What is ESN?

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In the past 3-4 years, there has been more interest by producers in using different sources of nitrogen to meet their crop needs. The reason for this is to increase nitrogen-use efficiency. One product that has been available is ESN which is a semi-permeable polymer membrane that is applied to urea fertilizer. The polymer coating controls the rate that nitrogen is released to the soil and the crop. As the soil warms, the membrane that coats the urea allows the water to enter to dissolve the urea, but nitrogen must then diffuse through the membrane and into the soil.

The thickness of the polymer coating varies resulting in different time-release of the urea fertilizer. This reduces the risk of leaching in early spring and allows for better utilization by the growing crop. At soil temperatures around 65 degrees Fahrenheit, the nitrogen releases over a 60-80 day period. When applied near planting time, the bulk of the nitrogen will be released 40-50 days later. This would be similar to a side-dress nitrogen application. In most cases this material may cost more per pound of nitrogen but is another way of spreading your nitrogen risk. Under dry soil conditions, there would be little advantage to this slow release technology, but under wet soil conditions the technology would fit very well. Research studies from Iowa State University from 2003 to 2005 showed a 6 bushel increase in yield compared to untreated urea.

To date ESN is not approved for fall application in Nebraska for row crops. So far ESN is approved for application anytime after March 1. University of Minnesota research shows fertilizer N recovery ranged from 37% for the 100-lb rate of ESN broadcast in the fall and not incorporated to 99% and 74% when ESN was spring applied and not incorporated at the 60 and 100-lb N rates, respectively. This would suggest that spring application would be more efficient.