

# NEWMOA Pollution Prevention Technology Profile Enclosed Spray Gun Washers Using Alternative Cleaners

February 8, 2007

## Introduction

The purpose of this Technology Profile is to provide summary information about enclosed spray gun washers that use alternative cleaners in order to raise awareness of their potential to reduce hazardous chemical use and the generation of hazardous waste and air emissions. This profile focuses on the potential benefits of enclosed spray gun washers using alternative cleaners when compared to traditional spray gun cleaning systems. The Profile contains the following sections:

<u>Section</u>	<u>Page</u>
<b>Background</b>	<b>1</b>
<b>Traditional Spray Gun Cleaning Overview</b>	<b>2</b>
<b>Enclosed Gun Cleaner Technology</b>	<b>3</b>
Benefits	<b>3</b>
Concerns	<b>4</b>
<b>Alternative Cleaner Technology</b>	<b>4</b>
Benefits	<b>5</b>
Concerns	<b>5</b>
<b>Case Study – Amato’s Auto Body</b>	<b>7</b>
<b>Case Study – US Air Force Study</b>	<b>7</b>
<b>Contacts for More Information</b>	<b>12</b>
Resources and Vendors	<b>12</b>
State Technical Assistance Programs	<b>14</b>

Note: this Technology Profile is not intended to be an “approval” of these technologies. The appropriateness of the use of a particular spray gun cleaner technology should be determined on a facility-specific basis. Potential users should contact officials in the state in which the facility is located to determine their specific regulatory requirements. A listing of technical assistance program contacts for the northeast states is located at the end of this profile. For contacts outside the northeast go the Pollution Prevention Resource Exchange national programs directory located at: [www.p2rx.org/Networking/NationalProgram.cfm](http://www.p2rx.org/Networking/NationalProgram.cfm).

## Background

Spray guns are used to apply paint and other coatings in a wide variety of businesses including wood furniture manufacturing, and various metal coating operations, including auto body shops. Companies of all sizes use spray guns for coating, ranging from aircraft manufacturers down to the neighborhood auto body shop. More businesses are using enclosed systems to clean their spray guns. However, most of these systems use traditional cleaning solvents, such as paint thinner (mineral spirits), or methyl ethyl ketone (MEK). In addition to being volatile organic compounds (VOCs) that contribute to ground-level ozone formation (i.e., smog), traditional solvents are associated with worker health and safety problems, are flammable, and if spilled, can create significant environmental cleanup challenges and liabilities.

There are several vendors who offer gun cleaner systems that are enclosed and use alternative solvents. Enclosed spray gun cleaners using alternative cleaners are appropriate for all sizes and types of businesses that use spray guns.

This P2 Profile outlines the benefits of these enclosed systems using alternative cleaners over traditional methods of spray gun cleaning. The relative benefits and challenges of using an enclosed gun cleaner, and using the associated alternative solvents are discussed in separate sections below. Fully enclosed systems can use traditional solvents and some of the benefits and challenges are associated with the equipment alone.

## **Traditional Spray Gun Cleaning - Overview**

Spray guns are typically cleaned at the end of the day, or between uses of different types or colors of coatings. At an auto body shop that can mean at least three cleanings for each repair job, not matter what the size of the job. When cleaning is needed, pure solvent is introduced into the gun to displace the coating and clean the gun. In the past, the spray gun was discharged into the air, with the solvent evaporating. This method is rarely used today. In the interest of reducing air emissions and reusing the solvent, users began to discharge the solvent into a bucket. At the end of the day, the gun is taken apart, soaked in the solvent bucket, and scrubbed to remove recalcitrant coating.

Another piece of equipment that requires cleaning at many shops is the coating reservoir cup. Large shops often use dedicated lines connected to larger containers, called pressure pots. But at shops that use relatively small quantities of different types and/or colors of coatings, such as a body shop, the coating is placed in a metal cup that is attached to the top of the spray gun. The cup must also be cleaned between each coating change. To reduce cleaning needs, some shops use disposable liners in these cups that are changed with each coating change; however, even then there is usually some cleaning required of the cup itself.

