

ECPA REPORT

Subject: Rinsing effectiveness of Plant Protection Product (PPP) Containers

I. Introduction

The crop protection industry recognizes the need to extend best practice to the management of packaging waste. It does so through various industry processes and educational initiatives designed to minimize the risk, to people and the environment, associated with handling waste PPP containers. The introduction of Container Management Schemes (CMS) is one of the primary product stewardship activities supported by the European Crop Protection Agency (ECPA) throughout Europe and, globally, by Crop Life. The ECPA's policy on CMS consists of the promotion of packaging reduction, use of innovative design, **rinsing** and recovery.

This memorandum has been written to illustrate that, by using the correct rinsing procedure, rigid PPP containers holding water miscible products can be rinsed to remove 99.99% of the original formulation. This is the current requirement of the United States Environmental Protection Agency (EPA) to render the packaging waste as non-hazardous in accordance with the Code of Federal Regulations [1]. The EPA has also provided a guideline [2] on how to conduct the rinsing procedure and this is the guideline that has been adopted to conduct any rinsing studies. The EPA believes that the rinsing protocols will satisfy the residue removal performance testing requirements of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) [3]

The ECPA are satisfied that utilisation of the correct rinsing procedure will ensure that packaging wastes can be classified as non-hazardous in accordance with the EU Waste Framework Directive (WFD) and the List of Waste (LoW) annex [4].

The data within this report was generated using the EPA rinsing procedures, triple or pressure rinsing, by several of the major Crop Protection companies

II. Results

A variety of container sizes based upon HDPE, with or without barrier material, has been used with a variety of formulation types and this is conveyed in Tables 1 and 2 respectively. Table 3 illustrates the rinsing data that has been generated by certain member companies as part of their fulfilment of the FIFRA requirements.

Table 1: Container Type and Size used for this study

Container Materials Used	Available Sizes
HDPE: High Density Polyethylene	Ounce: 16, 20,21, 64, 75, 78, 104 Gallon: 0.5, 1.0, 2.5 Quart: 1 Pint: 1 Litre: 0.1, 1, 5, 15, 20
HDPE/F: Fluorinated High Density Polyethylene	Ounce: 128 Gallon: 2.5
Coex PE/EV: Co-extruded High Density Polyethylene/ Ethylene Vinyl Alcohol	Litre: 0.1, 1.0
Coex PE/PA: Co-extruded High Density Polyethylene/ Polyamide	Litre: 5

Table 2: Formulations used for this study

Formulations Types
SC: Suspension Concentrate
CS: Capsule Suspensions
EW: Emulsions, oil in Water
EC: Emulsifiable Concentrates
OD: Oil based Suspension Concentrates
SE: Aqueous Suspo-Emulsions
SL: Soluble Concentrates
ZC: Mixed formulations of CS and SC
FS: Suspension Concentrates for seed treatment

Table 3: Rinsing Data

Product / Key	Type H, F, I, S	Formulation type	Container material	Container volume	Type of rinsing	Rinsing protocol	Residue (a.i.)
A001	H	SC	HD-PE	2.5 gal	triple	EPA	<0.01%
(mixture)					triple	EPA	<0.01%
A003	H	SC	HD-PE	2.5 gal	triple	EPA	<0.01%
(mixture)					triple	EPA	<0.01%
A004	I	SC	HD-PE	75 oz	triple	EPA	<0.01%
A005	I	SC	HD-PE	21 oz	triple	EPA	<0.01%
A006	I	SC	HD-PE	16 oz	triple	EPA	<0.01%
A007	F	SC	HD-PE	2.5 gal	triple	EPA	<0.01%
A008	F	SC	HD-PE	0.5 gal--64 oz	triple	EPA	<0.01%
A009	F	SC	HD-PE	1 gal	triple	EPA	<0.01%
A010	I	SC	HD-PE	78 oz	triple	EPA	<0.01%
A011	I	SC	HD-PE	20 oz	triple	EPA	<0.01%
A012	I	SC	HD-PE	2.5 gal	triple	EPA	<0.01%
A016	I	SC	HD-PE	2.5 gal	triple	EPA	<0.01%
A017	I	SC	HD-PE	104 oz	triple	EPA	<0.01%
A018	H	CS	HD-PE/F	2.5 gal	triple	EPA	<0.01%
A019	F	SC	HD-PE	2.5 gal	triple	EPA	<0.01%
A024	F	EW	Coex PE/EV	100 ml	triple	EPA	<0.01%
A025	F	EW	Coex PE/EV	1000 ml	triple	EPA	<0.01%
	F	EW	Coex PE/EV	1000 ml	pressure	EPA	<0.01%
A026	F	EW	Coex PE/PA	5 L	triple	EPA	<0.01%
	F	EW	Coex PE/PA	5 L	pressure	EPA	<0.01%
A027	F	EW	HD-PE	100 ml	triple	EPA	<0.01%

