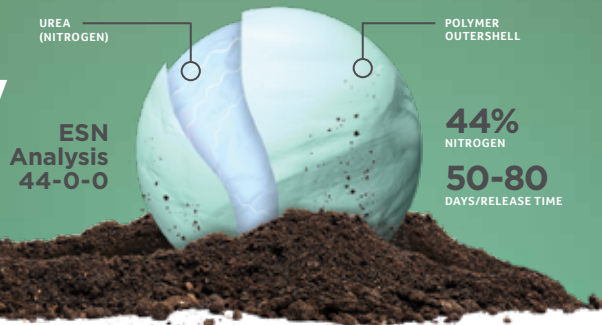




# How ESN Technology Works



## Coated Nitrogen Granules

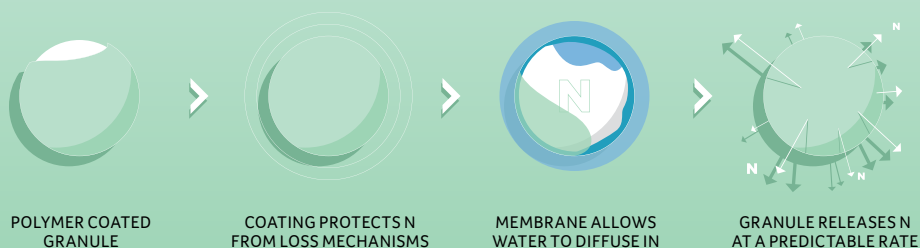
ESN technology uses a flexible, polymer coating to encapsulate an N granule. The coating protects the N from loss mechanisms, releasing it when the crop needs it most.

## 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.



# Corn



**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](http://smartnitrogen.com)

**Nutrien**



## ESN Technology for Corn

During the first few weeks after planting, corn takes up very little nitrogen (N). In a few weeks of rapid growth at mid-season, the crop consumes 60-80% of its total N needs.

ESN technology controls the N supply until the growing plants need it most. Additionally, it significantly reduces N loss to the environment. Using ESN technology is a smarter way to grow.

### ESN Technology and Increased Yield

Research has shown that increased yield is a result of ESN technology protecting N from being lost to the environment. ESN maximizes N efficiency, compared with similar N treatments from urea or UAN. Resulting yield increases of up to 40 bu/ac have been recorded. An average increase of 15-20 bu/ac was typical in areas of higher N loss.

### ESN Has Been Shown to Increase Yield in a Range of Conditions

Soil drainage class	Greater precipitation or irrigated	
	Lower organic matter	Higher organic matter
Poorly drained	15-20 bu/ac	8-10 bu/ac
Moderately well drained	15-20 bu/ac	8-10 bu/ac
Well drained	15-20 bu/ac	8-10 bu/ac

- Expectations are based on 80% of N attached to ESN
- Greater precipitation = 6-8 inches of combined rainfall in May and June (a majority of the Corn Belt)
- Areas with lower precipitation have shown up to 30 bu/ac increases
- Higher organic matter represents >3-4%

### 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.

### 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.



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

### 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](http://smartnitrogen.com).