

The 4 R's of nutrient stewardship

Best management practices for using ESN follow the 4 R's of nutrient stewardship:

- use the right product,
- at the right rate,
- at right time, and
- in the right place.

When N loss is minimized, the nitrogen available to growing plants is maximized. Smart use of nitrogen is an excellent way to ensure viable and productive resources for years to come.

As a result of its environmental benefits, ESN technology is eligible for government incentives through a National Conservation Stewardship Program as well as some EQIP programs (US only). For more information, visit SmartNitrogen.com.



For more information about ESN technology or to locate the field representative in your area call **800-403-2861**.



Agrium Advanced Technologies (AAT) is a strategic business unit of Agrium Inc. AAT produces and markets controlled-release nutrients, micronutrients and plant protection products for sale to the agricultural, professional turf and ornamental markets primarily in North America.

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Environmentally Smart Nitrogen



ESN technology helps reduce N loss

ESN is the most advanced fertility product in decades. Traditional N applications require careful management and can still result in significant N loss. Leaching can lead to 60% loss, volatilization losses can be up to 40% and denitrification can lead to up to 60% N loss. ESN technology delivers N when the crop needs it, with significant reductions in the risk of loss to the soil, air and surrounding watershed. ESN technology is a smarter way to grow.

Nitrogen efficiency yields improved results

ESN technology helps maximize N use efficiency in a way that is also environmentally friendly. Results for crop production include:

- Maximize yield
- Maximize quality
- Maximize seed application safety
- Wider application window, convenience and ease of use
- Safe for the environment, government purchase incentives may apply
- Backed by independent research

Environmental loss mechanisms defined

Volatilization is the loss of nitrogen to the atmosphere as ammonia gas. This most often happens when nitrogen is applied on the soil surface in the organic form of urea, and is not incorporated quickly.

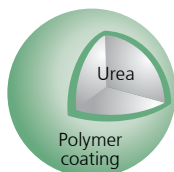
Denitrification is when anaerobic microorganisms strip the oxygen from nitrate, producing nitrogen gas, nitric oxide, or nitrous oxide, which release to the atmosphere. This occurs in wet soils, compacted soils, and warm soil temperatures when readily decomposable organic matter is present.

Leaching is the movement of plant nutrients in the soil solution below the root zone. This occurs most frequently in coarse-textured, cracked or sandy soils, during higher levels of precipitation or irrigation, with excessively applied fertilizers, or when there is a limited plant root zone.

How ESN technology protects against N loss

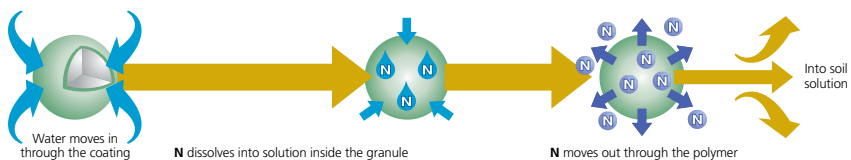
Coated nitrogen granules

ESN technology uses a flexible, micro-thin polymer membrane to encapsulate an N granule. The coating protects the N from loss mechanisms, releasing it when the crop needs it most.



Temperature controlled release

The unique polymer membrane allows water to diffuse into the granule, dissolving the N inside and becoming a water and urea solution. The same growing conditions that favor plant growth and nutrient demand are the conditions that release N from the polymer coating: moisture and temperature. Moisture creates the N solution inside the coating, which that moves through the coating at a predictable rate that is based on soil temperature.



ESN is the only controlled release nitrogen designed for agriculture that delivers a significant return on investment through increased nitrogen efficiency.