In more sophisticated settings, gun cleaning stations are installed. A spray gun cleaning station usually resembles a metal sink with a lid. When in use, the lid is opened. The spray gun is connected to the solvent reservoir and the cleaning solvent is sprayed through the gun. The solvent and coating mixture is collected within a basin. The spray gun is also disassembled and cleaned in the collected solvent along with the metal paint cup. After use, the solvent is filtered before entering the reservoir for reuse, and the lid to the equipment is closed. The principle for a gun cleaning station is the same as open bucket cleaning – spray the solvent into a container and clean the gun by hand. The bucket collection method and gun cleaning stations are currently utilized in many businesses. Many of the manufactures of fully-enclosed gun cleaning systems also manufacture gun cleaning stations.

The use of hazardous solvents for gun cleaning creates volatile organic compound (VOC) emissions and hazardous waste, and exposes employees to hazardous materials. Another drawback to traditional solvents is that they are flammable and therefore subject to fire safety regulations as well as occupational and environmental controls. Use of traditional solvents is regulated and involves management and storage restrictions, as well as significant fire insurance expenses. In addition, the use of solvents is associated with the potential for inadvertent spill and

release to the environment – a potentially costly liability. Because solvent-loss and worker exposure remain high with hand cleaning and container collection of solvent, a key advancement is cleaning the gun in a fully-enclosed system where air emissions are controlled and the solvent is recycled. A further improvement is to use alternative less hazardous solvents in the fully-enclosed system. Both of these advancements are discussed in the subsequent sections.

## **Enclosed Gun Cleaner Technology**

An automated enclosed gun cleaner draws cleaning fluid from a reservoir and sprays it at pressure onto and into the paint gun. This occurs within a closed container system. In most systems the paint removed from the gun and the cleaner collects in a reservoir where it is filtered and reused. When the cleaner can no longer adequately clean the guns the operator removes and replaces it with fresh cleaner. The filter is also replaced. An option that could be economical for some facilities is to distill the spent solvent so it can be further reused. Some enclosed cleaning units include distillation as an integrated part of their equipment system. Distillation reduces the quantity of fresh solvent needed in a given period of time, but does not eliminate the need to purchase and use hazardous solvents. Therefore, health impacts, environmental liability, regulatory requirements, and fire insurance rates might not decrease.

Enclosed gun cleaners come in different sizes, typically for one, two, or four guns. Some systems are designed to clean the metal coating reservoir cup as well. Most automated systems use a diaphragm pump that is operated with compressed air so the gun cleaner can be located in or near the paint mixing or spray areas. Some systems run on electricity and therefore must be located in a separate area to avoid explosion risks. There are several potential benefits and concerns associated with the use of fully-enclosed spray gun cleaning systems as outlined below.

### **Benefits of Fully-Enclosed Spray Gun Cleaning Systems**

The main benefits to users of fully-enclosed spray gun cleaning systems are:

- **Increased Productivity** – enclosed cleaners are loaded and then cleaning occurs automatically – typically in two minutes or less. Guns do not need to be taken apart, and most systems clean two or four guns at a time. Shop personnel do not need to tend the machine – they can do other things. Manual gun cleaning can take 10 to 20 minutes per gun.
- **Reduced Operating Costs** - enclosed gun cleaners are much more efficient at collecting and reusing the cleaner than using the spray-into-a-container method. If traditional solvents are used, the waste solvent is a hazardous waste. An enclosed gun cleaner reduces the quantity of waste solvent that requires disposal – reducing costs.
- **Reduced Material Purchase Costs** - Enclosed systems minimize loss of solvent due to volatilization and continuously recycle the solvent. Therefore, less new cleaner is required, reducing purchase costs. Enclosed cleaners contain a filter that removes paint and other debris before it reaches the diaphragm pump. Solvent loss to the air is typical with the bucket method of manual spray gun cleaning, so the quantity of solvent that can be reused is limited.

- Reduced Exposure to Air Emissions – fully-enclosed systems control air emissions more effectively than gun cleaning stations or the bucket collection method. This reduces fugitive releases and the associated hazards to employees and the environment.

