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Safe and Cost Effective Paint Gun Cleaning Systems

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Using EP-921™ Solvent and a Closed-Loop Reclamation Station

An environmentally friendly paint gun cleaning system is now available for use in corrosion control shops. The new system uses a solvent called "EP-921™," which can be used with either the "IT-200™" or "IT-45 SSER™" paint gun cleaning and reclamation station. The paint gun cleaning stations use a closed loop filtration system that continuously recycles EP-921™ through the system and provides a readily available supply of the solvent.

Introduction

To reduce the cost and regulatory compliance burden associated with paint gun cleaning, Naval Air Depot (NADEP) Cherry Point, NC has transitioned all paint gun cleaning operations to a low-Volatile Organic Compound (VOC), non-Hazardous Air Pollutants (HAPs) paint gun cleaning solvent and associated reclamation station.

The new solvent is called "EP-921™" and is manufactured by Inland Technology Incorporated. The EP-921™ can be used in conjunction with two of Inland Technology's paint gun cleaning systems, either the manual

Background

Pneumatic paint guns are widely used at Naval Air Systems Command (NAVAIR) maintenance facilities. Paint guns traditionally have been cleaned with thinner to remove paint in the internal workings of a gun. This traditional approach requires rinsing the pressure pot or cup with thinner and dumping it into a suitable waste container (atomizing air is not used). New solvent is then sprayed through the gun to remove any remaining contamination from the paint equipment. Finally, the paint gun is disassembled and the components are washed with thinner and dried before re-assembly.

Paint gun cleaning stations are often available to make the cleaning process easier and more efficient. These stations provide a location where new and recycled solvent is available for cleaning. They provide a receptacle where solvent can be forced through the paint equipment during cleaning and paint guns can be disassembled and reassembled.

Regardless of the methods used for paint gun cleaning, any maintenance activity that paints frequently uses a lot of thinner to clean equipment. Estimates range from 0.5 gallons to 2.0 gallons of thinner to clean a single paint gun. A large corrosion paint shop can use hundreds or thousands of gallons of thinner over the course of a year and spend thousands of dollars for paint thinner and waste disposal just to clean paint guns.

Typical paint gun configuration.

paint gun cleaning and reclamation station "IT-45 SSER™," or the automatic paint gun cleaning and reclamation station "IT-200™." The automatic cleaning station is typically used for smaller paint operations. Both cleaning stations provide a readily available supply of EP-921™ that is continuously recycled through the "Edge Tek™" closed loop filtration system. The closed loop filtration system extends the useful life of the solvent.

EP-921™ can be used with other paint gun cleaning systems, but should be used in equipment that recycles the EP-921™ and is equipped with a filtration system that will extend the life of the solvent. The Inland Technology's Edge Tek™ filtration system, NSN 4250-01-381-8029, can be procured separately and can be easily adapted to most paint gun cleaning equipment.

NADEP Cherry Point expects an annual savings of almost $14,000. (The cost of a single unit is approximately $4,500 plus the cost of the solvent.) Additionally, the new technology and solvent will provide a significant reduction in hazardous materials, hazardous waste, and Toxic Release Inventory (TRI) chemicals as well as improving the safety and health of the painters.

Regulatory Drivers

Thinners vary based on the type of paint with which they are used. Some of the most common paint thinners used in aviation maintenance are procured under military specification MIL-T-81772. This specification covers polyurethane thinners (Type I), epoxy thinners (Type II), and acrylic thinners (Type III). Thinners are a blend of high-VOC solvents and are heavily regulated and costly to use. Under the Clean Air Act (CAA), these thinners are considered HAPs and are subject to reporting under Section 313, TRI provisions of the Emergency Planning and Community-Right-to-Know Act (EPCRA). These solvents also contain chemicals cited in the U.S. Environmental Protection Agency's list of 17 high priority chemicals for reduction/elimination.

Inland Technology (IT-45 SSER) reclamation station.

Key Features

- Reduced procurement costs. Low-VOC paint gun cleaning solvent is filtered and recycled by the cleaning station thereby greatly extending its useful life.
- Reduced hazardous waste disposal costs. The low-VOC paint gun cleaning system generates 90 percent less hazardous waste than conventional paint gun cleaning methods, thus greatly reducing disposal costs.
- Easy cleanup. Painters simply clean their equipment using the paint gun cleaning station and wipe any solvent residue from the paint gun.
- Enhanced environmental compliance. The low-VOC EP-921™ solvent used with the closed-loop filtration paint gun cleaning system significantly lowers emissions and complies with the National Emission Standards for Hazardous Air Pollutants (NESHAPs).

Scheduling

Scheduling depends largely on the individual site's procurement procedures and the manufacturer's lead-time. Implementation is estimated to be between 60 and 120 days.

