

## PestiClean ID



PestiClean is a fully automated integrated system for the treatment of empty plastic pesticide containers. That is, they are received, volume gauged, registered, rinsed and compressed, so that any further use is precluded and 100% recycling or retiring is facilitated. The bulk of pesticides volume, is globally distributed in plastic (HDPE – High Density Polypropylene ) one – off containers. So far the issue of handling the used containers has not been resolved in an efficient manner. In the absence of any other arrangement, they are either burnt / discarded outdoors, causing soil and water pollution, or reused for food stuff and

water, at a significant poisoning risk. Due to their toxic residues they cannot be ordinarily recycled, as common plastic containers do, and require special treatment.

To address the problem, recommendations have been issued jointly by FAO (Food & Agriculture Organization) and WHO (World Health Organization). In “International Code of Conduct on the Distribution and Use of Pesticides: Guidelines on Management Options for Empty Pesticide Containers”, May 2008, withdrawal schemes are proposed, which should ensure that :

- *The containers must be rinsed right after their use.*
- *Any improper subsequent use should be precluded.*
- *The withdrawal process should be convenient for the users.*

Schemes’ specific details are to be determined on a state level. Following FAO – WHO recommendations, EU guideline 2009/128/EK, has been issued, which is particularized in National Action Plans, all of which prescribe empty containers’ treatment, as follows:

- Containers are to be rinsed either manually (triple rinsing) or by a pressure mechanism, right after being emptied into the sprayer tank
- They are preserved at the users’ facilities, until the collection dates (usually once a year)
- On these dates, users carry the containers to the collection points where specialized personnel will check them for cleanliness. Inadequately rinsed ones will be returned to users, while the rest are transported to their ultimate

destination, where they are recycled (non-hazardous classification) or destroyed (hazardous classification), depending on national legislation.

In most countries, rinsed containers are classified as “non-hazardous” and can be recycled. This majority approach is also proposed by FAO. The scheme’s cost is usually carried by the pesticide distribution companies and, in rare cases by the users, whose participation is either compulsory or voluntary, (20-20 for 40 enacted schemes). In most cases, the scheme’s operation costs largely exceed the value of the retrieved material. Virtually all withdrawal schemes have so far been uneconomical. Compulsory participation, wherever legislated, is poorly implemented, due to the absence of an automated record keeping process. Doing this manually in compulsory schemes, would render them even more uneconomical.

These obvious drawbacks of the current process are due to the lack of mechanization and the need for human involvement at every step (rinsing, storing, collection, examination, recording, transportation). Current process is costly, time consuming, inconvenient and in most cases, ineffective.

PestiClean’s purpose is to automate the process of empty plastic pesticide containers withdrawal. It accepts unrinsed containers and delivers them clean and compressed while it keeps record of their size and the user’s id.

PestiClean’s advantages compared to the current process, are :

- User’s involvement is minimal. He simply puts the containers on the poles and dials his unique id number (VAT number for EU, SSN for the US, equivalent elsewhere)
- Unlike triple rinsing, using PestiClean is safe for the user, fending his hands both from toxic residue and the rinsate
- Containers need not be stored in facilities or collection points, often incompletely rinsed
- Required delivery time is minimal compared to current long and cumbersome collection process
- Rinsing is objectively adequate, due to the sensor monitored return water quality. It lasts until required cleanliness is achieved, so that the non-hazardous material can securely be recycled
- Rinsed containers are compressed, so that their volume is permanently eliminated and transportation costs to recycling centers are greatly reduced. They can be temporarily stored in linked repositories, awaiting special transportation, or mixed with other plastics following the ordinary recycling route, within each country’s policy.

- Registering users' id and containers' sizes, enables the implementation of penalty – reward participation strategies, which, consequently, could facilitate 100 % effective success rates for withdrawal schemes. Registered data can be easily transmitted, by wireless or other media, to any pertinent scheme authorities.
- PestiClean can operate unattended on a 24/7/365 basis, on minimal electricity and recyclable water costs. Annual capacity is 15.000 Kgr of plastic.
- Following each jurisdiction's environmental provisions and container withdrawal scheme's structure, several options are available for placing PestiClean:
  - At common use, spraying water supply points where containers can be treated while tanks are being filled, also receiving the rinsate. Such water supply points, equipped with evaporation pools (see below), can also serve as tank rinsing facilities.
  - In the EU prescribed "Green Points", where rinsate can be pumped into waterproof bottom evaporation pools, where pesticide concentrates will remain after solution water evaporates, heated by solar irradiation or other thermal source. Rinsed and compressed containers will be efficiently routed to recycling centers, together with ordinary plastic collected in the Green Points.
  - In all other cases, PestiClean can be placed in easily accessible, strategically selected locations, usually accompanied by evaporation pools.

An activated carbon filter can also be used in most cases. This will be inset in the water return pipeline to withhold the toxic substances. Clean water can be either drained or recycled following legislation.

All above features offer obvious advantages over the current situation, rendering the pesticide container withdrawal process efficient and convenient, while enabling compulsory, penalty – reward based schemes.

PestiClean versions can be used for other containers, plastic or metallic, requiring treatment before being recycled, containing motor oils, radiator fluids and other chemicals. These uses can be accommodated by varying its dimensions, fluid and temperature.

PestiClean is ideal for Coops, Municipalities, Regions, Recyclers and agri-products distributors. In most cases, it can be 100% financed by EU funding programs (or equivalent funds elsewhere). In all countries, retrieved recyclable material has a significant market value, offering a steady cash flow at minimal maintenance costs.

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