Trained Fertilizer Applicator Training

ProFACT

Professional Fertilizer Applicator Certification and Training
2011 NJ Fertilizer Law
Enacted to Protect Water Quality

What you need to know:
- What’s Good for Turf can be Bad for Water Quality
- Risks of Turf Fertilizing
- How to Read Turf Fertilizer Labels
- How to Properly Use & Calibrate Fertilizer Equipment
- Review of the Law: How it Affects Your Job
Plants need 16 elements for growth:

From water and air come oxygen, carbon, and hydrogen.

The rest come from soil.

Fertilizers are applied to optimize nutrients in soil. The nutrients typically needed in fertilizers are…

- Nitrogen
- Phosphorus
- Potassium

If not applied properly, fertilizer nutrients intended for turfgrass can move into surface and ground waters.
What Can Happen to Nutrients After Application to Turf?

**GOOD**
- Taken up by plants and other soil organisms
- Stored in the soil on clay particles and organic matter

**BAD**
- Runoff in water or with soil erosion
- Leach into ground water when water carries them past plant roots
- Volatilize – nitrogen can convert to a gas & be lost to the air

Depending on how nutrients are applied to turfgrass, the outcome may be good or bad for business & the environment.
Turf, Nutrients, & Water Quality

- Turf cover of soil actually protects water quality by reducing runoff and soil erosion.

- Less runoff means there is less risk for nutrients and sediment (soil) to move off landscapes and pollute water.

- The goal of applying fertilizer nutrients is to have them taken up by plants and other organisms for growth or storage in the soil for later use.

- When properly applied, fertilizer nutrients help to maintain and, in some cases, improve turf effectiveness of reducing nutrient runoff and soil erosion.
Risks of Turf Fertilizing

- Good water quality is important for human, animal, and plant health. Excess phosphorus and nitrogen from applying fertilizer improperly can contribute to degrading both fresh and coastal water quality.

- In particular, excess phosphorus is the primary concern in freshwaters, while nitrogen is the main concern for coastal waters and drinking water supplies.
You’ve seen ponds like this, stagnant and covered with algae. This pond is “eutrophic.”

- This can happen naturally over a long period of time or it may happen “unnaturally” if a waterbody receives runoff containing excess nitrogen and/or phosphorus.
- Excess nutrients allow some plants to overgrow, throwing off the balance of organisms living in the pond, & leading to low oxygen levels in the water.
- Result: a body of water that can’t support diverse populations of living things.
When and Where Does the Law Restrict Fertilizer Application?

- To avoid runoff and leaching of fertilizer nutrients intended for plant health, don’t apply fertilizer to surfaces where it can’t be absorbed, when soil conditions are very wet or frozen, and when nutrient uptake into plants is slow.

- This is the basis for when & where fertilizer application is prohibited by the law.
Applications are prohibited before and during heavy rain and whenever soil is saturated or frozen.

Applications to impervious surfaces are prohibited and must be removed. Impervious surfaces include driveways, sidewalks, streets, porous pavement, paver blocks, gravel, crushed stone, decks, patios, elevated structures, and other similar structures, surfaces, or improvements.

Nitrogen and phosphorus fertilizer cannot be applied within 25 feet along water bodies (buffer area).
- The buffer distance can be reduced to 10 feet if the application is “directed.”
- One “rescue treatment” per year is allowed to turf between 10 and 25 feet from a waterbody.

Applications are prohibited after December 1st and before March 1st for professionals. Applications by consumers are prohibited after November 15th and before March 1st.
To decrease the risk of nitrogen and phosphorus fertilizer being applied at a rate beyond what is needed for turfgrass health, the law specifies the amount and form of nutrients that may be applied.
The “per application” rate of total nitrogen is limited to 1.0 lb per 1,000-ft\(^2\) and any amount of nitrogen above 0.7 lb must be applied as slow release nitrogen.

The annual nitrogen rate applied to turf is limited to 4.25 lb per 1,000-ft\(^2\).

