

# Technical Bulletin

## Blending ESN into Dry Fertilizer Blends Reduces Caking After Storage

**CHALLENGE:** Humidity and warm temperatures cause fertilizer blends to take on moisture over the summer, creating issues with bridging (caking), which reduces product flowability at time of use.

**SOLUTION:** Blending ESN into dry fertilizer blends helps reduce caking and improves flowability after storage under high humidity conditions.

**TEST DETAILS:** We used a fertilizer caking test to determine how different dry blends bridge (cake) when exposed to high humidity and pressure to simulate pile weight. Blends were made from common materials including urea (46-0-0), AMS (21-0-0-24S), MAP (11-52-0), and MOP (0-0-60). ESN was added into the blends at a rate of 25% and urea was reduced by a similar % to make room in the blend.



### ESN SMART NITROGEN

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

Known Conditions for Urea Bridging (Caking)	%RH:	90%
	Temp:	30°C
Test Cycle Timing	<b>Step 1:</b> 48 hours at 79% RH and 30°C, 24 hours at 20% RH and 40°C	
	<b>Step 2:</b> 48 hour rest period (35% RH and 25°C)	
Column Pressure	30 psi	

Fertilizer Type	Dry Blend Components
Urea (46-0-0)	100% Urea
29-13-5-3	53% Urea, 13% AMS, 26% MAP, 8% MOP
29-13-5-3 w/ESN	28% Urea, 13% AMS, 26% MAP, 8% MOP + <b>25% ESN</b>
36-6-0-6	64% Urea, 25% AMS, 11% MAP
36-6-0-6 w/ESN	36% Urea, 25% AMS, 11% MAP + <b>25% ESN</b>



### HOW CAN WE HELP?

Contact your local retailer or ESN marketing representative and discuss how to incorporate more ESN into your urea blends for improved handling and nitrogen use efficiency.

### FOR MORE INFORMATION:

[www.SmartNitrogen.com](http://www.SmartNitrogen.com)

### RESULTS:

Analysis	Average % Caking
Urea (46-0-0)	67.9%
29-13-5-3	49.9%
29-13-5-3 w/ESN	18.1%
36-6-0-6	52.1%
36-6-0-6 w/ESN	37.9%





**UREA**

**FIGURES:** Examples of caking in different fertilizer blends after exposure to high humidity and pressure.



**29-13-5-3S**



**29-13-5-3S w/ESN**



**36-6-0-6S**



**36-6-0-6S w/ESN**

**CONCLUSION:** Blending ESN with dry fertilizer blends will help reduce clumping (*e.g., bridging or caking*) compared to the urea check and the two blends without ESN. Reductions in caking will improve handling and flowability through farm equipment during application.

**HOW CAN WE HELP?**

Contact your local retailer or ESN marketing representative to discuss how to incorporate more ESN into your dry fertilizer blends for improved handling and potential nitrogen use efficiency.



**FOR MORE INFORMATION:**

[www.SmartNitrogen.com](http://www.SmartNitrogen.com)