# Core Competency Training – Cleaning / FOD Prevention

Revised 7/1/2021

# Applicable Procedures

- The following procedures provide guidance on what cleaning processes we use in our manufacturing :
  - TA1041 USER GUIDE: PRECISION CLEANING
  - TA1051 User Guide: Heated Ultrasonic Cleaning
  - TA1051-001 User Guide: Heated Acetone Ultrasonic Cleaning
  - TA1051-002 User Guide: Heated Micro 90 Ultrasonic Cleaning
  - TA1061 User Guide: General Workmanship Cleaning
  - TA1108-001 Critical Cleaning of Microphone Parts
  - TA1254 User Guide: Cleaning Printed Circuit Board Assemblies
  - TA1276 User Guide: Vapor Degreaser (Aerotron)
  - TA1288 User Guide:  Ultrasonic Cleaner (setup)

# Know the different types of cleaning methods:

- Brush cleaning
- Ultrasonic cleaning
- Soaking
- Wiping
- Vapor degreasing
- Stir Plate

# TA1041 USER GUIDE: PRECISION CLEANING

- TA1041 is used for the following:
  - SURFACE CLEANING
  - CRITICAL FIXTURES
  - NON-CRITICAL FIXTURES
  - CLEANROOM TRANSPORT BOX CLEANING
  - STANDARD ESD TRANSPORT BOX CLEANING

# TA1051 User Guide: Heated Ultrasonic Cleaning

- TA1051 is used to clean things like:
  - Machined parts
  - Heavily contaminated machined parts
  - Heavily contaminated subassemblies
  - Heavily contaminated fixtures and tooling

# TA1061 User Guide: General Workmanship Cleaning

- TA1061 is used for the following applications:
- Flux removal (Primary Method)
  - Weld joints
  - Thin metal diaphragms
  - Memory rings
  - Electrodes
  - Machined parts

# TA1051 Procedure: Heated Ultrasonic Cleaning

## Remember to…

1. Turn on ventilation system.
2. Put on **chemical goggles**. Safety glasses are not acceptable.
3. Plug in ESD strap.
4. Wipe the selected Beaker/Container clean to remove any debris or residue from the previous operator.
5. Place Beaker/Container into Ultrasonic and run cycle for 10 or 25 min @ 35° C.
6. Rinse parts thoroughly with virgin IPA and dispose of waste in the appropriate container.
7. Place parts on an ionizing table for a minimum of one (1) minute.
8. Dry parts in 250° F oven for sixty (60) minutes minimum.

# TA1041 and TA1061 Controls:

- In process Brush – Double-Ended Applicator Brush is cleaned, using **TA1041-Process A or TA1061-Process D, on the 1st day of each month.** The brush is labeled with the expiration date, 3 months after the issue date.
- Brushes must be cleaned or replaced as contaminants become evident. Clean brushes per TA1041-Process A or TA1061-Process D.
- Brushes must be replaced on the 1st day of every other month.
- Container lids must be wiped clean daily. For each container, fill bowl with solvent and use low-lint wipe. Lids may be wiped more frequently as contaminants become evident.
- Containers must be emptied and cleaned prior to replenishing solvents. Dispose of remaining solvent, rinse inside of container with fresh solvent, then fill container with fresh solvent.

# Important reminders when inspecting product for cleanliness:

- Residue left from cleaning must be re-cleaned till removed.
- Look over Fixtures and Tools for contamination before using. Clean when present.
- After the final wash process, don't think all is clean and ready to hand into the next operation like welding. Bring assembly back to a microscope and  check that all contamination is removed before sending to final closing of sensor.
- Excess flux may be picked free and blown off with pressurized air prior to brush cleaning.
- Visually inspect parts for contamination under scope with 10X magnification.  Be sure to check inside holes, sleeves and recesses.

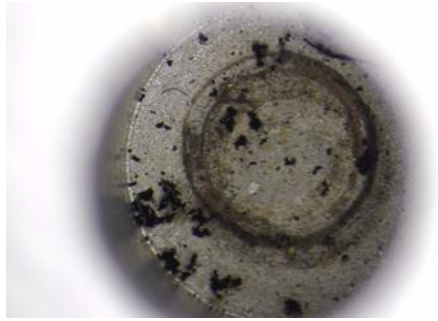
# Using Finger Cots or Gloves

- Once parts are cleaned you must  wear gloves/finger cots for all remaining steps.
- Finger Cots or gloves must be worn when working with open sensors and high impedance parts (e.g. quartz, ceramic, insulators, electrodes, or any part that comes in contact with them).
- Finger Cots or gloves must be changed whenever they are removed or become contaminated (e.g. flux, epoxy, etc.).
- Finger Cots and gloves must never be reused. If a Technician leaves the work area, finger cots or gloves must be changed.

# Cleaning Reminders

**Tools & Equipment**

Tools (i.e. tweezers, scalpels, side cutters, wire cutters, oilers and brushes) used in Assembly should be, at a minimum, cleaned by wiping with alcohol to prevent contamination during the assembly process.