Fertilizer applied to turf cannot contain available phosphate unless:

- a soil test (no more than 3 years old) indicates there is a need
- turf is being established for the first time
- turf is being re-established or repaired
- fertilizer is delivered under the soil surface directly to feeder roots
- using certain products with natural organic components containing phosphorus
Who is allowed to Apply Fertilizer?

- The Fertilizer Law requires training to ensure that Professional Fertilizer Applicators are aware of the risks from fertilizer to New Jersey waters and that fertilizer is applied as the law directs:
  - Professional fertilizer applications must be done by certified or trained applicators.
  - Trained fertilizer applicators must be supervised by a certified fertilizer applicator.
Any individual who applies fertilizer for hire, including any employee of a government entity who applies fertilizer within the scope of employment must obtain:

- **certification** as professional fertilizer applicator [referred to as “Certified Fertilizer Applicator”] or
- **training** if applying fertilizer under the direct supervision of a certified professional fertilizer applicator [referred to as “Trained Fertilizer Applicator”]

Direct supervision means that the Certified Fertilizer Applicator provides written instructions to the Trained Fertilizer Applicator and maintains immediate contact through a mobile phone or radio. Written instructions should include detailed directions for the application as well as spill response protocol.
The certification program provides professional fertilizer applicators with training and education in at least the following subject areas:

- the proper use and calibration of fertilizer application equipment;
- the environmental risks to water quality related to fertilizer use on turf;
- all applicable State and federal laws, rules and regulations;
- the correct interpretation of fertilizer labeling information;
- the best management practices developed by the Rutgers New Jersey Agricultural Experiment Station (NJAES) for nutrient management in turf.
Online training programs for Certified and Trained Fertilizer Applicators are available online at ProFACT.rutgers.edu

Organizations qualified by Rutgers NJAES may train certified professional fertilizer applicators and individuals who will apply fertilizer only under the direct supervision of a certified professional fertilizer applicator.

Rutgers NJAES may also recognize the training program of any person employing professional fertilizer applicators if the training meets the established requirements.

Public List of Certified and Trained Fertilizer Applicators

Rutgers NJAES publishes and maintains a list of all certified and trained fertilizer applicators at ProFACT.rutgers.edu
How to Read Turf Fertilizer Labels

Looking at a bag of fertilizer, you’ll find 3 numbers – for example:

22 – 0 – 10

This is the “Fertilizer Grade” which describes the analysis or guaranteed concentration by % of total fertilizer weight of the three most important nutrients:

% Total **Nitrogen** (N), % Available **Phosphate** (P$_2$O$_5$), and % Soluble **Potash** (K$_2$O)
When applying more than 0.7 lb per 1,000-ft\(^2\) of N to turf, the fertilizer must contain sufficient **slow release nitrogen** to keep the amount of **water soluble nitrogen** being applied to no more than 0.7 lb per 1,000-ft\(^2\).

As an example, an application of N at 1.0 lb per 1,000-ft\(^2\) to turf would need to have a minimum of 30% of the total N coming from slow release nitrogen.
Forms of Nitrogen in Fertilizer

Water Soluble Nitrogen

Water soluble nitrogen is readily available for uptake by plants and other soil organisms. It produces a rapid color and growth response in turf. These effects are usually apparent for 4 to 6 weeks.

Water soluble nitrogen has greater potential for foliar burn and loss through leaching and runoff.

Sources of water soluble nitrogen in turf fertilizers include urea, ammonium sulfate, potassium nitrate, ammonium nitrate, and ammonium phosphate.
Water Soluble Nitrogen & the Fertilizer Label

- The water soluble nitrogen is reported on the label of the fertilizer container as % Ammoniacal Nitrogen, % Nitrate Nitrogen, % Urea Nitrogen, and % Other Water Soluble Nitrogen.

- These forms are listed as a break-down of the total nitrogen (N) analysis on the fertilizer label. Below is an example of how these forms will be listed on the label.