Product / Key	Type H, F, I, S	Formulation type	Container material	Container volume	Type of rinsing	Rinsing protocol	Residue (a.i.)
A028	F	EW	HD-PE	1000 ml	triple	EPA	<0.01%
	F	EW	HD-PE	1000 ml	pressure	EPA	<0.01%
A029	F	EW	HD-PE	5 L	triple	EPA	<0.01%
	F	EW	HD-PE	5 L	pressure	EPA	<0.01%
A030	H	EC	Coex PE/EV	100 ml	triple	EPA	<0.01%
A031	H	EC	Coex PE/EV	1000 ml	triple	EPA	<0.01%
	H	EC	Coex PE/EV	1000 ml	pressure	EPA	<0.01%
A032	H	EC	Coex PE/PA	5 L	triple	EPA	<0.01%
	H	EC	Coex PE/PA	5 L	pressure	EPA	<0.01%
A033	I	OD	Coex PE/EV	100 ml	triple	EPA	<0.01%
A034	I	OD	Coex PE/EV	1000 ml	triple	EPA	<0.01%
	I	OD	Coex PE/EV	1000 ml	pressure	EPA	<0.01%
A035	I	OD	Coex PE/PA	5 L	triple	EPA	<0.01%
	I	OD	Coex PE/PA	5 L	pressure	EPA	<0.01%
A036	F	SC	HD-PE	100 ml	triple	EPA	<0.01%
A037	F	SC	HD-PE	1000 ml	triple	EPA	<0.01%
	F	SC	HD-PE	1000 ml	pressure	EPA	<0.01%
A038	F	SC	HD-PE	5 L	triple	EPA	<0.01%
	F	SC	HD-PE	5 L	pressure	EPA	<0.01%
A039	F	SC	HDPE	2.5 gal	triple	EPA	<0.01%
A040 (mixture)	I	SC	HDPE	1 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%
A041 (mixture)	F	SC	HDPE	2.5 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%

Product / Key	Type H, F, I, S	Formulation type	Container material	Container volume	Type of rinsing	Rinsing protocol	Residue (a.i.)
A042 (mixture)	F	SE	HDPE	2.5 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%
A043 (mixture)	F	SC	HDPE	2.5 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%
A044 (mixture)	F	SE	HDPE	2.5 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%
A045	I	CS	HDPE	1 gal	triple	EPA	<0.01%
A046 (mixture)	H	SE	HDPE	2.5 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%
A047	H	SC	HDPE	2.5 gal	triple	EPA	<0.01%
A048 (mixture)	H	SE	HDPE	2.5 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%
A049	H	SL	HDPE	2.5 gal	triple	EPA	<0.01%
A050 (mixture)	H	SE	HDPE	2.5 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%
					triple	EPA	<0.01%
					triple	EPA	<0.01%
A051	I	EC	HDPE	1 gal	triple	EPA	<0.01%
A052 (mixture)	H	SC	HDPE	2.5 gal	triple	EPA	<0.01%
						EPA	<0.01%
						EPA	<0.01%
A053 (mixture)	H	SE	HDPE	2.5 gal	triple	EPA	<0.01%
					triple	EPA	<0.01%
					triple	EPA	<0.01%
					triple	EPA	<0.01%

Product / Key	Type H, F, I, S	Formulation type	Container material	Container volume	Type of rinsing	Rinsing protocol	Residue (a.i.)
A054	I	EC	HDPE	1 gal	triple	EPA	<0.01%
A055	I	EC	HDPE	1 gal	triple	EPA	<0.01%
A056	I	EC	HDPE	2.5 gal	triple	EPA	<0.01%
A057	I	CS	HDPE	1 quart	triple	EPA	<0.01%
A058	I	CS	HDPE	2.5 gal	triple	EPA	<0.01%
A059	I	CS	HDPE	1 pint	triple	EPA	<0.01%
A060	I	ZC	HDPE/F	128 oz	triple	EPA	<0.01%
(mixture)					triple	EPA	<0.01%
A061	I	SC	HDPE	2.5 gal	triple	EPA	<0.01%
(mixture)					triple	EPA	<0.01%
A062	F	FS	HDPE	2.5 gal	triple	EPA	<0.01%
(mixture)					triple	EPA	
A063	H	EC	HDPE	15 L	triple	EPA	<0.01%
(mixture)					triple	EPA	<0.01%
A064	H	SL	HDPE	15 L	triple	EPA	<0.01%
(mixture)					triple	EPA	<0.01%
A065	F	SC	HDPE	2.5 gal	triple	EPA	<0.01%
(mixture)					triple	EPA	<0.01%
A066	H	EC	HDPE	1-20 L	triple	EPA	<0.01%
A067	H	SL	HDPE	1-20 L	triple	EPA	<0.01%
A068	H	SL	HDPE	20 L	pressure	EPA	<0.01%

Key:

H – Herbicide
I – Insecticide
F – Fungicide
S – Seed-care

III. Conclusions

To comply with the FIFRA residue removal performance testing, companies have to illustrate that their containers can be rinsed to meet the 99.99% removal criteria laid down by the EPA.

It is evident that all formulations have achieved the required removal value with a residue of <0.01% irrespective whether the rinsing technique has been “triple” or “pressure” rinsed. The data covers a wide range of formulations (type and activity), a wide range of packaging sizes and the most common container materials currently used on the market today.

The PEG (ECPA) are therefore confident that, by adopting the correct rinsing procedures, rigid PPP containers can be rendered non-hazardous and therefore be handled and accepted as such within Container Management Schemes.

References:

- [1] Code of Federal Regulations (40 CFR): Protection of the Environment (Subpart B § 165.25(f)(1))
- [2] Office of Pollution Prevention and Toxics: OPPTS 8XX XXXX Rinsing procedures for Dilutable Pesticide Products in Rigid Containers – basic testing recommendations June 25, 2008
- [3] Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) (7 U.S.C. 136, et seq.).
- [4] DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance)
