1						

The entire Sierraform GT range contains slow-release potassium.

Sierraform GT minimises leaching

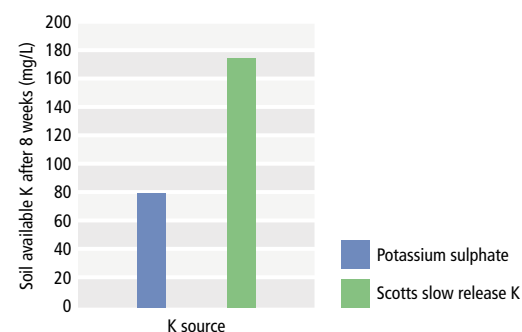


It is only recently that chemistry developments have enabled production of a slow release potassium in a plant-available form, ensuring a bank of available potassium in the soil profile for an extended time. Thus for turf professionals in the past, the application of K presented problems of leaching and raised salinity in its present form K_2SO_4 particularly in low CEC profiles. Sierraform GT has solved that problem.



Sierraform® GT

Scotts slow release K spoon feeds fine turf



Ref: Trial No E06TFL007, Levington Research Station, UK

The slow release potassium source in Sierraform GT provides a gradual release of potassium over time. This means that potassium losses are limited in terms of leaching and luxury consumption, leaving more available K in the soil for the plant at a later date. The effect is one of spoon feeding nutrients to the turf.

Improved drought tolerance

Potassium plays an important role in improving drought tolerance in turf plants; it enables chloroplast hydration during drought and salinity stresses and regulates transpiration.

As Sierraform GT delivers potassium in a slowly available form this extends the time span over which it can be effective for increasing stress tolerance. When potassium is delivered in a slow-release form, the plants' ability to withstand drought conditions is greatly increased.

Maximum power in a tiny granule

Each small, uniform Sierraform GT granule (0.7-1.4mm) will contain the same analysis as on the bag. These tiny granules are easy to spread, thus ensuring that the best coverage per square metre of turf is achieved. Every grass plant on your green therefore receives exactly the same quantity of nutrients. This results in even growth with a beautiful, uniform colour. Since the smaller Sierraform GT granules are absorbed into the soil so quickly, you can mow the grass again very soon after application, and players will not experience any disruption to play.

Safe and reliable

Since Sierraform GT has a regulated release pattern, its application is absolutely safe. There is virtually no risk of scorching, and there is practically no leaching. This is not only beneficial for the environment; it is also extremely economical. Every nutrient element in Sierraform GT reaches its intended destination: the plant.

Salt Index

- Salt Index is important, as injury to turfgrass plants can occur when fertiliser concentrations in the soil solution or in solutions on above ground parts are high enough to cause dehydration of plant cells due to osmosis
- The Salt Index of fertilisers is a measure of the osmotic pressure created in the soil solution by the addition of fertilisers
- Salt Index is expressed as the ratio of increase in osmotic pressure produced by a given material to that produced by the same weight of sodium nitrate (which is given a Salt Index of 100).

Salt Index of Nitrogen & Potassium sources

The slow release nitrogen (methylene urea; MU) and potassium source used in Sierraform GT has a significantly lower Salt Index compared to all other commercially available sources of nitrogen and potassium. This equates to improved safety to the turf.

Improved uptake of Nitrogen and Magnesium

Over application of cations such as potassium can create an imbalance in the base saturation of CEC sites. This is particularly relevant immediately after fertiliser application. By supplying potassium in a slowly available manner the soil chemistry is maintained in a sustainable equilibrium. Plant uptake of nutrients such as calcium, magnesium and nitrogen can all be inhibited by too much potassium. This is especially relevant in rootzones with a high sand content.

Improved Magnesium and Nitrogen uptake with Sierraform GT versus Sierraform

Significantly higher magnesium and nitrogen levels were found in the leaf tissue of turf treated with Sierraform GT compared with Sierraform. This highlights the benefits of maintaining the soil chemistry in equilibrium and minimising any inhibition of plant uptake caused by a rapid release of potassium.

▶ Scotts Fact

Potassium plays an important role in strengthening turf plants, making them more resilient under environmental stress conditions. However over-application of K can create a chemical imbalance in the soil profile and can inhibit the uptake of nutrients such as calcium and magnesium. By supplying K in a slowly available manner the soil chemistry is maintained in sustainable equilibrium.

Sportsmaster®

Optimal and cost effective fertilisation through blended controlled release fertiliser

The Sportsmaster range contains a number of products that can be flexibly deployed, so that within a budget an optimal fertilisation program can still be put together.



Scotts Sportsmaster's controlled release technologies are blended with conventional nutrient fertilisers, offering both the full controlled release of Sierrablen nitrogen and the fast growth produced by conventional fertiliser applications.

In addition, the Sportsmaster range contains a unique methylene urea product (27+1+3), specifically designed with a granule size that accommodates spreading on fairways, sports fields and other broadacre turf areas.

