

# Silwet\* HS-604 Penetrant



MARKETING BULLETIN

SPECIALTY FLUIDS - AGRICULTURE

Silwet HS-604 penetrant is a pH-stable silicone co-adjuvant. It is a potentially cost effective product to lower the total adjuvant use in many in-can glyphosate and related herbicide formulations, typically without compromising herbicide performance.

Field trials have shown that at use levels less than 1% Silwet HS-604 penetrant can lower the use of tallow amine ethoxylates (TAE) from the typical 10-12% concentrations required in many glyphosate formulations to about 4%. This means that the total adjuvant rate may be as low as 5%. Although this is a significant reduction of TAE and total in-can adjuvant, the 5% TAE and Silwet HS-604 penetrant combination can provide equivalent or slightly better weed control relative to the typical 12% TAE formulations. The lower adjuvant level has shown decreased eye irritation relative to the 12% TAE loaded glyphosate formulations. Additionally, since TAE is being eliminated or reduced in many herbicide formulations due to potential toxicity concerns, Silwet HS 604 penetrant may provide an effective alternative to high levels of TAE. An added benefit of Silwet HS-604 penetrant is its built-in antifoam that typically helps provide very effective foam control in glyphosate formulations.

Silwet HS-604 penetrant is a flexible co-adjuvant to help formulators optimize and customize cost effective glyphosate designs. Lower adjuvant use, less material handling, reduced TAE surfactant levels, less foaming and, in some cases, lower costs, are options available when optimizing the design and performance of glyphosate products.

Silwet HS-604 penetrant can help boost the performance of TAE and related adjuvants used in herbicide formulations.

## Key Features and Typical Benefits

- Penetrant to enhance glyphosate uptake
- Potentially 60% lower adjuvant rate for in-can herbicides
- Lower adjuvant level has shown reduced eye irritation effects relative to 12% TAE loaded glyphosate formulations
- Low foaming
- Nonionic
- Meets EPA 40 CFR §180.910 requirements<sup>(1)</sup>

### Typical Physical Properties

Appearance	Transparent colorless to pale yellow liquid
Surface Tension (0.1%) <sup>(a)</sup> , mN/m	25-29
Spreading Diameter <sup>(b)</sup> , mm	40
Viscosity 25 °C, cPs	30-80
Density (estimated), gm/cm <sup>3</sup>	1.0
pH Stability	4-10
Solids, %	90

Typical physical properties are average data and are not to be used as or to develop specifications.  
 (1) The components meet the requirements of U.S. EPA regulation 40 CFR §180.910, and are therefore exempt from tolerances in food when used as an inert ingredient in agricultural applications in accordance with the other conditions of that regulation.

(a) Wilhelmy Plate Method; solutions prepared in 0.005M NaCl

(b) Spreading at 0.1%

\*Silwet is a trademark of Momentive Performance Materials Inc.

General Considerations for Use

**In-Can Glyphosates and Herbicides**

Silwet HS-604 penetrant is stable to hydrolysis between pH 4 and pH 10. It is recommended that Silwet HS-604 penetrant be blended with another adjuvant, such as a Tallow Amine Ethoxylate (TAE) in the ratio of 85% TAE and 15% Silwet HS-604 penetrant. This composition can be then used in a glyphosate formulation, between 3-7% by weight, depending on the dilution rate of the herbicide formulation.

