

Appendix I. Calculations Used for Assessing S-Methoprene Aquatic Exposure from Briquet and Sand Mix Formulations

Table I-1. S-Methoprene Formulations and Maximum Application Rates

Formulation	% ai	Application Intervals	Max. application
Briquets	2.1	150 days	0.0058 lbs ai/A/day.
XR Briquets	8.62	30 days	0.014 lbs ai/A/day.
Sand mix	39.0/pouch (powder)	7 days	0.004-0.017 lbs ai/A/day

I.1 Briquet:

This formulation is a sustainable release product with recommended repeat treatment every 30-150 days depending upon briquette size. Application sites are designed to control mosquitoes in small bodies of water. Examples of application sites are: storm drains, catch basins, roadside ditches, fish ponds, ornamental ponds and fountains, other artificial water-holding containers, animal watering troughs, cesspools and septic tanks, waste treatment and settling ponds, flooded crypts, transformer vaults, abandoned swimming pools, tires, construction and other manmade depressions, cattail marshes, water hyacinth beds, vegetation-choked phosphate pits, pastures, meadows, rice fields, freshwater swamps and marshes, salt and tidal marshes, tree holes, woodland pools, floodplains, and dredging spoil sites, small bodies of water such as storm drains, catch basins, roadside ditches, ornamental ponds and fountains.

Application rate of XR Briquets 8.62% ai:

Given: 1.19 lbs = 100 briquets or about 84 briquets/lb. Therefore, each briquette weighs 0.012 lbs (5.4 g) with about **0.001 lbs ai/briquet (0.43 g ai)**. Maximum application is about 1 briquet per 100 ft² of water surface area or 1 briquet per 10 ft³ (75 gal.) of water up to 2 ft deep with an additional briquete for every 2 ft depth of water in areas deeper than 2 ft (i.e. 4 briquets in 6-8 ft of water) as noted in Table 2.3.1. Theoretically 436 briquets (10 lbs/A) can be applied to one acre of shallow water. Under this scenario, there would be the equivalent of about a total of **0.436 lbs ai/A** contained in these slow release briquets. Assuming an even release rate over 30 days the potential exposure is about **0.014 lbs ai/A/day**.

Application rate of Briquets 2.1% ai:

Given: 17.7 lbs = 220 briquets or about 12 briquets/lb. Each briquette weighs 0.08 lbs (36.2 g) and contains about **0.76 g ai/briquette or the equivalent of 0.002 lbs ai/briquet**. Maximum application is 1 briquet per 100 ft² of water surface area or 1 briquet per 10 ft³ (75 gal.) of water up to 2 ft deep. Use 1 additional briquette for every 2 ft depth of water in areas deeper than 2 ft (i.e. 4 briquets in 6-8 ft of water) as noted in Table 3.1. If this formulation is used to cover one acre, there would be the equivalent of about **0.87 lbs ai/A** (435.6 briquets/A). Assuming an even release rate over 150 days, the potential exposure is about **0.0058 lbs ai/A/day**.

Table I.2. Briquet and XR Briquet Application Chart

Max Water Vol. in Application Site	Briquet Application	Water Depth	Allowable Flow for 30 Day Mosquito Control
0-10 cu ft	1	0 – 2	0 – 1,500 gal
10-20 cu ft	2	2 – 4	1,500 – 3,000 gal
20-30 cu ft	3	4 – 6	3,000 – 4,500 gal
30-40 cu ft	4	6 – 8	4,500 – 6,000 gal

Pouch (Sand) Usage 39% ai: One application is efficacious for 7 days. Examples of application sites are: storm drains, catch basins, roadside ditches, fish ponds, ornamental ponds and fountains, other artificial water-holding containers, animal watering troughs, cesspools and septic tanks, waste treatment and settling ponds, flooded crypts, transformer vaults, abandoned swimming pools, tires, construction and other manmade depressions, cattail marshes, water hyacinth beds, vegetation-choked phosphate pits, pastures, meadows, rice fields, vineyards, fruit and nut orchards, berry fields and bogs, freshwater swamps and marshes, salt and tidal marshes, tree holes, woodland pools, floodplains, and dredging spoil sites, small bodies of water such as storm drains, catch basins, roadside ditches, ornamental ponds, and fountains. Application rates are noted in Table 2.3.2.