A distinct advantage of Super Sportsturf + Fe is that there is no need to irrigate.

Product technology

Standard NPK – fertiliser with small granules. Some analyses within the Sportsmaster range offer coated N or NPK granules blended with uncoated N, P and K granules and secondary elements.

Application

Coarse mown turf, sports fields, fairways and recreational turf.

Technical information

Sportsmaster	Analysis	Application rates	Particle size	Scotts code
Hi K + Mg	15+0+20	20-30g/m ²	1.8-4.0mm	4265
Hi N	22+2+8	20-30g/m ²	1.8-4.0mm	4266
Super Sportsturf + Fe	27+1+3	15-20g/m ²	1.7-4.0mm	8497A

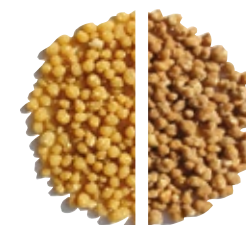
Conventional

Mini Prill free flowing upfront fertiliser

Conventional

Scotts new Conventional Mini Prill is a free flowing product comprising homogeneous prills. Conventional contains nitrogen and potassium but no phosphorus hence there is no phosphate leaching. It's ideal as a value upfront fertilising option for golf course fairways, tees and roughs and all sports fields and recreational turf.

The uniform prill provides even distribution to minimise spotting. Great for spring green-up. Available in two analyses, 16+0+10 and 26+0+10.



Technical information

Conventional	Analysis	Application rates	Particle size	Scotts code
Mini Prill	16+0+10	25g/m ²	2.0mm	4900
Mini Prill	26+0+10	18-25g/m ²	2.0mm	4905

Sierrasol®

Scotts premium water soluble fertiliser technology
– in solution it can be directly absorbed by the leaf or roots

Sierrasol

Sierrasol represents Scotts premium water soluble fertiliser technology – in solution it can be directly absorbed by the leaf or roots. With the addition of M-77®, an exclusive chelating agent that stimulates root hair development, the yields from Sierrasol are fast and obvious.

Use Sierrasol as a foliar or soil applied liquid fertiliser. At rates below 0.9kg/100m², Sierrasol can be left on turfgrass for foliar uptake. At higher rates of application, Sierrasol can be irrigated into soil for root uptake.

Technical information

Sierrasol	Analysis	B	Cu	Fe	Mn	Mo	Zn	Scotts code
Turf Hi N	28+2+15	0.01	0.011	0.13	0.05	0.01	0.033	3537

Key features and benefits

- Produces extremely rapid response in turf
- Ideal choice as a maintenance fertiliser
- Use in combination with Sierraform

Sierrasol is a water soluble fertiliser designed specially for grass and based on long-standing proven Peters® Professional® technology. Sierrasol dissolves easily in a water tank and can then be applied to the grass area requiring treatment. Sierrasol technology prevents the flocculation of main and trace elements so the tank remains free of sediments and no foliar residues form. Sierrasol contains M-77, developed by Scotts, which is a special package of vitamins and trace elements for grass.

► Only Sierrasol & Peters fertilisers contain M-77

M-77 is an important component in Sierrasol. This Scotts innovation optimises the availability and absorbability of all nutrient elements according to the principle: 'It's no just about what you offer a plant; it is primarily about what the plant absorbs.'

The strength and formulation of M-77 is a combination of ingredients. The effects of these ingredients ensure that nutrients remain available to the plant and optimise absorption. The combined actions of good availability of nutrients and optimum conditions directly around the roots make M-77 an indispensable component.

M-77 'unlocks' the roots, increasing the effectiveness of the nutrients. Only Sierrasol and Peters products contain M-77.



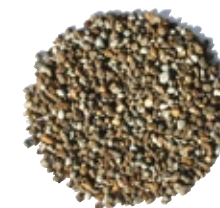
Step Hi-Mag

A package of essential trace elements especially for turfgrass application

Under the brand name STEP (Scotts Trace Elements Package) Scotts offers a well-balanced trace element product. STEP Hi-Mag is a package of essential trace elements especially for turfgrass application. The homogeneous trace element fertiliser has an ideal granule size (0.7-2.0mm) for use on greens. STEP Hi-Mag can be easily applied by using a Scotts spreader.

Advantages of STEP Hi-Mag

- It is highly concentrated and fine granulated for perfect distribution
- Can be used to pre-condition turfgrass against stress
- It can be applied in combination with an existing fertiliser regime
- STEP Hi-Mag has a high magnesium percentage



Technical information

Analysis					Application rate		Particle size
Mg	Cu	Fe	Mn	Zn	Maintenance	0.7kg/100m ²	0.7-2.0mm
12%	0.5%	8%	3%	1%	Construction	1.1kg/100m ²	

Greenmaster Liquid[®]

Liquid fertilisers designed to cover the majority of turf feeding requirements for all seasons



Introducing the next generation of liquid fertilisers

Scotts introduces the next generation of liquid fertilisers that take any guesswork out of caring for all turf situations. Our Greenmaster Liquid range consists of four high quality fertiliser solutions.