Total Nitrogen (N) ...........................................................................................................% 
.................................................................% Ammoniacal Nitrogen 
.................................................................% Nitrate Nitrogen 
.................................................................% Urea Nitrogen 
.................................................................% Other Water Soluble Nitrogen
Forms of Nitrogen in Fertilizer
Slow Release Nitrogen

- **Slow release nitrogen** fertilizer delays and extends the availability of the nitrogen for plant uptake.

- **Slow release nitrogen** is available over a longer period of time and the turf response lasts longer.

- **Slow release nitrogen** also has a lower risk for foliar burn and loss through leaching and runoff.

- Sources of **slow release nitrogen** include natural organics, ureaform materials, coated soluble materials, and methylene ureas.
Slow Release Nitrogen & the Fertilizer Label

- Slow release nitrogen is reported on the label of the fertilizer container as % Slowly Available Water Soluble Nitrogen and % Water Insoluble Nitrogen.

- These forms are listed as a break-down of the Total Nitrogen (N) analysis on the fertilizer label. Below is an example of how these forms are listed on the label.

  Total Nitrogen (N) .................................................................%  
  ...........................................% Slowly Available Water Soluble Nitrogen  
  .................................................................% Water Insoluble Nitrogen

- In some fertilizers, the % Other Water Soluble Nitrogen may contain forms of water soluble nitrogen with slowly available properties. The guarantee for those forms is reported on the label as % Slowly Available Water Soluble Nitrogen (possibly as a footnote designated by an *) and is considered slow release nitrogen. The specific source (sulfur coated, methylene urea, feather meal, etc.) of slow release nitrogen, if claimed, is listed on the label using a footnote.
New Jersey law requires that the complete break-down for Total Nitrogen is listed as part of the guaranteed analysis on the label of specialty fertilizers for turf.

- Total Nitrogen (N) ................................................................. %
- ................................................................. % Ammoniacal Nitrogen
- ................................................................. % Nitrate Nitrogen
- ................................................................. % Urea Nitrogen
- ................................................................. % Other Water Soluble Nitrogen
- ................................................................. % Water Insoluble Nitrogen

Note that the sum of each % for break-down components will equal the % of Total Nitrogen.

The Certified Fertilizer Applicator is expected to understand how to use this information to calculate the percentages of slow release versus water soluble nitrogen.
New Jersey law requires that the label of specialty fertilizers for turf contain the following summary of best management practices for nutrient management in turf:

“Do not apply near water, storm drains or drainage ditches. Do not apply if heavy rain is expected.

Apply this product only to your lawn, and sweep any product that lands on the driveway, sidewalk or street back onto your lawn.”
Summary of the Label for Specialty Fertilizers for Turf

The following information (a–g), in the format presented, is the minimum required for all specialty fertilizer labels.

a. Net weight
b. Brand Name
c. Grade
d. Guaranteed Analysis
   Total Nitrogen (N) ..........................................................____%
   ___% Ammoniacal Nitrogen
   ___% Nitrate Nitrogen
   ___% Urea Nitrogen
   ___% Other Water Soluble Nitrogen
   ___% Water Insoluble Nitrogen
   (Break-down forms of N add to the Total Nitrogen guarantee)
   Available Phosphate (P₂O₅) ............................................____%
   Soluble Potash (K₂O) ........................................................____%
   (Note: If other nutrients are claimed, then those will also be listed in the Guaranteed Analysis. Zero guarantees are not allowed except in the chemical form break-down where they may be used if needed for clarity. Sources of nutrients, when shown on the label, shall be listed below the completed Guaranteed Analysis statement.)

e. Derived from: Source of nutrients, when shown on the label, shall be listed below the guaranteed analysis treatment.

f. Name and address of the licensee.

