

CropLife International OPEX Tool – Summary for operator exposure scenarios

CropLife International has published a spreadsheet-based operator exposure tool as part of its “Principles of Regulation”.

The tool contains exposure data from two sources: the US-EPA Occupational Pesticide Handler Unit Exposure Surrogate Reference Tables, for almost all application scenarios, supplemented by exposure data from the German Model for a backpack sprayer applying powder-based formulations.

Model output is provided as the Margin of Exposure (MoE) or the % of the Acceptable Operator Exposure Level (AOEL).

The exposure scenarios, application and pesticide parameters, and types of personal protective equipment, are summarized in the table below. Note that not all variables may be applicable to all scenarios.

CropLife OPEX Calculator			
Exposure scenario			
Mixing/loading			
	Dry flowable & wettable granule products		
	Granules & granule products for dry spreading		
	Liquids & liquid products		
	Wettable powders & powder products		
	Low pressure handgun sprayer for powder products		
	Backpack sprayer for liquid and granule products		
	Mechanically-pressurized handgun sprayer for liquid and granule products		
	Backpack sprayer for powder-based products		
Application			Work rate (default; can be adapted)
	Aerial application, fixed-wing aircraft – liquid formulations		500 ha/day
	Open cab tractor, airblast sprayer		15 ha/day
	Open cab tractor, ground-boom sprayer		80 ha/day
	Open cab tractor, solid broadcast spreader		80 ha/day
	Application of granules by hand – granular bait		1 ha/day
	Low pressure handgun sprayer – powder-based products		1 ha/day
	Backpack sprayer; general broadcast/foiar applications & in greenhouses – liquid and granule products		1 ha/day
	Mechanically-pressurized handgun sprayer; in greenhouses, mushroom houses, general broadcast/foiar Applications – liquid and granule products		1 ha/day
	Backpack sprayer – powder-based products		1 ha/day
Formulation	Liquid	Dose (g a.i./ha)	Free variable
	Powder (for spray)		
	Wettable granule (for spray)		
	Dry granule (for spreading)		

CropLife OPEX Calculator			
PPE during mixing & loading			Exposure reduction
	Respiratory	None (= potential exposure)	--
		Mask – protection factor 5	80%
	Clothing	None (= potential exposure)	Not included in model
		Long-sleeve shirt, long pants, shoes plus socks (= single layer)	50%
		Coveralls in addition to long-sleeve shirt, long pants, shoes plus socks (= double layer)	75%
		Chemical resistant gloves	90%
PPE during application			Exposure reduction
	Respiratory	None (= potential exposure)	--
		Mask – protection factor 5	80%
	Clothing	None (= potential exposure)	Not included in model
		Long-sleeve shirt, long pants, shoes plus socks (= single layer)	50%
		Coveralls in addition to long-sleeve shirt, long pants, shoes plus socks (= double layer)	75%
		Chemical resistant gloves	90%
No PPE		Not included in model. The basis of the model is normal workwear (<i>i.e.</i> long sleeved shirt and long trousers).	
Exposure estimate from database		Mean or “best fit”, depending on the exposure scenario	
Body weight		60 kg (default)	
Exposure routes		Dermal & inhalation (both for mixing/loading & application)	
Exposure duration		Not a variable	
Pesticide absorption		Dermal (undiluted product) = product specific variable – Default value = 6% for liquid and 2% for solid formulations Dermal (diluted product) = product specific variable – Default value = 30% Inhalation = 100%	