The Greenmaster Liquid range is designed to cover the majority of turf feeding requirements for all seasons.

The fertilisers in this range contain trace elements to boost performance and growth. All year round fertilising has never been easier or more effective.

The complete year-round solution

The Greenmaster range comprises Spring & Summer, High N, Autumn and NK formulations.

Using Scotts Greenmaster Liquid fertiliser range, you can have controlled growth through spring and summer.

The range offers professional turf managers the next generation of quality products.

	Spring & Summer 14+1.3+8.3+traces	High N 23+0+0	Autumn 8+1.7+13.3	NK 11+0+9.1+traces																								
Usage	Complete NPK formula for main season feeding without excess top growth.	Fast acting liquid feed for use on all turf areas during the spring and summer.	Designed for autumn and winter use or where extra potash and hardened growth is required. Low nitrogen content will not encourage disease	Use year round to aid management of soil phosphate build-up.																								
	Contains trace elements for improved growth and recovery.	Easily taken up by roots and leaves	Two-to-one potash to nitrogen ratio encourages hardened growth and discourages disease.	One-to-one potash to nitrogen ratio balances and toughens the sward.																								
	Gives up to four weeks response at high rate.			Contains trace elements to improve growth and recovery. Gives up to four weeks response.																								
Application rate	3 - 8L/1000m ²	4 - 12L/1000m ²	3 - 8L/1000m ²	3 - 8L/1000m ²																								
Area treated by 10L pack	Up to 3333m ²	Up to 2500m ²	Up to 3333m ²	Up to 3333m ²																								
Nutrient levels applied (kg/ha) from one application	<table border="1"> <thead> <tr> <th>Low rate 3L/1000m²</th> <th>Medium rate 4.5L/1000m²</th> <th>High rate 8L/1000m²</th> </tr> </thead> <tbody> <tr> <td>N P K 5.3 0.5 3.2</td> <td>N P K 7.9 0.7 4.6</td> <td>N P K 14 1.3 8.3</td> </tr> </tbody> </table>	Low rate 3L/1000m ²	Medium rate 4.5L/1000m ²	High rate 8L/1000m ²	N P K 5.3 0.5 3.2	N P K 7.9 0.7 4.6	N P K 14 1.3 8.3	<table border="1"> <thead> <tr> <th>Low rate 4L/1000m²</th> <th>Medium rate 6L/1000m²</th> <th>High rate 12L/1000m²</th> </tr> </thead> <tbody> <tr> <td>N P K 11 0 0</td> <td>N P K 16.5 0 0</td> <td>N P K 33.1 0 0</td> </tr> </tbody> </table>	Low rate 4L/1000m ²	Medium rate 6L/1000m ²	High rate 12L/1000m ²	N P K 11 0 0	N P K 16.5 0 0	N P K 33.1 0 0	<table border="1"> <thead> <tr> <th>Low rate 3L/1000m²</th> <th>Medium rate 4.5L/1000m²</th> <th>High rate 8L/1000m²</th> </tr> </thead> <tbody> <tr> <td>N P K 3.3 0.7 5.5</td> <td>N P K 5 1.1 8.2</td> <td>N P K 8.8 1.9 14.7</td> </tr> </tbody> </table>	Low rate 3L/1000m ²	Medium rate 4.5L/1000m ²	High rate 8L/1000m ²	N P K 3.3 0.7 5.5	N P K 5 1.1 8.2	N P K 8.8 1.9 14.7	<table border="1"> <thead> <tr> <th>Low rate 3L/1000m²</th> <th>Medium rate 4.5L/1000m²</th> <th>High rate 8L/1000m²</th> </tr> </thead> <tbody> <tr> <td>N P K 4.2 0 3.5</td> <td>N P K 6.3 0 5.2</td> <td>N P K 11.3 0 9.4</td> </tr> </tbody> </table>	Low rate 3L/1000m ²	Medium rate 4.5L/1000m ²	High rate 8L/1000m ²	N P K 4.2 0 3.5	N P K 6.3 0 5.2	N P K 11.3 0 9.4
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High N

Coverage (litres of product required)

Area treated	Low feed rate	Medium feed rate	High feed rate
Tennis court-regulation (262 m ²)	1L	1.6L	3.2L
Golf green (500m ²)	2L	3L	6L
Bowls green, six rink (1475m ²)	6L	8.8L	17.7L
1000m ²	4L	6L	12L
1 hectare	40L	60L	120L

Spring & Summer, Autumn and NK

Coverage (litres of product required)

Area treated	Low feed rate	Medium feed rate	High feed rate
Tennis court-regulation (262 m ²)	0.8L	1.2L	2L
Golf green (500m ²)	1.5L	2.3L	4L
Bowls green, six rink (1475m ²)	4.4L	6.6L	11.8L
1000m ²	3L	4.5L	8L
1 hectare	30L	45L	80L