### **Concerns about Fully-Enclosed Spray Gun Cleaning Systems**

The main concerns that users of fully-enclosed spray gun cleaning systems should consider are:

- Traditional Solvents – if traditional solvents are used in any gun cleaning system, including fully-enclosed equipment, the spent solvent must be handled and disposed of as a hazardous waste. The filters must be changed periodically, and are also a hazardous waste. Air emissions from the use of traditional solvents are now heavily regulated due to their potential health effects and their role in the formation of ground level ozone and smog. Use of an automated enclosed gun cleaner can reduce VOC emissions, worker exposure to harmful materials, and the associated regulatory burdens, but does not eliminate them.
- Alternative Cleaner – if an alternative cleaner is used it must be compatible with the automated cleaning equipment. For example, a water-based cleaner cannot be used in equipment not designed to be corrosion resistant. Generally the equipment and cleaner are purchased together as a system from one vendor.
- Maintenance – the automated cleaning equipment needs to be maintained in order for it to continue to operate properly. The frequency of maintenance requirements is dependent on the number of gun cleanings required, and for the metal paint cups, whether a disposable liner is used or not. If a disposable liner is not used, then a lot more coating is introduced to the system, and the maintenance frequency is increased. In general there are three maintenance activities:
  - Clean out basin
  - Change the filter(s)
  - Add makeup, or replace the cleaning solution
- Scale of Operation – the economic benefit of an automated cleaning system is directly related to the volume of cleaning required – the more cleaning, the more savings. Therefore, in a small shop that does not use a lot of paint, an automated system might not pay for itself quickly – the payback period will be longer.

### **Alternative Cleaner Technology**

Alternative cleaners are generally biodegradable, non-flammable, and have a low VOC content. Boiling points are high (above 290°F) and vapor pressures are low (1 mm Hg at 68°F or less). Alternative cleaners generally fall into two categories: corn and soybean-derived, often combined with d-Limonene citrus; and N-Methyl-2-Pyrrolidone (NMP)-containing aqueous blends of organic solvents, esters, and surfactants. Corn/soybean cleaners tend to be most effective on solvent-based polyurethanes, enamels, epoxies, and UV-curable coatings. NMP cleaners work well cleaning waterborne and solvent-borne coatings, including two-part coatings.

NMP alternatives have relatively high flash points (greater than 190°F). The corn/soy cleaners tend to have lower flashpoints (less than 130°F), so ignitability and explosion can be a concern.

Alternative cleaners can be reused by filtering to remove soils and/or allowing the coating to settle out, and then decanting. Some alternative cleaners can be distilled to improve purity – however, with some compounds the distillation process alters the cleaner so it is no longer effective. There are numerous benefits associated with the non-hazardous nature of alternative solvents as outlined below. In addition, there are concerns that need to be considered.

### **Benefits of Using Alternative Cleaners**

The main benefits to users of using alternative cleaners in fully-enclosed spray gun cleaning systems are:

- Air Emission Reductions - reduces worker exposure, improves employee morale, and enhances company image in the community.
- Reduced Regulatory Burden and Liability - eliminating virgin solvent storage and hazardous waste management requirements also reduces regulatory burdens and liability. For example, one facility, GF Office Furniture went from large quantity generator (LQG) to small quantity generator (SQG) status under RCRA by using an enclosed spray gun cleaner with alternative cleaners (from 18,750 kg/month to less than 100 kg/month).
- Reduced Material Use - alternative cleaners can remain effective up to 10 times longer than conventional paint thinners or methyl ethyl ketone (MEK) – increased cleaner life translates into reduced chemical use (purchase costs) and reduced waste generation (disposal costs). Enclosed systems continuously recycle the solvent. Enclosed cleaner systems contain a filter which removes paint and other debris before it reaches the diaphragm pump. Solvent loss to the air is typical with the bucket method of manual spray gun cleaning, so the quantity of solvent that can be reused is limited.
- Easy Cleanup - alternative solvents can be removed with a water rinse, so cleanup of equipment and spills uses water.