g. Directions for use to the end user. Minimum directions for use of specialty fertilizers include:
   i. Recommended application rate or rates in units of weight or volume per unit area of coverage (where application rates are given in volume, the label shall provide information to calculate the application rates by weight); and
   ii. Application timing and minimum intervals to apply the product when plants can utilize nutrients; and
   iii. The statement "Apply Only as Directed" or a statement of similar designation.
Proper Use of Fertilizer Equipment
Fertilize the Turf, Keep Fertilizer Out of NJ Waters

Granular Application

Liquid Application
Granular Application
Calibration and Equipment Use

Two basic equipment types: **Broadcast** and **Drop Spreaders**

◆ Each spreader should be used based on its specific characteristics for:

  ◆ Swath width
  ◆ Overlap distance
  ◆ Walking or vehicle speed
  ◆ Settings for “trim” areas along impervious surfaces and buffers

◆ Consult the Certified Professional Fertilizer Applicator and equipment manual for specific details on equipment setup and calibration.
Fertilizer manufacturers will often provide instructions on the fertilizer container regarding the proper settings for specific brands of spreaders.

Field calibration checks are done to ensure these settings are correct.

If the field calibration check indicates the setting are not accurate, the spreader:

- needs maintenance and re-calibration or
- should be replaced.

The Certified Fertilizer Applicator is responsible for performing or providing instructions on how to perform a field calibration check for spreading equipment.
Granular Application Review of Terms

**Swath width** – this is the distance (width) over which a spreader applies fertilizer.

**Overlap** – this is amount (%) of overlap that each successive pass (swath) of the spreader should deliver over the previous pass (swath).

The swath width and overlap distance determine the parallel distance between successive passes of the spreader. For example, if the swath width is 12 feet and the overlap is 100%, the parallel distance between passes should be 6 feet.

**Walking or vehicle speed** – this is speed that an applicator or machine travels while applying the fertilizer.

Is important to maintain a consistent walking or vehicle speed during the application to ensure an accurate rate of fertilizer is applied. The fertilizer application rate will be too high if the walking or vehicle speed is too slow.

Certified Fertilizer Applicators are responsible for providing Trained Fertilizer Applicators with instructions on the proper spacing between passes of spreading equipment and speed of operation.
Granular Application Spreadr Settings

Drop and rotary spreaders typically have a slide control setting that adjusts the size of the openings, which the fertilizer flows through. Increasing the size of the openings increases the rate of the fertilizer application.

This slide control is typically numbered or lettered. Calibration is performed to match specific settings with a specific application rate. Fertilizer manufacturers often perform calibrations of their products for various spreaders. Those results are then provided as recommended settings on the fertilizer labels.

The Certified Fertilizer Applicator is responsible for providing Trained Fertilizer Applicator with the proper slide control setting(s). The slide control setting should not be adjusted without approval of the Certified Fertilizer Applicator.
Granular Application
Spreader Deflector Shields & Buffer Size

Drop and rotary spreaders may have deflector shields to control the delivery pattern of the fertilizer.

For drop spreaders, the deflector shield is used to scatter the fertilizer and prevent the fertilizer from being dropped (delivered) as narrow lines or rows of fertilizer within the target area.

For rotary spreaders, a deflector shield is used to deflect the delivery pattern away from non-target areas such as sidewalks, streets, and buffers.

A buffer size of 25 feet is required when fertilizer is applied with a rotary spreader without a deflector shield. A drop spreader or a rotary spreader with a deflector shield must be used if a buffer size of 10 feet will be maintained.
Granular Application
Spreader Delivery Pattern Settings

◆ More advanced and accurate rotary spreaders have an adjustment (for example, helical cone) that optimizes the delivery pattern of the fertilizer application. This adjustment increases or decreases the amount of fertilizer that is thrown to one side of the delivery swath.

◆ Some rotary spreaders have a 3rd port adjustment as well as deflector shield and a helical cone. The 3rd port (opening) is open during normal operations but closed during ‘trim’ applications to reduce the flow of fertilizer from the hopper. The 3rd port, helical cone, and deflector shield are used in combination to more accurately control the delivery of fertilizer.

