

PAINTING EQUIPMENT CLEANING

COMMONLY OBSERVED PRACTICES

All coating practices require some type of equipment cleaning. For spray painting, the most common coating operation, spray guns and accessories must be cleaned between color changes, when orifices clog and, often, at shift changes. Paint guns are generally cleaned using a solvent that is compatible with the product sprayed (i.e., paint thinner). These types of solvents are relatively expensive to purchase and dispose of, and are hazardous to the environment and employee health if handled improperly.

External equipment surfaces are generally cleaned by soaking, wiping or flushing with solvent. If this process is done in an open container, a significant quantity of solvent is lost to evaporation. Internal parts and passageways are commonly cleaned by flushing solvent through the gun and orifice. This practice also results in significant evaporation and loss of usable product.

POLLUTION PREVENTION OPTIONS

The amount of solvent used and generated as a waste because of painting equipment cleaning can be dramatically reduced through simple techniques and the use of specialized equipment. Following is a summary of the most common and effective pollution prevention options.

SETTLING AND REUSE

Waste gun wash solvent/paint mixtures will partially separate in quiescent situations. The solvent rising to the top of a storage container should be of adequate quality to use for initial gun cleaning. A small quantity of new or distilled solvent can then be used for a final rinse. Used solvent can be placed back into the storage container for subsequent settling and reuse. Eventually, sludge will comprise the majority of the container and off-site hazardous waste disposal will be necessary. At this point, the processes can be repeated using a different container. Solvent waste reduction of up to 33% can be accomplished with this simple method. (Note: Facilities classified as Large Quantity Generators (LQG) and Small Quantity Generators (SQG) have maximum hazardous waste storage time limits. Use of this option should consider these regulatory factors).

AUTOMATIC GUN WASHERS

An automatic gun washer operates like a dishwasher. The paint gun is partially disassembled and placed in the unit. Cleaning is accomplished by recirculating solvent sprays. These units reportedly reduce solvent waste by 50 to 75%. VOC emissions can be reduced by up to 20% and a 60% labor time savings can be achieved.

Units range in cost from \$600 for small units (gun wash only) to approximately \$1500 for industrial type units (gun and paint hose wash). Example gun washer equipment literature is enclosed as Appendix A. Similar units may also be leased through various chemical suppliers and waste management companies at a cost of \$165 to \$195 per five-gallon waste solvent change out interval.

ON-SITE DISTILLATION

On-site distillation and reuse of gun wash solvents is a common pollution prevention and material conservation practice utilized in numerous manufacturing facilities and automobile body repair shops. Waste solvent is collected and processed through the distillation equipment. Approximately 80% of the used solvent is recovered with basically the same cleaning properties as new product.

The remaining 20% sludge (still bottoms) must be collected for off-site hazardous waste disposal.

To help maintain the cleaning properties of the recycled thinner, certain paint/solvent wastes should be segregated. Waste gun wash solvent and any waste lacquer paint/thinner mixtures may be included for recycling. All waste urethanes, enamels and enamel reducers should be placed in a separate container. Enamel and urethane products will not clean as well as pure lacquer thinner. By segregating the two, the reclaimed solvent will possess cleaning properties like a virgin thinner. This waste management technique has the advantage of reducing the volume of virgin thinner required as well as the amount of waste thinner generated.

On-site distillation equipment comes in a wide range of capacities; 5 gallons per 8 hour shift batch operation to more than 100 gallon per hour flow-through units. Costs for 5 gallon batch units start at approximately \$1500 with an average cost of \$3000.

COSTS/BENEFITS

Figure 3-1 can be used to calculate the costs/benefits provided by the above pollution prevention options. A company should enter its own data and perform the corresponding calculations. An example situation is included to assist in the calculations.

Figure 3-1 Painting Equipment Cleaning Alternatives Cost/Benefit Estimate Worksheet			
ITEM	VARIABLE	EXAMPLE	YOUR FACILITY
EXISTING CONDITIONS (12 MONTH)			
A	Gallons of gun wash solvent purchased per year	400	
B	Solvent purchase cost per gallon	\$7.80	
C	Gallons of gun wash solvent disposed of per year	330	
D	Solvent disposal cost per gallon	\$2.45	
E	Annual cost (A x B) + (C x D)	\$3,930.00	
SETTLING AND REUSE			
F	Reduction in waste generation and solvent purchase	33%	
G	Annual cost savings = E x F/100	\$1,297.00	
AUTOMATIC GUN WASHER			
H	Reduction in waste generation and solvent purchase	62.5%	
I	Annual cost savings = E x H/100	\$2,456.00	
	Capital cost	\$1,500.00	
ON-SITE DISTILLATION			
J	Reduction in waste generation and solvent purchase	80%	
K	Annual cost savings = E x J/100	\$3,144.00	
	Capital cost	\$3,000.00	

Figure 3-2
Example Calculation Cost Comparison

POLLUTION PREVENTION OPTION	ANNUAL COST SAVINGS	CAPITAL COST	PAY BACK (YEARS)
Settling and Reuse	\$1,297.00	\$0	Immediate
Automatic Gun Washer	\$2,456.00	\$1,500.00	0.61
On-site Distillation	\$3,144.00	\$3,000.00	0.95

As shown in Figure 3-2, all three options achieve long term cost savings with equipment payback at less than one year.