



## **PRACTICAL SYSTEMS INC.**

11617 Prospect Road • Odessa, FL 33556  
(727) 376-7900 • Fax (727) 372-1900  
(800) 237-8154 • Fax (800) 330-3800  
[www.LookToPSI.com](http://www.LookToPSI.com)

### **Procedure for Treating Optical Laboratory Alloy Reclaim Tank Wastewater Using Cad-Con 1000™**

Please read directions thoroughly before treating wastewater.

1. Treat and dispose of your alloy tank water at least every one to two weeks. Whichever you decide, it is important to be consistent in the time between treatment so that your laboratory results can be properly interpreted.
2. Drain alloy tank wastewater into a suitable container (a 5-gallon plastic or steel bucket works fine).
3. If you use vinegar or another product to “clean” your alloy, you will need to test the pH of the wastewater. This is easily done with pH test strips that can be purchased online (order strips with pH range of 1 to 14). Stir the water to blend thoroughly and follow the instructions on the test strip package. If the pH is below 6.5, stir in a tablespoon of pH Pre-Treat (available from PSI, part #1000PH). After 5 minutes, measure the pH again. Repeat this step until the pH reaches 6.5 or above. This pre-treatment step neutralizes the adverse effects of vinegar.
4. Add and thoroughly mix the proper amount of Cad-Con 1000™ (1 cup or 4 ounces treats 5 gallons of alloy reclaim tank water). Keep the Cad-Con suspended throughout the wastewater for about half an hour by stirring every 10 minutes.
5. At this point, **if you have a treatment unit for removing suspended solids (such as a Panhandler)**, the treated alloy tank wastewater can now be added to and mixed with the other liquid wastes for final treatment and filtering. It will not contaminate the effluent or the residual solids from that process. However, **if you have no treatment unit that separates and removes suspended solids, continue on to Step 6.**
6. Put the cover back on the bucket and place the container in a location where it can remain undisturbed for 5 days. This will allow gravity to separate the solids from the water and settle them completely into a compact sediment layer at the bottom of the pail. The objective of this step is to keep the water and the sediment separate for disposal.
7. For proper disposal slowly pour the clear water down a drain being careful to keep the sediment from mixing with the clear water as you pour. After you have poured off as much clear water as possible, absorb the remaining water and sediment with paper towels or any other inexpensive absorbent material. Dispose of the sediment and absorbent as solid waste in your dumpster or recycle this material along with alloy dross or slag.

**NOTE:** Local sewer discharge limitations may require the wastewater to be filtered prior to discharge. Check with your local sewer authority as this must be determined on a case-by-case basis for your specific location.

## **IF YOU ARE COLLECTING A LABORATORY SAMPLE FOR TESTING**

If a lab sample is to be taken for testing, obtain sample bottles and forms from your local analytical laboratory in advance. Note that it is vitally important that the final treated wastewater samples sent to the lab be totally free of all solid particles. The following process should be carried out between Steps 6 and 7, above.

After the treated wastewater has settled for 5 days, remove the cover from the pail without disturbing the contents. Do not agitate the water or disturb the sediment layer at the bottom of the pail. Put on a fresh pair of disposable nitrile gloves. Carefully dip water from the top of the pail with a clean plastic or glass cup and fill the sample bottles as per the instructions provided by the lab. Record the date and time on the container label. Be careful not to contaminate the water sample or the inside of the sample bottle with anything. Label the samples and deliver the samples to the lab as soon as possible. Note: the bottles from the lab may contain a small amount of liquid put there by the lab as a preservative to keep the chemical components in the water from reacting with the container. Be sure to follow the instructions provided by the lab.

Finally, in order to verify regulatory compliance, compare the lab test results against the discharge requirements issued by your local sewer authority. Lab results will, in most cases, be lower than the applicable discharge requirements. If this is observed, compliance is verified. If compliance is not achieved, have the results evaluated by an environmental professional or contact PSI for assistance in evaluating the results. An environmental professional can help to determine the cause of the non-compliance and recommend an appropriate modification to the treatment process.

## **TO THOSE WHO TREAT DAILY**

A number of labs have indicated that they prefer to treat their alloy tank water on a daily basis and have asked if they can reduce the dosage. Although we have no direct data, we are reasonably confident that a dosage of ¼ cup Cad-Con 1000™ to 5 gallons of daily-use alloy tank water would be sufficient. However, as with the protocol described above, you are responsible for the compliance of your discharges and, therefore, are encouraged to verify compliance of this alternative protocol with laboratory testing.

## **REGARDING PROCESS ADDITIVES**

Cad-Con 1000™ is designed to work on alloy reclaim tank water that has been exposed only to the metallic components of blocking alloy. If any additional chemical is used in the process to extend the life of the alloy (e.g. vinegar, propylene glycol, etc.) it may have a negative impact on the performance of Cad-Con 1000™. Additional steps may be needed (as described in Step 3 above) to neutralize the effects of the additive chemical and ensure that the Cad-Con 1000™ delivers its normally extraordinary results. Contact PSI for more information at 800-237-8154.

## **TREATING OTHER WASTES**

These instructions are general and will provide excellent results for treating the alloy tank wastewater of most optical laboratories. Although we have no test results regarding the use of Cad-Con 1000™ for the treatment of other optical laboratory wastes (such as alloy-contaminated swarf sludge, coolants, polishes and emery), we are aware of labs that have used the product for treating such wastes with excellent results.

## COMPLIANCE

Due to the potential variation of conditions under which this product might be used and the disparity in regulations among states and local authorities, compliance is never guaranteed. It is important to note that compliance is always the responsibility of the owner, operator and/or manager of the optical laboratory. No vendor supplying treatment equipment, products or even “environmentally friendly” substitutes can guarantee compliance. Compliance is and always will be **YOUR** responsibility.

