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| **C75 Cavity Flange Hand Lapping Procedure** |
| **Document Number:** | CP-C75-CAV-CHEM-FLAP | **Approval Date:** | 22- APR-2020 |
| **Revision Number:** | Initial Release | **Periodic Review Date:** | 01-MAY-2022 |
| **Document Owner:** | Alex Wildeson |  |  |

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# Purpose and Scope

This document applies to C75 cavity flanges used for SRF OPS production projects.

The purpose of this document is to describe the process of correcting surface imperfections on C75 cavity flanges for indium seals.

# References

Link References and related documents here.

# Terms and Definitions

1. **PPE** – Personal Protective Equipment.
2. **Clamshell Fixture –** A fixture designed to securely hold cavities in place on a table or inside a machine.

# Process Details

**Required PPE:**

* Safety glasses or goggles
* Appropriate gloves
	+ Chemically compatible with solvents or cleaners
	+ Leather or similar material when lifting or working near pinch points
* Steel toe safety shoes if necessary
* Refer to the Lapping Room OSP or consult your supervisor if unsure.

## C75 Cavity Flange Lapping:

**Note:** Each C75 cavity has 6 flanges which will need to be lapped to some degree. There are 2 HOM flanges, 2 beam line flanges, 1 FPC flange, and 1 field probe flange. Ensure any indium on the flanges has been removed prior to lapping.

## 5.1 Preparation for lapping of cavity flanges:

1. Don appropriate PPE for the task.
2. Gather necessary supplies.
3. Install cavity into a clamshell fixture. Orient the cavity so that the flange to be lapped is in an accessible position. Clamp the cavity in place with appropriate hardware.
	1. The cavity must be secured so that it does not rotate in the clamshell fixture.
4. To prevent excessive water and residual lapping slurry from entering the cavity, block off internal cavity port(s) as needed with clean rags/wipers or plugs.

## 5.2 Flatness lapping of cavity flanges:

1. Assess the condition of the flange to determine which grade of lapping paper to use.
	1. If the flange is flat as determined from the incoming QA inspection (± 0.002”) or better and free of scratches and pitting, start with gray 40 micron aluminum oxide abrasive paper.
	2. If the flange is not within the 0.002” tolerance or is scratched or pitted start with 100 grit aluminum oxide abrasive paper.
	3. If the flange is greater than 0.006” out of tolerance, the manual hand method is NOT to be used, consult your supervisor.
2. Use an appropriately sized aluminum block for the flange to be lapped. The block should be flat within 0.002”. Place a piece of the appropriate lapping paper onto the block.
3. Use soapy water (diluted Micro90 is typically used) to keep the flange wet when lapping. Grasp the aluminum block firmly and start to wet lap the flange by moving the block back and forth across the flange.
	1. DO NOT allow the aluminum block to skip across the flange while lapping.
	2. Be sure to rinse the abrasive paper often with water and replace as necessary.
4. Clean the flange with a wet clean-room wiper (AlphaWipe) and inspect the flange to check the progress. Continue lapping until the entire flange surface has a uniform appearance and is flat within 0.0025”.
5. After a uniform surface has been achieved, step down to the next grade paper. The lapping paper starts at 100 micron, then 80, then 60, and then the gray 40 micron aluminum oxide abrasive paper.
	1. Clean the flange each time the lapping paper is changed.
6. Once you have achieved a uniform surface finish with the 40 micron paper, check for flatness with a straight edge and a 0.002” shim.
	1. If the flange is not within specification, restart the lapping process, generally with 100 micron paper.
	2. If flange is within specification, contact your supervisor to determine which work center will receive the cavity next.

## 5.3 Finishing lapping of cavity flanges:

1. The finishing step uses two different types of 40 micron paper. The first will be the translucent blue 40 micron paper and the second will be the dark blue 40 micron paper.
	1. Use a circular motion when lapping the flange, not a back and forth motion.
2. Use soapy water to keep the lapping surface wet and to prevent loading the 40 micron abrasive paper with niobium. Wet lap the flange using small circular motions while keeping the lapping block flat on the cavity flange. Be sure to rinse the abrasive paper often with water and replace as necessary. Rinse and inspect the flange to check on progress. Continue lapping until the entire surface has a uniform appearance.
3. Once a uniform appearance has been achieved with the translucent blue paper, repeat step 5.3.2 using the dark blue 40 micron paper.
4. When a smooth, uniform finish has been achieved with the final dark blue 40 micron paper, clean and dry the flange surface with a clean-room wiper (AlphaWipe), and inspect the flange.
	1. If flange passes inspection continue to the next step, if not repeat 5.3, steps 1 and 2.
	2. Contact your supervisor if the flange does not pass inspection after repeating the steps.

## 5.4 C75 Field Probe flange

1. Place a small piece of Gray Scotch-Brite 7448 Ultra-Fine onto the Field Probe flange and rotate in a circular motion until a uniform surface is achieved.
2. Repeat with white abrasive then non-abrasive Scotch-Brite.
3. Clean the Field Probe flange with a wet clean-room wiper (AlphaWipe), and inspect the flange, repeat of necessary.

## 5.5 After lapping

1. Install protective covers with clean dry wipes on all flanges when cavity is complete.
2. Contact your supervisor when cavity is complete.

# **Revision History**

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| **Rev #** | **Revision or update:** | **Effective:** |
| Release  | Initial Release  | 4/16/2010 |
| A | Changes made to procedure | 7/15/2011 |

# **Approvals**

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