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| Copper Plated Components Cleaning Procedure |
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# Purpose and Scope

PURPOSE: The purpose of this procedure is to ensure that proper cleaning and drying of this component is done in a repeatable and safe manner.

SCOPE: This procedure will cover cleaning Copper Plated Waveguide Extensions and Adapters and other like components. These items have a fragile copper plating that is easily damaged.

# References

[C50 Copper Plated Waveguide Extension Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-212153/Copper%20Plated%20Waveguide%20Extension%20%20Cleaning%20Procedure.docx.pdf)

[Chemistry Cleaning Procedures](https://jlabdoc.jlab.org/docushare/dsweb/View/Collection-2654?sort=Date)

[SRF-19-83800-OSP](https://mis.jlab.org/mis/apps/mis_forms/operational_safety_procedure_form.cfm?entry_id=83800) - OSP for Safe Operations in the Production Chemistry Room

# Terms and Definitions

* **Component**: For the simplicity of this procedure, the terms cavities, components, and/or parts are considered interchangeable and will be generally referred to as “component”. Components generally are used to seal a cavity and potentially see beam. They are to be kept as clean as possible and should never be put in the same water as hardware.
	+ If a component is a mix of metals or an unusual size or shape, the PI/PM and/or a supervisor should be consulted on the appropriate method to use.
* **DI/UPW**: Deionized (DI) and Ultra-Pure Water (UPW) are used interchangeably in this procedure and may also be referred to as simply water.
* **Ultrasonic, USC, and sonic:** are used interchangeably in this procedure. The container or tank may also be referred to as a bath.
* **N2 / Nitrogen:** filtered nitrogen is most commonly used.
* **PI/PM/SOTR:** Principal Investigator, Project Manager, Subcontracting Officer Technical Representative. Someone otherwise in charge of the project or item in question. A supervisor may also be utilized if needed.

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| * **Items used in this procedure:**
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| **Detergents:** | **Solvents:** | **Wipers:**  |
| Citranox | Clean Room Quality Isopropyl (Isopropanol), Acetone | TX1009B Alpha Wipes, TX2009 Beta Wipes |

# Process Details

**SAFETY:**

Individuals must keep safety as the first priority in the process; before beginning any job, the user must assure they have the correct PPE for the individual job.  Maintaining the level of safety and secure nature of the work area is paramount.  Assure personal safety by using caution in movement and taking necessary steps to avoid unnecessary personnel in the immediate area.

Refer to the work-center OSP for specifics.

## Prior to Cleaning

**NOTE**: The Copper Plated Waveguide Extensions and Adapters have an internal delicate coating of copper that may flake with excessive scrubbing or ultra-sonicing, care should be taken when handling and cleaning these items to avoid permanent damage.

1. Ensure the workspace is clean and tidy.
2. Don appropriate PPE.
	1. Gloves should be worn whenever handling items and changed after cleaning and as needed to maintain cleanliness.
3. Inspect item(s) for damage (abnormalities, chips, scratches, etc).
	1. If an item has pre-existing impairment, notify the PI/PM or a supervisor.
	2. Do not proceed until written acknowledgement of previous damage presence has been received.
4. All items shall be completely disassembled and gaskets removed prior to executing this procedure unless otherwise directed by the PI/PM.
5. Use only pre-approved detergents and solvents.
6. To prevent excessive exposure to particulate in air, the technician is to perform all actions within the laminar flow hood (when possible).

## Cleaning

1. Remove all indium, tape, and tape residue from all areas.
	1. Use acetone and an AlphaWipe as necessary.
	2. Plastic razor blades may also be used externally only on non-copper coated areas.
2. Prepare a HDPE (or solvent compatible) container large enough to comfortably fit the component and fill it with enough isopropyl to cover it.

**NOTE**: Only work on one component at a time and work quickly but carefully once the cleaning process has begun to avoid oxidation of the copper.

1. Clean both the inside and outside of component.
	1. Use a TX 1009B Alpha Wipe and a soft bristled bottle brush to apply Citranox directly to the component until all visible oxides have been removed.
	2. Additional wipers, brushes or other means may be necessary to pre-clean heavily soiled components.

**NOTE**: Copper wastewater should be saved and disposed of appropriately.

1. Rinse with only DI water until no soap residue is present.
	1. Extra rinsing may be needed in blind spots and bellows.

## Drying

1. Dry each component individually IMMEDIATELY after rinsing it:
	1. Place the component in the container of isopropyl.
	2. Agitate or use a small container to pour isopropyl over the component to ensure all areas are covered in isopropyl.
	3. Allow the component to soak in the isopropyl if necessary to thoroughly penetrate the blind holes or bellows.
		1. Use the isopropyl squirt bottle if necessary.
2. Carefully remove the component from the container and transfer to a cart near a filtered nitrogen (N2) gun.
3. Place a wiper or other barrier on the cart to prevent metal to metal contact.
4. Dry the component using the nitrogen (N2) gun.

**NOTE**: Hearing protection may be worn, as the noise can be excessive.

* 1. Change the component position as necessary to reach all interior/exterior areas where moisture may remain.
1. Painstakingly inspect component for any water, stains, or damage prior to moving onto the next dogleg for rinsing/drying.
	1. Repeat the cleaning process if necessary.
2. Bag the component once all processes are complete, and the component is assuredly clean and dry.
	1. Only bag if the component is COMPLETELY dry and no stains appear on surface.
	2. Place the component in its own bag.
	3. Fill the bag with filtered N2 to limit oxidation.
	4. Seal opposite end of bag with sealing machine.
	5. Cover both flange faces with the appropriately sized protective cover
3. Proceed to the next work center or step.
	1. Components may be placed in an appropriately sized container to protect the flanges in transport.

# **Revision History**

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| Rev # | Revision or update: | Effective: |
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# **Approvals**

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