### **Concerns about Using Alternative Cleaners**

The main concerns that users of alternative cleaners in fully-enclosed spray gun cleaning systems should consider are:

- Coating Type - depending on what type of coating is sprayed with the guns, the resulting spent cleaning material (including filtered/settled solvents) and the filters could be a hazardous waste.
- Increased Requirements for Gun Drying - alternative cleaners do not evaporate quickly due to their low VOC content – therefore, with some systems the cleaned guns should be dried out with compressed air in order to prevent corrosion and breakdown of parts due to exposure to the chemicals. Some fully-enclosed systems have been designed so that the gun comes out of the machine ready for use.

- Residue Issues – some alternative coatings, mainly those that are citrus-based can leave a thin residue in the gun which can affect the next coating sprayed.
- Incompatibility with Plastics - some alternative cleaners can dissolve certain types of plastics such as poly vinyl chloride (PVC) and poly ethylene terephthalate (PET) – use of butyl rubber gloves is recommended. Any affected area should be washed with water
- Incompatibility with Equipment Materials - with water-based alternative cleaners corrosion and rusting are concerns and therefore, the equipment and lines need to be made from stainless steel and/or polypropylene-lined components.
- Cost per Gallon - alternative cleaners typically cost two or three time more than solvents per gallon. However, they typically retain their cleaning power longer than traditional solvents. In addition, there can be costs associated with converting to stainless/polypropylene components.

### Costs of Using Alternative Cleaners in Fully-Enclosed Spray Gun Washer Systems

Table 1 provides some detail on the cost benefits of using a fully-enclosed spray gun washer that uses alternative solvents.

**Table 1: Example Cost Comparison Table<sup>1</sup>**

	Gun Washer and Recycling Combined in One Machine	Gun Cleaning With No Recycling – Use Waste Hauling Service	Recycler and Gun Washer in Separate Machines	Gun Washer with Alternative Solvents
Lease Payment or Monthly Service Fee	\$185.00	\$400.00 (includes solvent)	\$150.00	\$152.00
Lacquer Thinner	\$80.00	-	\$80.00	-
Cleaning Solution	-	-	-	\$26.00
Filters	-	-	-	\$21.00
Haz-Mat Report (Annual)	\$25.00	\$25.00	\$25.00	-
Fire Funnel	\$3.00	\$3.00	\$3.00	-
Recycle Labor	-	-	\$60.00	-
Haz-Mat spill container	\$5.00	\$5.00	\$5.00	-
Recycler liners	\$25.00	-	\$25.00	-
Vent Installation	\$5.00	\$5.00	-	-
Still Bottom Hauling	\$50.00	-	\$50.00	-
<b>Total Monthly Cost</b>	<b>\$378.00</b>	<b>\$438.00</b>	<b>\$398.00</b>	<b>\$199.00</b>

<sup>1</sup> Adapted from information about the Bonny Marlin System 1000, found at [www.bonnymarlin.com/cost.html](http://www.bonnymarlin.com/cost.html) on October 6, 2005.

Elimination of Hazardous Waste?	No	No	No	<i>Yes</i>
Eliminates use of Lacquer Thinner?	No	No	No	<i>Yes</i>
Paint & Material Waste	Significant	Significant	Significant	<i>Decreased</i>
Owner's Liability: - safety & health risk - fire risk	Significant Significant Significant	Significant Significant Significant	Significant Significant Significant	<i>Decreased</i> <i>Decreased</i> <i>Decreased</i>
VOC Cap Impact	Significant	Significant	Significant	<i>Reduced</i>

## Case Study – Amato’s Auto Body<sup>2</sup>

Amato’s Auto Body is located in San Diego, California and is subject to strict air quality regulations. In 2004 Amato’s switched from cleaning spray guns in a bucket with paint thinner to the Bonny Marlin system. Amato’s still uses solvent-based paints, and so still generates some paint waste. Due to the introduction of the Bonny Marlin system for spray gun cleaning, thinner use was reduced by 75 percent and paint waste disposal was reduced by 50 percent. The total cost savings from these reductions was \$3,866 per year. Maintenance of the Bonny Marlin system involved adding 1 quart of cleaning solution each week for makeup; changing one pre-filter every other week; and changing one recycle filter every six weeks. The total cost of system maintenance was \$868. The capital cost of the Bonny Marlin system was \$7,120 yielding a simple payback period of less than 2 years and 6 months.