Certified Fertilizer Applicators are responsible for training Trained Fertilizer Applicators on how to use these adjustments during applications.
Liquid Application Calibration and Equipment Use

Training for the proper application of liquid is similar to granular applications.

- Correct flow rate of the liquid (calibrate)
- Swath width
- Overlap distance
- Walking or vehicle speed
- Settings for “trim” areas along impervious surfaces and buffers

Certified Fertilizer Applicators are responsible for training Trained Fertilizer Applicators on spray equipment setup and calibration. An example of calibrating liquid fertilizer equipment follows.
Select the Proper Head for the Desired Flow Rate

Handheld “shower-head” nozzles are often used for liquid applications on turf. These nozzles produce a large droplet size with low drift potential to prevent off-target application.

Select the proper “shower-head” nozzle for the desired flow rate. For example:

- 1.5 gallons per minute
- 2.0 gallons per minute
- 3.0 gallons per minute
- 4.0 gallons per minute

Nozzles are typically color coded for the intended flow rate.
After selecting the nozzle, confirm that liquid flows through the nozzle properly.

- Flow water into a measuring bucket for one minute.
- You should collect the expected amount of water after one minute.
- If there is more or less water in the measuring bucket, adjust the pressure regulator down or up and repeat the one-minute calibration measurement.
- Repeat until the pressure delivers the correct amount of water in one minute.
Liquid Application
Handheld Spray-gun Technique

 Spray Swath
A spray swath is created as the operator holds the spray-gun at a 45° angle to the body and swings the spray-gun back and forth across his/her body. The applicator’s arm should swing fast enough to hit an area within the swath three times with the spray.

 Width
Shower-head nozzles are typically used to apply a swath width of 8 feet.

 Overlap
The stop and return motion of the operator’s arm swing creates a spray distribution that requires a 100% overlap between successive passes so that application has an even distribution. Thus, an applicator should overlap 4 feet between each parallel pass (8 foot swath).

A typical walking speed is 20.5 feet in 5 seconds (2.8 mph) for handheld sprayer applications.
Liquid Application
Handheld Spray-gun for Trim Application

Trim application along sidewalks, streets, and buffers are performed using a half-swath with a handheld spray-gun.

- The applicator walks along a position that is 1.5 feet from the non-target edge.
- To start the application and avoid “burn”, the handheld spray-gun is held pointing away from the non-target edge. The spray is triggered as the applicator’s arm swings toward the non-target edge.
- Applicator uses a half-swing of the arm to create a swath that is 4 feet wide and throwing the spray back into the turf area (away from the non-target area).
- Walking speed is increased to 26 feet in 5 seconds (3.5 mph).

First pass after the trim pass, move over 4 feet and use the full (8 feet) application swath. Spray back to foot tracks from previous pass.
Proper Use of Fertilizer Application Equipment
Mixing & Loading Practices

- Take care to avoid spills while mixing and loading fertilizer. Spills should be cleaned up immediately. Regular spills of small quantities in the same place or on paved surfaces with the potential to wash away, put water quality at risk.
Proper Use of Fertilizer Application Equipment
Mixing & Loading Practices

**Basic Guidelines:**

- Park fertilizer application and transport equipment on level ground. Avoid slopes that lead to open water or stormwater drainage features.

- Avoid mixing and loading fertilizers near a well, surface waterbody, drainage feature, or paved surface that drains into a stormwater drainage system. Stay 100 feet or more downslope from any well.

- Place a tarp under fertilizer spreaders and hoppers when mixing and loading granular fertilizers to contain spills.

- Have brooms, shovels, and buckets available for immediate cleanup.

