

NAS NORTH ISLAND - NAVY REGION SOUTHWEST NAVY ENVIRONMENTAL LEADERSHIP PROGRAM

POLLUTION PREVENTION

MINI - MAX STEAM CLEANER

LEAD ACTIVITY

Naval Air Station (NAS) North Island

STATUS

Complete

MISSION

Reduce hazardous waste disposal and air emissions created by solvents containing volatile organic compounds (VOC)

REQUIREMENT

Use of solvents containing VOCs in a number of parts cleaning applications can generate hazardous waste, air emissions, and human health concerns. In order to reduce these effects, alternative cleaners are required to replace the solvents. Any Navy station that has parts cleaning operations may potentially use these alternative-cleaning agents for their operations.

DESCRIPTION

NAS North Island is using the Mini-Max Cleaner® , developed by PDQ Precision Inc., to clean small-bore weapons, gas turbine engine parts, and other small parts. The steam cleaner can be used to replace ozone-depleting substances (ODS) such as cleaning solvents. The Mini-Max Cleaner® is a self-contained, portable unit that converts distilled or deionized water mixed with a non-hazardous cleaning solution called Arma-Sol® into high-pressure, dry steam. The high-pressure steam, because of its moisture, temperature, and pressure, effectively removes contaminants from a surface. The steam dries on contact with the part, reducing drying time and spots. The unit contains an internal heating chamber and a small pump that draws the liquid from any container into the superheated chamber. The steam is then forced out through the nozzle of a hose directly onto the part to be cleaned. Arma-Sol® comes either "dry", consisting of a rust inhibitor only that leaves no residue, or as a "wash", consisting of a rust inhibitor and a detergent to clean greasy components. Because the Mini-Max



Mini-Max Waste Management System

Cleaner® is a self-contained unit that uses steam to remove dirt and grease from the components, no wastewater is generated during use. Also, as no hazardous solvents are used in the cleaning process, only a small amount of hazardous waste requires disposal.

The Mini-Max Cleaner® is available in a variety of sizes and has a basic output of 190 pounds per square inch (psi) and a high output of 290 psi. The single unit, with one heating chamber, produces steam for about 10 minutes before it must stop to recover (recovery time is 2 minutes). The Mini-Max Modular II™ unit has two chambers which increases the amount of steam available. The Mini-Max Modular IV™ unit has four chambers, which creates continuous steam as long as liquid is provided.

NAS North Island is using a Mini-Max Waste Management System™ to clean electro-mechanical parts at the Aircraft Intermediate Maintenance Department (AIMD) Commander of Naval Air Forces Pacific Fleet (CNAP) Support Equipment Facility (Building 801). The Waste Management System™ consists of a Mini-Max Modular II™ unit, a mobile cart, and a self-contained, enclosed booth. The unit has been effective getting into the small areas of turbine engines and has reduced cleaning time. Cost analysis data are being gathered. However, the current mobile unit is not always plugged in and ready for use, discouraging use for small jobs. Therefore, AIMD is planning to obtain a Mini-Max Modular IV™ unit for continuous steam and a custom-built, large environmental control unit to clean large parts in an enclosed area. When cleaning dirty or greasy parts, the hazardous waste can be contained by cleaning the part on a towel or cloth that is then disposed of properly. With the addition of the large booth and the Modular IV unit, AIMD will have the steam cleaner ready for use at any time and the ability to clean larger parts.

The Marine Corps Security Force at NAS North Island is using three single Mini-Max System units to clean small-bore weapons such as M-16 rifles and large 50-caliber weapons. The three units are used together to clean, rinse, and apply a rust inhibitor using the "dry" Arma-Sol® so that no residue is left on the weapons. This process reduces weapons cleaning time by about 60 percent and cleaning results are better than the traditional method of soaking the entire unit in a cleaning solvent. CNAP has two Mini-Max Modular II™ units to clean forklift parts during equipment overhaul; however, the Mini-Max has not been effective for cleaning large parts that are heavily corroded. The steam cleaner is not effective on large parts because the steam is evaporated by the time it reaches the part.

BENEFITS

- Eliminates use of ozone-depleting substances in cleaning process
- Eliminates waste solvent generation and disposal requirements
- Eliminates air emissions related to solvent use; the Mini-Max Cleaner® won the 1997 South Coast Air Quality Management District (SCAQMD) Clean Air Award, and Arma-Sol® has been classified as a Clean Air Solvent (CAS) by SCAQMD
- Reduces solvent procurement and disposal costs

ACCOMPLISHMENTS/CURRENT STATUS

Date	Activity
JUL 1997	Vendor demonstrated Mini-Max Cleaner→ at NAS North Island
AUG 1997	Units installed at NAS North Island
MAR 1999	Procure Modular IV™ unit and large booth for use at AIMD
AUG 1999	Complete cost analysis

FUTURE PLAN OF ACTION & MILESTONES

Not Applicable

COLLABORATION/TECHNOLOGY TRANSFER

The Mini-Max Cleaner® was evaluated as part of the Pollution Prevention Equipment Program (PPEP). It can be used to clean electronic, mechanical, electrical, automotive, and industrial parts, and military weapons. The units are now being used at many military facilities.

BIBLIOGRAPHY

- Mini-Max Cleaner® Equipment Evaluation from AIMD to NAWC Lakehurst, December 1997

RELATED GOVERNMENT INTERNET SITES

[PPEP Book Web Site: Hand Held Steam Cleaners](#)

RELATED NAVY GUIDEBOOK REQUIREMENTS

- 01002 VOC and HAP Emissions Control from Solvent Cleaning

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