## Case Study - U.S. Air Force Study<sup>3</sup>

In 2003 the U.S. Air Force performed a study to determine which alternative solvents and which automatic spray gun cleaners perform best for their needs. The coatings used in the greatest quantities by the Air Force are epoxy high solids primer, polyurethane topcoat, and fluorocarbon topcoat. The researchers found 33 commercially available alternative solvent paint gun cleaners for initial consideration. MSDS information was reviewed to screen out cleaners with undesirable characteristics. Favorable characteristics included: low vapor pressure (below 7 mm Hg at 68oF), low or no VOC content, low odor, low toxicity, and high flashpoint (above 140oF). As a result, 10 solvents were selected for initial evaluation.

Alternative Cleaners – Initial Evaluation: The initial evaluation involved a test for cleaning performance. Aluminum panels were painted with each of the three commonly used coatings and allowed to cure for 30 minutes. Then the paint was cleaned from the aluminum panels by placing them in a bucket and spraying the cleaner onto the coated panels. A brush was used if necessary. Note that the circumstances of this test are not representative of a spray gun or how it is cleaned. The performance evaluation criteria are listed in the Table 2 below.

<sup>2</sup> Goodbody, Leslie, California Department of Toxic Substances Control, Office of Pollution Prevention and Technology Development, communication with Amato’s Auto Body Shop, faxed from Amato’s to Bonny Marlin, September 16, 2005.

<sup>3</sup> Paint Gun Cleaner Evaluation, Pollution Prevention Project, CDRL 13: Final Technical Report, Prepared by NCI Information Systems for David Ellicks, AFRL/MLS-OLR, Robbins AFB, August 2003.

**Table 2: Performance Evaluation Criteria – Initial Evaluation**

Performance	Metric	Test Data
Ability of the cleaner to remove paint	Percentage of paint removed without agitation	Measure percentage of paint removed from panels after 5 minutes of applying 20 squirts of cleaner from a spray bottle
Ease of paint removal	Total effort required to completely clean panels, including agitation	Note all performance characteristics as to how the paint was removed, i.e.; dissolved and rinsed clean immediately, required soaking before coating came off
Characteristics of how each material performed	The friendly or unfriendly nature of the material to the operator	Odor, disposal requirements, supplemental cleaning requirements, special equipment
Degree to which paint was removed	Degree of cleanliness before agitation was used to achieve complete paint removal	Complete with no residual film, complete but film residual had to be washed off, estimate of coating still remaining before and after agitation was used for cleaning

Following the initial performance test, three cleaners were eliminated from further consideration because of their poor performance. The remaining seven cleaners are listed in Table 3:

**Table 3: Alternative solvents selected from initial test results for further evaluation**

Product	Manufacturer	Solvent Type
Safe Strip	Ecolink	NMP/Glycol Ether Blend
PGL 2020	Lord and Partners	NMP/Dibasic Ester Blend
Vertec Gold	Vertec Bio Solvents	Bio Ester( Ethyl Lactate, Methyl Soyate) Blend
Vertec Bio Citrus	Vertec Bio Solvents	Bio Ester( Ethyl Lactate)/d-Limonene Blend
Acrastrip 600	U.S. Polychemical Corp.	Glycol Acetate/ Glycol Ether/Dibasic Ester / Water Blend
EP-921	Inland Technologies	Propylene Carbonate/d-Limonene Blend
EP-1088 *	Inland Technologies	Propylene Carbonate/d-Limonene/ Glycol Acetate/ Pine Oil Blend

\* EP-1088 is no longer available from Inland Technologies

Alternative Cleaners – Detailed Evaluation: The selected materials were then tested in an automated spray gun cleaning machine, the Lord and Partners PLC 500A – using coated aluminum panels placed in the equipment. One panel was coated with each of the three different coating materials most used by the Air Force. Again, the circumstances of this test are not representative of a spray gun or how it is cleaned. The performance evaluation criteria are listed in the Table 4 below.