- Sweep small spills off trailers and hoppers onto the tarp and collect for distribution to intended target (turf).
Proper Use of Fertilizer Application Equipment
Mixing & Loading Practices

Liquid Fertilizer Guidelines

- Mixing and loading liquid fertilizers on an impervious pad with a containment slope/curb and a sump that allows collection and transfer to storage is preferred.
  - Avoid mixing and loading on impervious surfaces (driveways, streets, parking lots) that drain into a stormwater sewer system or surface water body.
  - Mixing and loading above a clay surface is better than sand or gravel; sand and gravel allow the fertilizer to quickly soak through the soil.

- Use a water source for mixing liquid fertilizers that is separate from a well to fill the sprayer tank; for example, a separate water tank. Anti back-siphon devices on wells are required by New Jersey law. Do not put the hose into the spray tank; leave an air gap of 6 inches between the hose and top of the sprayer tank.

- Always supervise filling of the sprayer. Don’t walk away while it’s filling.

- Consider a closed handling system which transfers the fertilizer directly from the storage container to the spray tank through a hose.

- Use rinsate for mixing subsequent loads or apply the rinsate to the turf.

- Limit the number of fertilizer transfer/loading sites within a facility whenever feasible.
Spill Cleanup Procedures

- All personnel handling and applying fertilizer should have a copy of standard operating procedures (SOP), which describes the procedures for fertilizer spill response.
- The fertilizer spill SOP should identify personnel responsible for clean-up and the chain-of-command for documenting remedial actions.
- In the event that a fertilizer spill does occur, the following steps should be taken:
  - Contain spills on tarps placed under loading trailers and application equipment receiving the fertilizer.
  - Have buckets and shovels available for immediate clean-up of dry granular fertilizers.
  - Have absorbent materials (clay & gel based materials) available for immediate clean-up of liquid fertilizers.
  - Sweep small spills off trucks, trailers, and hoppers onto the tarp and distribute this material within the intended target field.
Reporting Fertilizer Spills

- Report spills of any amount into streams or lakes. Report spills of more than 50 gallons on the soil or a mixing/loading pad. Smaller quantity spills should be reported if these could cause damage because of the nature of the material or spill location.

- To report, call the 24-hour Emergency Hotline of the New Jersey Department of Environmental Protection (DEP) at 1-877-WARNDEP / 1-877-927-6337

- Remove the spilled material and contaminated soil and dispose according to DEP recommendations.

- Prepare an emergency response plan for the site. You should understand where runoff will go, how to handle your particular fertilizers, and whom to call for help.
Review - New Jersey Fertilizer Law for Professional Fertilizer Applicators

- Prohibited applications of nitrogen and phosphorus fertilizer include:
  - Applications are prohibited before and during heavy rain and whenever soil is saturated or frozen.
  - Applications to impervious surface are prohibited and must be removed. Impervious surface include driveways, sidewalks, streets, porous pavement, paver blocks, gravel, crushed stone, decks, patios, elevated structures, and other similar structures, surface, or improvements.
  - Applications are prohibited after December 1st and before March 1st for professionals. Applications by consumers are prohibited after November 15th and before March 1st.
Review - New Jersey Fertilizer Law for Professional Fertilizer Applicators

Restrictions on nitrogen and phosphorus fertilizer use include:

- N and P fertilizer cannot be applied within buffer areas (25 feet) along water bodies.
  - When using a “directed” application, buffer size can be reduced to 10 feet.
  - One “rescue treatment” per year is allowed to turf growing between 10 and 25 feet of a waterbody.

- Turf fertilizers must not contain available phosphate. Only apply phosphate if prescribed by a soil test that is no more than 3 years old; when new turf is being established or repaired; or when using certain products with natural organic components containing phosphorus.

- The maximum “per application” rate of N is 1.0 lb per 1,000-ft².
  - Applications cannot apply more than 0.7 lb per 1,000-ft² water soluble nitrogen.

- The annual rate of N cannot be more than 4.25 lb per 1,000-ft².

- Professional fertilizer applications must be done by certified or trained fertilizer applicators. Trained fertilizer applicators must be supervised by a certified fertilizer applicator.