Formulation using 39% ai pouch as follows:

99.0 lbs washed, dry sand

0.1 lb. of ISP PVP/VA W-635

0.5 lbs. of water

2 pouches of B2E-02 (39% S-methoprene x 2); or 0.3 lbs ai

0.10 lb. of Microcel-E Drying Agent

Table I.3 Application of the 39% ai Pouches After Mixture with Sand

Dosage Rate (in Pouches)	Granule Application Rate/Acre (lbs.)	Pouches of B2E-02 to 99 lbs sand
1	5.0	4
1	7.5	3
1	10.0	2
2	5.0	8
2	7.5	6
2	10.0	4
3	5.0	12
3	7.5	9
3	10.0	6
4	5.0	16
4	7.5	12
4	10.0	8

Application of Pouches:

Given: Add 2 pouches or the equivalent of 0.3 lbs ai to 99 lbs of sand the resulting 1 lb of mix is equal to $0.3/100 = 0.003$ lbs ai per lb of sand mix. Therefore, 10 lbs of sand mix applied to 1 A is equal to 0.03 lbs ai/A. If there is an increase in the number of pouches used (i.e. 4) but a

decrease in sand mix application rate (i.e. 5 lbs sand mix/A) the exposure level is still equal to 0.03 lbs ai/A or the equivalent of 1 pouch dosage rate.

The maximum rate for this pouch formulation is as follows: 0.3 lbs ai (2 pouches) x 4 = 1.2 lbs ai; Pouches and other components are added to make 100 lbs of sand mix resulting in 0.012 lbs ai per lb of sand mix; Therefore, 10 lbs sand mixture/A is equal to 0.12 lbs ai/A. The range of rates are **0.03-0.12 lbs ai/A** for 39% ai B2E-02 pouch. Assuming steady release rate and 7 day efficacy, this formulation is expected to result in **0.004 – 0.017 lbs ai/A/day**.

I.2 Expected Aquatic Environmental Concentrations from Label Extrapolation

After evaluating the label derived applications rates for S-methoprene formulations that include briquets, granulars, liquid, and pouches, the Agency has extrapolated expected worst case environmental concentrations (EEC) for aquatic areas (Table I.3). The briquets are expected to release 2.0 – 5.04 ug/L/day of S-methoprene (1 ft. water) for 150 to 30 days, respectively. The granular formulation EEC values are from 1.8 – 22.0 ug/L/day (EEC values were obtained from the Agency nomograph entitled “EECs of Pesticides in Bodies of Water Immediately Following Direct Applications of from 0.1 to 10.0 lbs ai/A”).

Table I.3. Expected Environmental Concentrations for S-Methoprene Briquets and Sand Mix

Formulations	% Active ingredient	lbs ai/A/day	Application Intervals (days)	EEC (ug/L/day) for 1 ft water
Briquet	2.1	0.0058	150	2.0
Briquet XR	8.62	.014	30	5.04
Sand Mix 39% ai/pouch	39.0	0.004 – 0.017	7	1.5 – 6.2

Since S-methoprene is also used on rice fields and canberry bogs to combat mosquitos, the Agency has developed a model for deriving a single, screening-level concentration calculated as a representation of both short and long term surface water exposure to be used for both aquatic ecological risk assessments and drinking water exposure assessments for human health risk assessment. The compound is to be applied within 4 days after flooding but not to be applied after rice reaches the heading stage of growth. Application is directly to water at 1- 4 oz product/A (0.007 - 0.0134 lbs ai/A) resulting in **0.253 - 0.485 ug/L** (Table I.4).

Sand Mix (1.3 % ai): These residue values were the lowest ranging from 0.347 ug/L on Day1 to about <0.20 ug/L throughout the rest of the test.