**Table 4: Performance Evaluation Criteria – Detailed Evaluation**

Performance	Metric	Test
Degree of paint removal in the equipment	Quantity of paint removed after 5 minutes with no agitation in the equipment	Note all performance characteristics of paint removed at five minute cleaning in the equipment

Characteristics of how each material performed with the equipment	Compatibility of material with the equipment	Odor, disposal requirements, supplemental cleaning requirements, special equipment
Degree to which paint was removed	Degree of cleanliness before agitation was used to achieve complete paint removal	Complete with no residual film, complete but film residual had to be washed off, estimates of coating still remaining at the end of each test period

The researchers devised a scoring scheme where the higher the score the better the overall cleaning performance. The results of this testing, combined across all three types of coatings showed total scores of: 287 for VertecBio Citrus; 286 for Ecolink Safe Strip; 284 for VertecBio Gold; 239 for Lord & Partners PGL 2020; 223 for Polychem Acrastrip; 220 for Inland Technology EP 1088; and 208 for Inland Technology EP 921.

Enclosed Spray Gun Cleaners and Alternative Solvents - Field Testing: The Air Force then evaluated the cleaners by using them to clean spray guns in automatic spray gun cleaners located in paint shops at several bases. Overall, the Inland Technologies EP-921 and EP-1088, Vertec Bio Citrus, and Ecolink Safe Strip alternative cleaners obtained the most favorable feedback from users. Although the Polychem Acrastrip solvent worked well, operators were frustrated by the longer length of time required to clean the guns with it compared to the other solvents.

The Air Force also evaluated the following different makes and models of automated spray gun cleaning equipment by placing them in paint shops at several different air force installations:

- Becca Model 9880 Deluxe Power Clean Workstation with a Model 9725 High Capacity Solvent Saver Recycler
- Uni-Ram Model UG5500 DVM Automatic Spray Gun Cleaner with a Uni-Ram Model URS500P2 Solvent Recycler
- Lord & Partners Model PLC500A Paint Gun Cleaner
- Bonny Marlin Model BMS 1000 Wash Recycle Unit
- Inland Technologies Model IT-200 Paint Gun Cleaner

The Becca and Uni-Ram systems use distillation to recycle the solvent, whereas the Lord & Partners, Bonny Marlin, and Inland Technologies systems use filtration to recycle the solvent. The same paint shop used two or three different gun washers during the field test to generate some comparison data. Generally, the Air Force found that distillation units were more appropriate for high workload facilities and filtration units were more appropriate for smaller facilities. Generally, filtration systems were easier to operate and maintain. Overall, the Uni-Ram, Bonny Marlin, and Inland Technologies units performed adequately and operators provided favorable reviews. The Becca system had motor problems and did not receive favorable reviews at the facility that used it. The Lord & Partners system also had motor problems and did not receive favorable reviews at the facility that used it.

Cost Information:

The capital costs of new gun cleaning systems with solvent recycling were relatively low, as shown in the Table 5.

**Table 5: Prices for the Paint Gun Cleaning Equipment Used in the Field Tests (2003)**

Becca 9880 military spec with stainless steel tanks and vacuum assist distillation	\$13,000
Inland Technology IT-200	\$3,865
Bonny Marlin Water Wash System	\$4,490
Uni-ram UG5500DVM gun cleaner	\$2,690
Uni-ram URS500P2 solvent recycler	\$3,645
Lord & Partners PLC500A	\$2,140

While alternative solvents can be more expensive than VOC solvents, their regulatory and health and safety costs are lower. Alternative solvent costs associated with the Air Force study are presented in Table 6.

