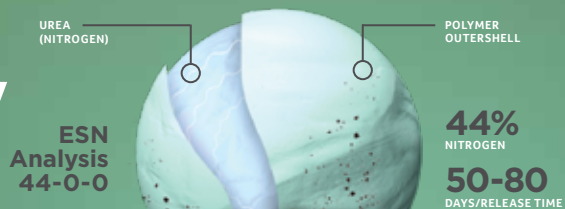


How ESN Technology Works



Coated Nitrogen Granules

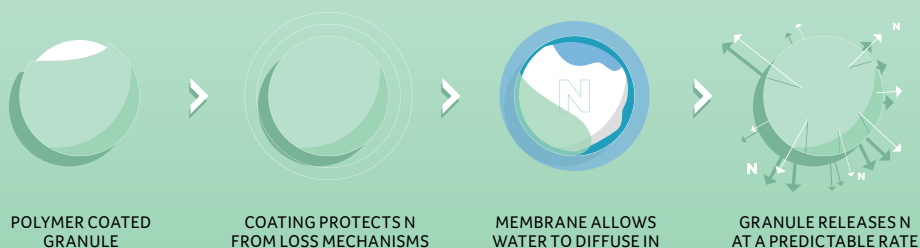
ESN technology uses a flexible, polymer coating to encapsulate an N granule. The coating protects the N from loss mechanisms, releasing it when the crop needs it most.

Temperature Controlled-Release

The unique polymer coating releases N based on the two requirements for crop growth: moisture and temperature. Moisture creates an N solution inside the coating, and the solution moves through the coating at a rate based on soil temperature. The movement and rate match the N demand of the growing crop.

Backed by Independent Research

ESN is backed by over 800 crop years of testing by independent, third-party researchers. The data is proof of performance for a unique product.



Reduced N Loss



ESN
SmartNitrogen

- Enhances nitrogen use efficiency
- Improves crop yield and quality
- Provides convenience through ease of use
- Environmentally responsible



Learn more about the industry's leading environmentally smart nitrogen at smartnitrogen.com

Nutrien



ESN Technology Helps Reduce N Loss

ESN is the most advanced fertility product in decades. Traditional nitrogen (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.

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.

Reduced Lodging

Excessive available nitrogen (N) early in the growing season can sometimes overstimulate vegetative growth in grain crops resulting in lodging. ESN's controlled nitrogen supply provides N when it is needed, avoids early season excesses and may reduce the lodging caused by excessive N supply.



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

Other Benefits of ESN Technology

WIDER APPLICATION WINDOW

ESN provides a wider application window in both the spring and the fall, allowing you to apply fertilizer on your schedule.

CONVENIENT TO USE AND APPLY

ESN is compatible with no-till operations and is easy to blend. It will not set up in storage and therefore has a longer shelf life.

ENVIRONMENTALLY RESPONSIBLE

ESN significantly reduces N loss, providing substantial benefits to the environment. In the U.S., the national NRCS and local EQIP programs offer grower incentives for the use of ESN.

Application Timing and Handling

ESN is generally applied at rates similar to conventional N fertilizers. Field location, weather conditions, timing of N demand and potential for N loss are all factors to consider in determining application timing.

ESN was developed and extensively tested to resist the effects of normal handling. Excessive handling can affect the coating and N release.

For more application timing and handling recommendations, talk to your local retailer, ESN representative or visit smartnitrogen.com.