

TPSA
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Trends in Pesticide Packaging

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Pesticide Packaging Systems

Components work together to safely contain and protect the product as it travels from the production plant, through the channels of distribution, to the end user's application equipment





Packaging Considerations

- Customer preference
- Regulatory requirements
- Protecting product integrity (compatibility)
- Economics
- Acceptability for recycling
- Consistency with existing product line
- Product image vs. competition



Liquid Packaging Systems for Pesticide and Adjuvant Products

- 12 x 1 quart
- 4 x 1 gallon
- 2 x 2.5 gallon
- 30 gallon drum
- 55 gallon drum
- 275 gallon caged IBC
- 15 gallon stainless steel
- 30 gallon HDPE
- 120 gallon rotationally molded mini-bulk
- 220 gallon rotationally molded mini-bulk
- Bulk, delivered in tank truck







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Bill of Material:

Single Trip HDPE Packaging System and Component Unit Costs

- 2.5 gallon bottle \$ 1.20
- 63 mm closure w/ induction seal \$ 0.18
- Incoming freight \$ 0.18
- Banner label \$ 0.30
- Booklet \$ 0.30
- Pallet \$14.00
- Pallet cap + tray \$ 4.00
- Corner boards + stretch wrap \$ 3.00
- Gallons per pallet = 240

Packaging cost per gallon = \$1.55



Per-gallon Cost Comparison Single Trip HDPE

- 12 x 1 quart \$5.52
- 4 x 1 gallon \$2.28
- 2 x 2.5 gallon \$1.55
- 30 gallon drum \$1.21
- 55 gallon drum \$0.82
- 275 gal caged IBC \$0.94



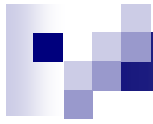


Bill of Material:

Refillable, Rotationally Molded 120 gallon Mini-bulk and Component Costs

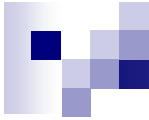
■ 120 gallon tank	\$410.00
□ Micro-valve and suction tube	\$ 32.00
□ Incoming freight	\$ 19.00
□ Banner label	\$ 0.30
□ Booklet	\$ 0.30
□ Tamper evident seals	\$ 4.50
□ Per gallon packaging cost (new)	\$ 3.88





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Initial Per-gallon Packaging Cost Refillable Liquid Containers

- 15 gal stainless steel drum with
Macro valve \$20.14
- 30 gal HDPE drum with
Micro valve \$ 2.74
- 120 gal mini-bulk \$ 3.88
- 220 gal mini-bulk \$ 2.76



Variables that affect per-gallon packaging cost for refillable containers

- Return freight
- Reconditioning cost
- Refills/season
- Years in service
- Semi-annual retesting to maintain U. N. certification
- Labels, booklet, placards
- Tamper evident seals
- Off-season storage
- Marketing program support for couplers,
 - transfer pumps



Packaging Trends

- Economics will dictate utilizing the most cost effective formulation and packaging systems
 - Innovation with formulation or packaging centers around higher value products or markets
 - Liquids formulations still the most popular
 - Post-patent marketplace
 - Proliferation of similar products
 - Glyphosate-tolerant cotton, soybean, corn



Future Implications for Pesticide Container Recycling

- Single-trip HDPE containers will continue to be widely used
- With the current charter as non-profit corporation the ACRC collects and recycles all properly rinsed pesticide and adjuvant containers at collection sites
- Container counts at sample collection sites and surveys indicate that over 40% of the volume being recycled through ACRC-sponsored programs is from non-members



Future Implications for Pesticide Container Recycling

- Technology is available today to mark, sort and collect “ACRC Members Only” containers
 - Inkjet trademark on container neck
 - Bar code
 - RFID
- Container recycling began as a stewardship initiative; has become a very divisive business issue.
- Regulatory solution or business-driven solution?



Volume Sold in Bulk Growing

- With properly designed storage, handling, and containment systems, handling pesticides in bulk can save labor and reduce exposure vs. emptying and rinsing large quantities of single trip containers
- Size of production units, application equipment and commercial applicators continues to grow
- Refillable containers are a necessary tool for delivering to branch locations, nursing application equipment and for repackaged sales to farmers and other applicators





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Crop Protection Products in Bulk

■ Initial investments

- Stationary bulk system
- Secondary containment
- Loading pad
- Building and other site security
- Operator training
- Record keeping





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Crop Protection Products in Bulk

- Infrastructure investments
 - Marketing programs
 - Production capacity
 - Terminals
 - Dedicated carriers
 - Participation in AASA
 - Specialized customer service and logistics
 - Technical training



Bulk Handling

- Retailer benefits
 - Labor savings
 - Better integration into automated mix and load systems
 - More efficient use of storage space
 - One inventory for direct fill into custom application or repackaging
 - Reduced risk of product theft
 - Less preparation for recycling (labor, rinsate, and container storage space)



Bulk Handling

- Manufacturer benefits
 - Customer loyalty
 - Fewer stock-outs
 - Opportunity for pre-season filling from production
 - No single-trip container recycling costs