**Table 6: Prices for the Paint Gun Cleaning Materials Used in the Field Tests (2003)**

Company:	Type:	Volume:	Price:	Shipping:
Lord & Partners	PGL 2020	4.4 Gal	\$464.20	\$50 Estimate
Poly Chem *	Accrastrip	5 Gal	\$134.75	Shipping Included
Vertec	Bio Gold	5 Gal	\$114.40	UPS (\$22.25)
Vertec	Bio Citrus	5 Gal	\$114.40	UPS (\$22.25)
Eco Link	Safe Strip	5 Gal	\$197	FOB
Inland Technology	EP 921	5 Gal	\$221.58	Shipping Included
Inland Technology	EP 1088	5 Gal	\$305.80	Shipping Included

\* Poly Chem is mixed 50/50 with water for use

The Air Force then performed a cost-benefit analysis using the following assumptions:

- Hazardous waste disposal - \$1 per pound
- Solvent required for
  - manual gun cleaning in a bucket – 55 gallons per month
  - automatic gun cleaning with distillation – 28 gallons per year
  - automatic gun cleaning with filtration – 20 gallons per year
- Labor rate - \$30.30 per hour
- Labor required for
  - manual gun cleaning in a bucket – 15 minutes per gun
  - automatic gun cleaning – 5 minutes per gun
- Average number of guns cleaned – 20 guns per week

Using these assumptions the researchers determined that total annual operating costs would be:

- \$22,907.52 for manual gun cleaning in a bucket
- \$4,583.64 for automatic gun cleaning with distillation
- \$4,532.75 for automatic gun cleaning with filtration

The Air Force study showed a significant cost savings of over \$18,000 each year by switching from traditional gun cleaning in a bucket to an automatic gun cleaner that uses an alternative

solvent. Because the capital cost of a new gun cleaning system with solvent recycling is relatively low, as shown previously in Table 5, payback periods are less than a year.

Fully-automated enclosed spray gun washer equipment and alternative solvents technology are continuously evolving with some manufacturers making significant improvements since these tests were conducted in 2003.

## **Contacts for More Information**

### **Resources and Vendors**

Mention of any company, process, product name, or website should not be considered an endorsement by NEWMOA, NEWMOA member states, or U.S. EPA.

#### **Bonny Marlin, Incorporated**

15927 Frederick Road

Rockville, MD 20855

(888) 926-7546

[www.bonnymarlin.com](http://www.bonnymarlin.com)

Bonny Marlin manufactures an automatic fully-enclosed spray gun cleaner system (BM1500) that uses filtration to recycle either of their non-flammable, non-hazardous, low VOC alternative solvents: BM6040 Solution; or the California South Coast Regulation compliant CAL Solution with just 22 grams of VOC per liter.

#### **Inland Technology, Incorporated**

401 East 27<sup>th</sup> Street

Tacoma, WA 98421

(800) 552-3100

[www.inlandtech.com](http://www.inlandtech.com)

Inland Technology is primarily a manufacturer of alternative solvents for a variety of applications, including the EP-921 solution for spray gun cleaning. Inland also manufactures cleaning equipment including the automatic fully-enclosed the IT-200 Paint Gun Cleaner that uses filtration to recycle the alternative solvent.

#### **Lord & Partners Limited**

9-741 Muskoka Road, #3 North

Huntsville, Ontario Canada P1H2L3

(877) 490-6660 (toll free)

[www.lordandpartners.com](http://www.lordandpartners.com)

Lord & Partners manufactures an automatic fully-enclosed spray gun cleaner, Model LP PLC500A, that uses filtration to recycle the alternative solvent, as well as an alternative spray gun cleaning solvent, P.G.L. 2020.

### **Automated Paint Gun Cleaner Equipment Only**

#### **Becca Incorporated**

2010 Cobb International Blvd, Suite H

Kennesaw, GA 30152

(800) 655-5649

[www.beccainc.com](http://www.beccainc.com)

Becca manufactures two models of automatic, fully-enclosed spray gun cleaner systems, and two models of manual spray gun cleaner stations that are all compatible with the use of alternative solvents. Becca equipment can be combined with a solvent distillation unit to recycle the alternative solvent.