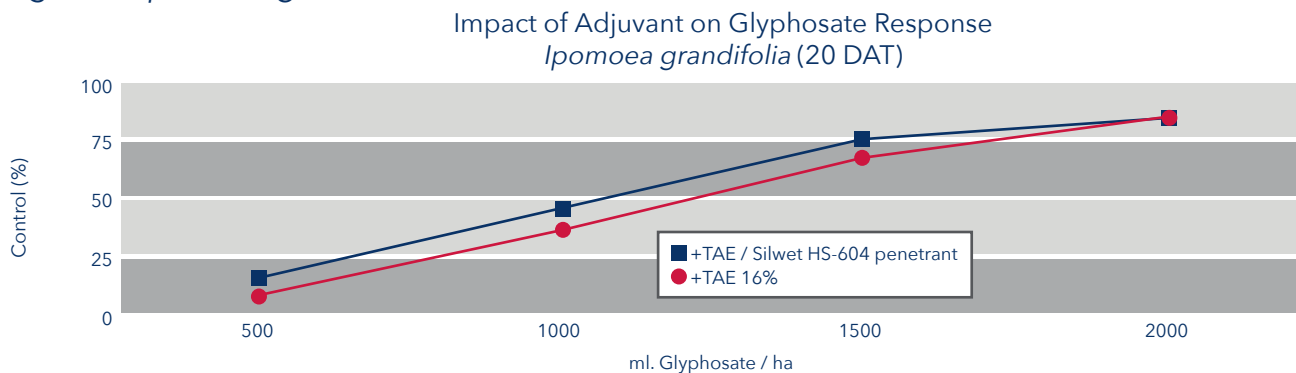
**Performance and Field Trial Data**

Silwet HS-604 penetrant may be considered for use as a co-adjuvant to lower the TAE concentration and total adjuvant use in in-can glyphosate and related herbicide products. Field trials on selected weeds showed that 41% glyphosate salts with 0.65% of Silwet HS-604 penetrant and 4.35% of TAE can provide an equivalent or slightly better control as compared to 41% glyphosate salt formulations with 16% TAE adjuvant. Depending on the weed species, herbicide control, cost and other formulation objectives, it is recommended to develop and test several concentrations in order to optimize the in-can product design and performance.

Glyphosate isopropylamine formulations containing Silwet HS-604 penetrant, in blends with TAE (total 5% blend) were compared to a typical formulation containing 16% TAE for control of *Ipomoea grandifolia*. In replicated field trials, the formulations were applied by back-pack sprayer, at rates between 0.5 and 2 L/ha, at a spray volume of 100 L/ha. Glyphosate efficacy was determined at 20 days after treatment (DAT), using a visual scale of 0-100%, where 0 indicates no effect and 100 indicates total weed control.

Figure 1 shows that the TAE plus Silwet HS-604 penetrant combination provided equivalent or better performance of glyphosate against *Ipomoea grandifolia*. This shows the potential for an approximate 68% reduction of TAE relative to the typical formulation containing 16% TAE, while maintaining or improving performance.

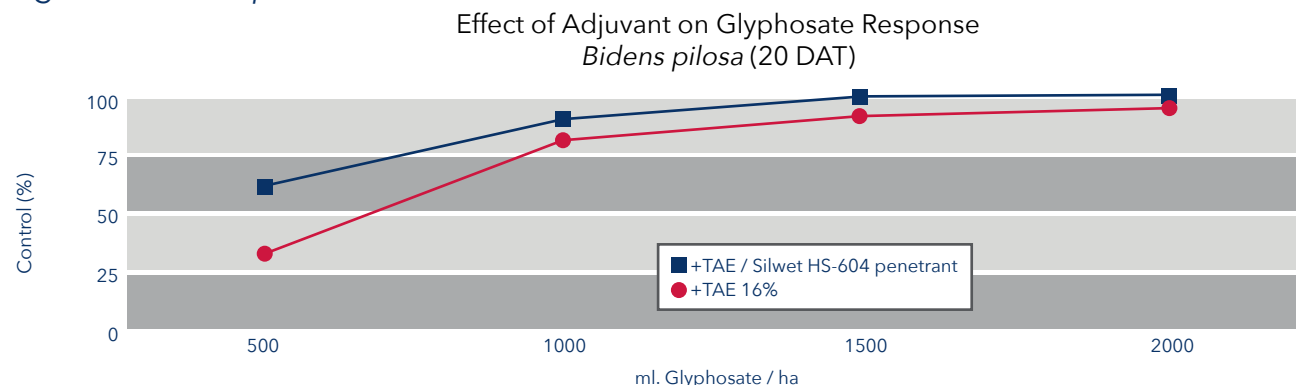
Figure 1: *Ipomoea grandifolia* Trials



Note: Test data. Actual results may vary.

Similar results were observed for the control of *Bidens pilosa* with glyphosate, using the same spray protocol, at a spray volume of 100 L/ha (Figure 2).

Figure 2: *Bidens pilosa* Trials



Note: Test data. Actual results may vary.

## Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

## Limitations

Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

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