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| C75 HOM Elbow Buffered Chemical Polish |
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| **Document Owner:** | Gregory Grose |  |  |

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# Purpose and Scope

To remove all impurities from surface of HOM Elbow (interior and exterior).

# References

[SRF-20-102692-OSP](https://mis.jlab.org/mis/apps/mis_forms/operational_safety_procedure_form.cfm?entry_id=102692) - OSP for Safe Operations in the Production Chemistry Room

[CP-STP-CAV-CHEM-ACID](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-141848/CP-STP-CAV-CHEM-ACID-R1.pdf) – Standard Acid Etching at the Chemical Fume Hood Procedure

[CP-STP-CAV-CHEM-DEGR](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-132364/CP-STP-CAV-CHEM-DEGR-R3.pdf) - Standard Cavity, Components, or Parts Degreasing Procedure

[Alconox User’s Manual](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-73545/Alconox-UserManual.pdf)- User’s manual for Alconox detergents

# 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”.
	+ 1. If a component is a mix of the following metals or an unusual size or shape, the PI/SOTR and/or a supervisor should be consulted on the appropriate method to use.
* **Hardware/fasteners**: nuts, bolts, washers. These should not be degreased in the same container or ultrasonic as components or feedthroughs and other parts that potentially see beam or face the inside of a cavity.
* **DI/UPW**: Deionized (DI) and Ultra-Pure Water (UPW) are used interchangeably in this procedure.
* **Ultrasonic, USC, and sonic:** are used interchangeably in this procedure. The container or tank may also be referred to as a bath.
* **UHV:** Ultra High Vacuum
* **HDPE:** High-Density Polyethylene
* **N2 / Nitrogen:** filtered nitrogen is most commonly used.
* **Quick Dump Rinser (QDR):** A sink that fills and empties water to rinse components several times.

# 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.

## **Pre-Cleaning**:

1. Don a fresh pair of vinyl gloves and appropriate safety glasses; To prevent excessive exposure to particulate in air, the user is to perform all actions under a ventilated hood (when possible).
2. Inspect HOM Elbow for damage (chips/scratches); if part has pre-existing impairment notify owner. Do not clean until owner verifies through written acknowledgement of previous damage presence.
3. HOM Elbows may be dirty and need to be UHV cleaned: (Refer to Standard Degreasing Procedure ([CP-STP-CAV-CHEM-DEGR](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-132364/CP-STP-CAV-CHEM-DEGR-R3.pdf)) for additional information on USC Cleaning and Degreasing.)
	1. Place HOM Elbow in ultrasonic.

**NOTE: Position HOM Elbows with openings facing upwards and in such a way as to prevent sealing surfaces from touching each other during USC process; failure to do so will result in an un-thorough clean and potential damage to the part.**

* 1. Close drain system of USC.
	2. Fill USC with DI water to the appropriate level according to USC minimum fill specifications and ensure HOM Elbow is fully submerged.
	3. Add Micro 90 detergent to USC at a dilution of 2% Micro 90. (Refer to Alconox User’s Manual ([Alconox User’s Manual](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-73545/Alconox-UserManual.pdf%22%20%5Ct%20%22_blank)) for additional information on detergents.)
	4. Set USC timer:
		1. 30 mins if USC is pre-heated.
		2. 60 mins if USC is room temperature.
1. Start USC.
2. After USC cleaning, rinse each HOM Elbow individually:
	1. Don fresh pair of vinyl gloves.
	2. Carefully transfer HOM Elbow to the “rinse only” wetbench side.
	3. Thoroughly rinse both interior and exterior with DI water hose.
	4. Agitate in first rinse basin 3 times.
	5. Agitate in second rinse basin 3 times.
	6. Agitate in third rinse basin 3 times.
	7. Rinse again with DI water hose.
3. Move the HOM Elbows to the chemistry room for acid etching.

## Acid Etching

**NOTE: The following steps of the procedure involve interaction with Buffered Chemical Polish (BCP) 1:1:1. Refer to Standard Acid Etching Procedure (**[CP-STP-CAV-CHEM-ACID](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-141848/CP-STP-CAV-CHEM-ACID-R1.pdf)**) for additional information on Mixing and handling of BCP.**

1. Don appropriate PPE for acid work according to the **Production Chemistry Room OSP**- [SRF-20-102692-OSP](https://mis.jlab.org/mis/apps/mis_forms/operational_safety_procedure_form.cfm?entry_id=102692).
2. Set up acid chemistry hood for procedure by:
	1. Prepare HDPE containers large enough to hold the elbows and any baskets used.
		1. One for BCP and one for rinse water.
	2. Prepare the HOM Elbows for etching (optional):
		1. Carefully transfer HOM Elbow to a High-Density Polyethylene (HDPE) basket large enough to hold HOM Elbows without any contact between parts.
		2. Use HDPE string to lift the elbows.
	3. Conduct a test run using water if necessary.

**NOTE: Position HOM Elbows with openings facing upwards and in such a way as to prevent sealing surfaces from touching each other during the acid etching process; failure to do so will result in air pockets and damage to the part.**

1. Pour enough BCP 1:1:1 into acid container to completely cover part.
	1. Make sure to factor in the liquid displacement of basket/part being submerged. Unnecessary acid spills will be avoided by taking this step.

**NOTE: Fresh BCP 1:1:1 yields an average etch rate of ~8µ per/min @ a temperature of 20°C. When etching multiple parts, keep track of the acid temperature. If acid reaches a temperature of 25°C, cease all work. Return acid to storing container and allow for enough time to pass for the acid temperature to drop. User can implement ice into the procedure to maintain a lower beginning temperature if numerous parts are done.**

1. Acid etch HOM Elbow:
	1. Set timer for time as directed by PI/PM.
		1. If no time is given, etch for 2 minutes.
	2. Slowly submerge the HOM Elbow in BCP.
	3. Agitate the Elbow back and forth so the BCP can flow in and out of the interior and eliminate trapped air pockets.
	4. Continue process until timer ends.
	5. Make sure to drain excess BCP from HOM Elbow before rinsing
2. Rinse acid etched HOM Elbow thoroughly.
3. Place in QDR and allow to rinse for a minimum of 5 minutes.
4. Repeat all HOM Elbows are complete.
5. Return acid hood and PPE to prior use condition.

## Post-Etching

1. Don fresh pair of gloves.
2. Inspect and dry ALL surfaces of HOM Elbow with N2 to insure no stains or blemishes remain, if necessary repeat any of the procedure.
	1. Extra attention should be paid to the flanges and sealing areas to ensure they are pristine and free of stains and scratches.
3. Once all processes are complete, and the part is assuredly ready, prepare for the next work center:
	1. Only proceed if no stains or scratches appear on the sealing surfaces.
	2. Bag the HOM Elbow in a clean room bag.
	3. Use clean plastic container for proper storage and transport.
	4. Insure that sealing surfaces and edges do not come in contact with any hard surfaces (i.e. another elbow.)
	5. Two elbows can be stored in each container as long as there is a sufficient and clean divider.
	6. Proceed to the next work center.

# **Revision History**

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# **Approvals**

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