**Herkules Equipment Corporation**

2760 Ridgeway Court  
Walled Lake, MI 48390  
(800) 444-4351  
www.herkules.com

Herkules manufactures two models of automatic, full-enclosed spray gun cleaner systems that are compatible with the use of alternative solvents. Both models use filtration to recycle the alternative solvent.

**Uni-ram Corporation**

171 Cooper Avenue, Suite 108  
Interstate Commerce Center  
Tonawadnda, NY 14150  
(800) 735-4331  
www.uniram.com

Uni-ram manufactures several models of automatic, fully-enclosed spray gun cleaners systems that are compatible with the use of alternative solvents. Some models can be combined with solvent distillation units to recycle the alternative solvent.

Alternative Solvents Only**Ecolink**

2227 Idlewood Road  
Tucker, GA 30084  
(800) 886-8240  
www.ecolink.com

Ecolink manufactures alternative cleaning products for numerous applications, including Safe Strip, a paint and coating remover that can be used for spray gun cleaning.

**Polychem**

584 Chestnut Ridge Road  
Chestnut Ridge, NY 10977  
(800) 431-2072  
www.uspoly.com

Polychem manufactures alternative solvents for many applications, including Acrastrip 600 for spray gun cleaning.

**Vertec BioSolvents, Incorporated**

1441 Branding Lane, Suite 100  
Downers Grove, IL 60515  
(630) 960-0600  
www.vertecbiosolvents.com

Vertec manufactures a variety of bio-based cleaners for many applications, including VertecBio Citrus and VertecBio Gold for spray gun cleaning.

**Northeast State Technical Assistance Programs**

<p><b>In Connecticut:</b>          Kim Trella          Department of Environmental Protection          79 Elm Street          Hartford, CT 06106          (860) 424-3242          kim.trella@po.state.ct.us</p>	<p><b>In Maine:</b>          Peter Cooke          Department of Environmental Protection          17 State House Station          Augusta, ME 04333          (207) 287-6188          peter.cooke@maine.gov</p>
<p><b>In Massachusetts:</b>          John Raschko          Office of Technical Assistance          100 Cambridge Street, Suite 900          Boston, MA 02114          (617) 626-1093          john.raschko@state.ma.us</p>	<p><b>In New Hampshire:</b>          Paul Lockwood          Department of Environmental Services          6 Hazen Drive          Concord, NH 03301          (603) 271-2956          plockwood@des.state.nh.us</p>
<p><b>In New Jersey:</b>          Ruth Foster          Department of Environmental Protection          401 East State Street, PO Box 423          Trenton, NJ 08625          (609) 292-3600          ruth.foster@dep.state.nj.us</p>	<p><b>In New York:</b>          Dennis Lucia          Department of Environmental Conservation          Pollution Prevention Unit          625 Broadway          Albany, NY 12233-8010          (518)-402-9469          djlucia@gw.dec.state.ny.us</p>
<p><b>In Rhode Island:</b>          Richard Enander          Department of Environmental Management          235 Promenade Street          Providence, RI 02908          (401) 222-4700, ext. 4411          rich.enander@dem.ri.gov</p>	<p><b>In Vermont:</b>          Paul Van Hollebeke          Department of Environmental Conservation          103 South Main Street          Waterbury, VT 05671          (802) 241- 3629          paul.vanhollebeke@state.vt.us</p>
<p><b>At NEWMOA:</b>          Jennifer Griffith          NEWMOA          129 Portland Street, 6<sup>th</sup> Floor          Boston, MA 02114          (617) 367-8558, ext. 303          jgriffith@newmoa.org</p>	

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The Northeast Waste Management Officials' Association (NEMWOA) is a nonprofit, nonpartisan interstates organization that addresses regional waste and pollution prevention issues. The membership is composed of state environmental agency directors of the hazardous waste, solid waste, waste site cleanup, pollution prevention and underground storage tank programs in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. NEWMOA provides a forum for increased communication and cooperation among the member states, a vehicle for the development of unified position on various issues and programs, and a source for research and training.