

# Relationship Between Enhanced Efficiency Fertilizers Terms

## Enhanced Efficiency Fertilizer T-70

Describes fertilizer products with characteristics that allow increased nutrient availability and reduce potential of nutrient losses to the environment e.g., gaseous losses, leaching or runoff when compared to an appropriate reference product. (Official 2018)

Potential EPA registration based on claims & exclusions

## Slow Release Fertilizers T-71

Fertilizers in a form that release, or convert to a plant-available form, plant nutrients at a slower rate relative to an appropriate reference soluble product. (Official 2018)

## Stabilized Fertilizer T-72

A fertilizer product that has been amended with an additive that reduces the rate of transformation of a fertilizer compound(s), extending the time of nutrient availability to the plant by a variety of mechanisms relative to its un-amended form. (Official 2014)

## Controlled Release Fertilizers T-103

A Slow Release Fertilizer that is engineered to provide nutrients over time at a predictable rate under specified conditions. (Official 2018)

## Urease Inhibitor T-45

A substance which inhibits hydrolytic action on urea by the urease enzyme. When applied to soils the effect of the urease inhibitor is less urea nitrogen lost by ammonia volatilization. (Official 1997)

## Nitrification Inhibitor T-49

A substance that inhibits the biological oxidation of ammoniacal nitrogen to nitrate nitrogen. (Official 2001)

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## PROPOSED LANGUAGE FOR REVIEW

### SUIP XX or Revised Policy Statement

#### Relationship Between Enhanced Efficiency Fertilizers, Slow Release Fertilizers, Controlled Release Fertilizers and Stabilized Nitrogen Fertilizers

The following chart (Fig X) depicts the relationship between key enhanced efficiency fertilizer terms including slow release fertilizer, controlled release fertilizer and stabilized fertilizer.

Enhanced Efficiency Fertilizer is the overarching term for all fertilizer products with characteristics that can improve plant nutrient use efficiency and minimize potential losses to the environment compared to standard commodity fertilizer materials such as urea, ammonium sulfate, ammonium phosphate, potassium chloride, etc. There are two distinct product categories considered enhanced efficiency, namely Slow Release Fertilizers and Stabilized Fertilizers. The fundamental distinction between the two is slow release fertilizers have inherent chemical and/or physical properties (e.g. solubility, coatings) that provide plant available nutrient forms to the soil over time. In contrast, Stabilized Fertilizers do not have inherent slow release properties, in fact their inherent properties are unchanged. Rather they contain additive(s) that typically act on key soil microbes or soil enzymes that in turn enable nutrients to be available to plants longer and less subject to environmental loss.

A specific type of Slow Release Fertilizer is a Controlled Release Fertilizer. As the name implies, a Controlled Release Fertilizer has been engineered to provide nutrients over time at a very predictable rate under specific conditions (e.g. 3 month release at 21C). Not all Slow Release Fertilizers are Controlled Release Fertilizers, but all Controlled Release Fertilizers are Slow Release Fertilizers.

Stabilized Fertilizers are divided into two major types - Urease Inhibitors and Nitrification Inhibitors. Urease Inhibitors typically target the urease enzyme in various ways, and nitrification inhibitors target soil bacteria involved in the soil nitrification process.