Cad-Con 1000™ must be thought of as a component in your overall program for compliance with environmental regulations. Used properly, it will provide consistent, reliable, cost-effective treatment of your alloy-contaminated wastes. But if used improperly, it may not, therefore, its use does not guarantee compliance. Compliance (and noncompliance) is demonstrated or proven, through laboratory analysis of treated wastewater samples. Product performance can also be evaluated in a similar manner. When verifying compliance or evaluating product performance, the services of an independent, state-certified environmental testing laboratory should be used. Also, it is important to keep all waste analytical test results on file. At the appropriate time, these records will demonstrate your compliance status to regulatory authorities.

There are two issues that must be addressed to ensure that compliance is achieved. First, the treated wastewater should be tested to verify that the dissolved concentrations of cadmium and lead are below the local discharge limits. These limits are published in your local sewer use ordinance or can be determined by contacting your local sewer authority. Second, the residual sediment (sludge) can be tested to verify that it has, in fact, been rendered non-hazardous and is, therefore, suitable for disposal with your other solid wastes.

## TO VERIFY COMPLIANCE

Obtain sample containers from your analytical laboratory in advance and follow the protocol defined above under the heading **IF YOU ARE COLLECTING A LABORATORY SAMPLE FOR TESTING**.

## TO EVALUATE PERFORMANCE (Environmental Testing Lab Procedure)

This procedure is to be carried out by your environmental testing laboratory using two 1-liter containers of untreated, unpreserved alloy reclaim tank wastewater. The objective of the Performance Evaluation is to determine the concentrations of total cadmium (Cd) and total lead (Pb) in wastewater samples representing Before Treatment and After Treatment with Cad-Con 1000™.

1. One of the two containers should be selected and labeled as the Before Treatment Sample. Without any form of physical or chemical treatment, this sample should be analyzed for Total Cd and Total Pb. The concentrations of cadmium and lead determined by this testing will serve as a baseline for the untreated alloy reclaim tank wastewater.
2. The other sample container should be labeled the Treatment Protocol Sample. First, check the pH of the wastewater in this sample. If pH is below 6.5, add 1.0 gm or less of pH Pre-Treat, blend into the sample and recheck pH after 5 minutes. Continue this step until a pH of 6.5 or greater is achieved.
3. To the one-liter sample of alloy reclaim tank wastewater (adjusted to pH 6.5 or above), add and thoroughly mix 6.0 grams of Cad-Con 1000™ (this equates to the recommended dosage of 1 cup or 4 ounces of Cad-Con 1000™ to each 5 gallons of alloy tank wastewater). Keep the material suspended in the sample for 30 minutes by slowly stirring using a magnetic stirrer. Cadmium, lead and other metals in the wastewater, both in solution and particulate form, are attracted to and chemically combine with the components in Cad-Con 1000™.

4. When Step 3 is complete, allow the treated sample to remain undisturbed for several hours while the large particles settle to the bottom of the container. Filter the water through a 1.0 $\mu$  filter. The residual solids that have been separated from the treated water now contain the cadmium and lead in a stabilized form. The filtered water is now clear and should be free of cadmium and lead.
5. Verify the efficacy of the process by analyzing the filtrate for Total Cd and Total Pb using the State-required EPA-approved procedures including the QA/QC protocols.

**Important Note:** Do NOT Add a preservative to the untreated samples when they are collected. The preservative, which is typically an acid, is not a part of the industrial process and will alter the chemical and physical properties of the wastewater and its composition which will interfere with the Cad-Con 1000™ treatment chemistry giving a false result. However, after treatment of the sample is completed, the treated and filtered wastewater sample may be preserved for later analysis.

**Important Note:** When analyzing the treated wastewater it is important to ensure that all solid particles have been filtered out. The solid residual particles of this treatment process contain all of the cadmium and lead removed from the water but in a chemically stabilized form. If solid particles remain after treatment, when the water sample is subjected to flame or plasma type analyses, the cadmium and lead that are chemically bound to these particles will be revealed giving a false positive reading. To avoid the potential for a false positive, you should filter the sample using a 5.0 $\mu$  or less filter prior to analysis.

6. The solid particulates (sediment or sludge) that are removed following treatment with Cad-Con 1000™ contain the chemically stabilized cadmium and lead. Since cadmium and lead are listed as hazardous wastes under the Resource Conservation and Recovery Act (RCRA), the sediment is potentially a hazardous waste. A waste that contains cadmium and/or lead is determined to actually be hazardous waste if it exceeds the applicable thresholds when tested using the Toxicity Characteristic Leaching Procedure (TCLP) (EPA Procedure No. 6010). Cad-Con 1000™ stabilizes the cadmium and lead (converts it to a form that is insoluble) so that it will not leach from the solids either when subjected to the TCLP or in the environment, and, thus, will not exceed the toxicity thresholds of 1.0 mg/L cadmium and 5.0 mg/L lead established by the EPA.

The information set forth herein is furnished free of charge and is based on technical data and the experience of the author, a Certified Environmental Professional (C.E.P.) It is intended for the users of Cad-Con 1000™ as a treatment for alloy reclaim tank wastewater with the understanding that any actions taken as a result of this information are done so at the sole discretion and risk of the user. Since the conditions of use of the information or Cad-Con 1000™ are outside our control, Geo-Chem Technologies and Practical Systems, Inc. make no warranties, expressed or implied and assume no liability in connection with any use of this product or this information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents.

**Please contact PSI at 800-237-8154 if you have any questions.**



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