

PEN-A-TRATE II™

Premium Nonionic Surfactant

PEN-A-TRATE II is a premium nonionic surfactant formulated to provide superior spray solution coverage and contact with the leaf surfaces of tough-to-control weeds.

Nonionic Surfactant Facts

Enhancing herbicide performance is more than just a wetting and spreading phenomena.

Most ordinary nonionic surfactants (NIS) contain nonylphenol ethoxylates (NPE) which are the traditional “workhorse” of NIS formulations.

Typical 80-20 surfactants rarely contain 80% surfactant load.

Actual concentrations range from 10-80%.

Products with less than 50% surfactant load act as spreaders, not activator adjuvants.

The HLB (hydrophilic/lipophilic balance) of an NPE based NIS is critical in predicting its performance.

Ethoxylation levels of NPEs, which determine their HLB, can vary widely and is usually not disclosed on product labels.

Different pesticides have different HLB requirements to optimize performance.

Cost Difference Isn't Worth the Risk

	Premium NIS	Cheap NIS
Grower cost/gallon	\$ 18.00	\$ 10.00
Cost @ 1 qt./100 gal.	\$ 4.50	\$ 2.50
Cost per acre @		
15 gpa	\$ 0.68	\$ 0.38
12 gpa	\$ 0.54	\$ 0.30
10 gpa	\$ 0.45	\$ 0.25



PEN-A-TRATE II Benefits

Optimum HLB level for enhanced performance across a wide range of herbicides.

Excellent wetting and spreading on tough-to-cover leaf surfaces.

Contains humectins to extend uptake time for more consistent performance.

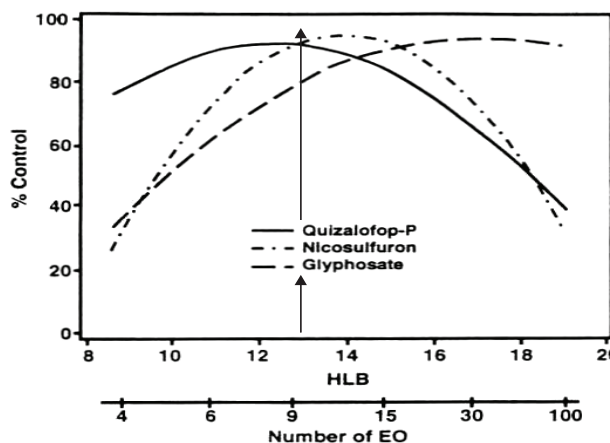
Manufacturer approved.

Easy-to-use, defoamed formulation.

Safer to handle and store.

- Nonflammable.
- Noncorrosive.

HLB Impact of Nonylphenol Ethoxylates on Herbicide Efficacy



(Quizalofop-P – low solubility 0.3 ppm)
 (Nicosulfuron – mod. solubility 360-12,500 ppm @ pH 5-7)
 (Glyphosate – high solubility 900,000 ppm @ pH 7)

Weed Technology, 1999, Volume 13:840-842
 Jerry M. Green, Dupont Agricultural Products, Stine-Haskell Research Center

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