Implementation Data

The following data summarize the requirements and constraints associated with the implementation of paint gun cleaning stations and EP-921™ solvent at NADEP Cherry Point.

General

The IT-200™ and IT-45 SSER™ equipment, along with the EP-921™ solvent, will provide a significant reduction in hazardous waste generation and improve worker health and safety. Paint gun cleaning systems are generally economically feasible when the volume of painting tasks is sufficient to generate savings. Site managers must first ensure that a facility performs a high volume of painting tasks since savings will increase in direction proportion to the use of the painting system itself.

Supply System Considerations

The IT-200™, IT-45 SSER™ and EP-921™ have been assigned National Stock Numbers (NSNs) in the Federal

Supply System. The NSNs are 4250-01-466-6473, 4250-01-464-8623 and 6850-01-381-3300 (5-gallons), respectively. To obtain a Material Safety Data Sheet (MSDS) for EP-921™, contact Inland Technology Incorporated of Tacoma, Washington at 800-552-3100.

Facility Requirements

The following facility/implementation requirements should be considered prior to installation of the equipment. The IT-200™ and IT-45 SSER™ require the following:

- **Electric:** This equipment has no special electrical power requirements.
- **Overall Dimensions:** Sufficient space must be available to install the equipment. The overall dimensions of the paint gun cleaning and reclamation station are 47.5 inches (length) by 30 inches (width) by 42 inches (height).
- **Compressed Air Requirements:** The manufacturer recommends no more than 80 pounds per square inch. (Each site should be equipped with an air regulator that can be used to control the amount of air pressure in the line at a given time to ensure the maximum is not exceeded.)
- **Air Sources:** Air inlet 1/4 NPT (female) coupler is required. (The equipment comes with a 1/4 NPT (f) Air Adapter.)

Dwight Edwards, aircraft painter at Naval Air Depot Cherry Point, NC is shown cleaning his paint gun using an Inland Technology (model IT-45) paint gun cleaner.

Training

Training will be required for those personnel who intend to use this paint gun cleaning system. Paint gun cleaning procedures vary slightly when using EP-921™, so painters must modify their work practices accordingly. Since there is no evaporative loss associated with EP-921™, most of the training and work practices associated with its introduction into a paint shop involve conservation techniques and techniques for removing unevaporated EP-921™ from the paint equipment. Conservation techniques include cascading extremely dirty EP-921™ into a pre-clean usage, density separation, and filtering the solvent. Training is expected to take one day.

Maintenance Planning/Scheduling

The paint gun cleaning station will require minimal periodic and preventative maintenance. Preventative maintenance on the average of five to seven minutes per month will be required and includes checking hoses, connections, hinges and ensuring the equipment remains intact. Inland Technology Incorporated will send any replacement parts that are broken for the life of the equipment as long as the EP-921™ solvent is being used. Filter changes will be necessary to keep the EP-921™ solvent fresh. The filter changes will be needed on the average of once per month based on usage and only require a few minutes to complete.

Environmental, Safety and Health Issues

The new systems will enhance environmental compliance by reducing the quantity of hazardous waste generated and decreasing the chances for improper handling/disposal of the waste.

Impact Analysis

The economic and environmental benefits were estimated based on the implementation of paint gun cleaning systems at two NADEP Cherry Point control shops. The resulting impact analysis compares the annual economic and environmental considerations of the paint gun cleaning systems versus the existing processes. The impact analysis incorporates:

- Initial cost of the new equipment,
- Recurring costs for both options,
- Reduced procurement costs for EP-921™, and
- Reduced hazardous waste disposal costs.

The following table shows a summary of the impact analysis results. The analysis revealed annual savings of over $13,000 for implementation of the paint gun cleaning systems. It also suggests an annual hazardous waste reduction of over 9,000 pounds. These results strongly support the decision to implement the cleaning systems.

Impact Analysis Metrics: Benefits of EP-921™ Paint Gun Cleaning Versus High-VOC Solvent Paint Gun Cleaning

Environmental, Safety and Health Benefits	NADEP Cherry Point
Hazardous Materials Reduction (lbs/year)	13,710
TRI Chemical Reduction (lbs/year)	6,892
Hazardous Waste Reduction (lbs/year)	9,258

Economic Benefits	
Payback (years)	3.93
Labor Savings (hours/year)	0
Return Rate	26%
Initial Cost (of 9 units plus solvent)	$50,551
Annual Savings	$13,952
Net Present Value	$83,996

Annual Operating Cost Elements	High-VOC Solvent Paint Gun Cleaning	EP-921™ Paint Gun Cleaning
MATERIALS	$11,992	$1,718
Hazardous Waste Disposal Costs	$4,549	$870
Total Annual Costs	$16,541	$2,588

Conclusion

Paint gun cleaning systems that incorporate EP-921™ solvent offer economic and environmental benefits to NADEP corrosion control shops.

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