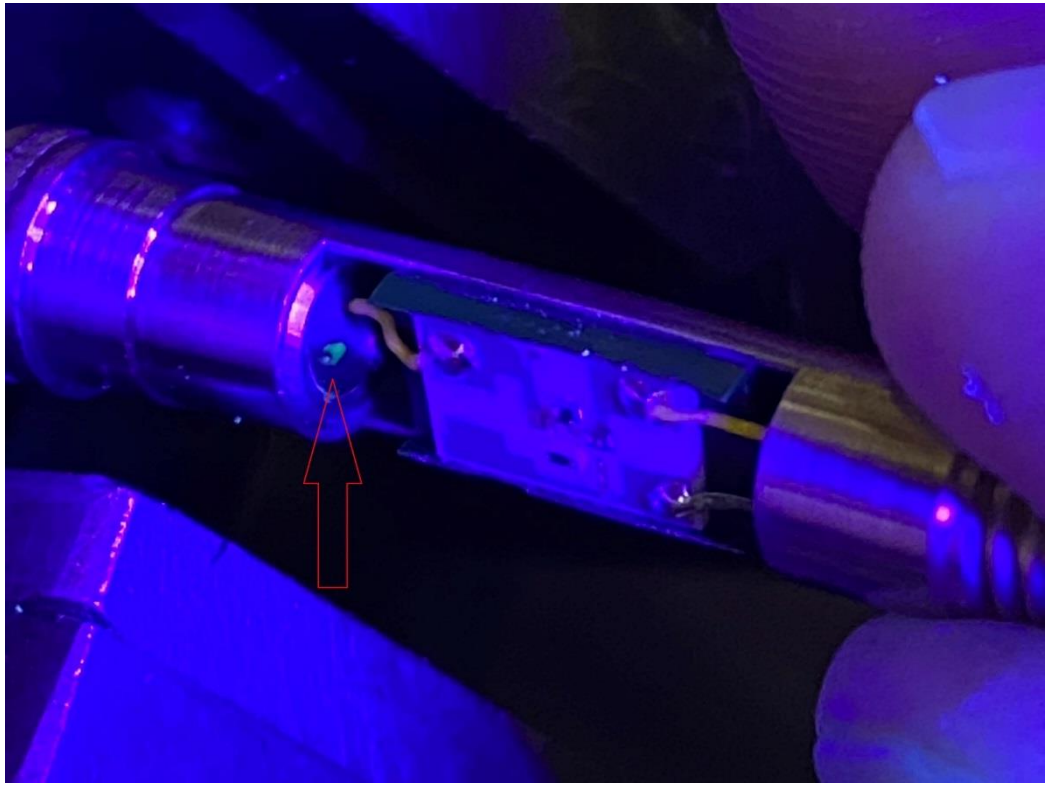
**Fixtures**

Fixtures should be cleaned prior to use, at a minimum, by wiping with alcohol to prevent contamination during the assembly process.

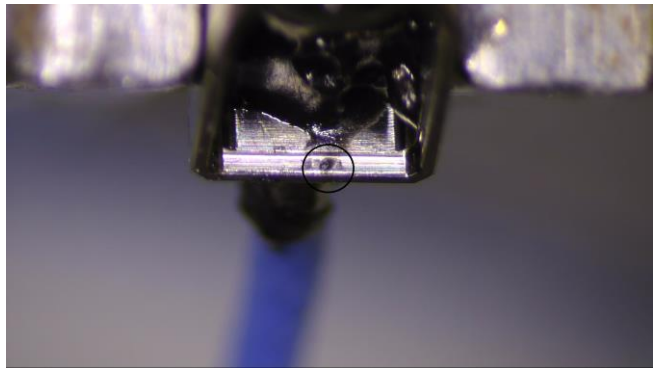
# FOD Prevention - TA1074

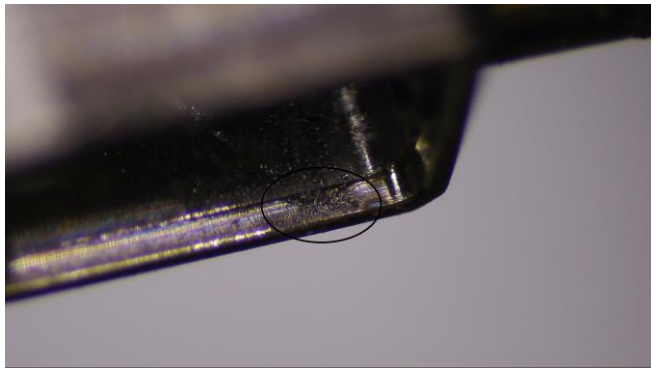
- Foreign object damage or foreign object debris (FOD) is a substance, debris or article that could potentially cause damage or product failure.
- Types of FOD that may be found in assembly areas include things like wire clippings, contaminants in cleaners that may leave residue, solder splatter, solder balls, metal burrs, brush hairs, flux, and components removed from amplifiers.

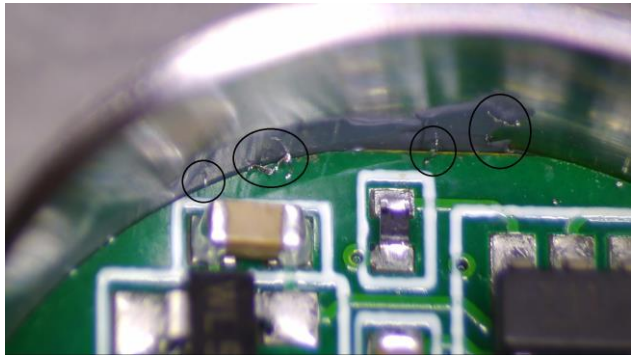
# FOD EXAMPLE - Flux not cleaned

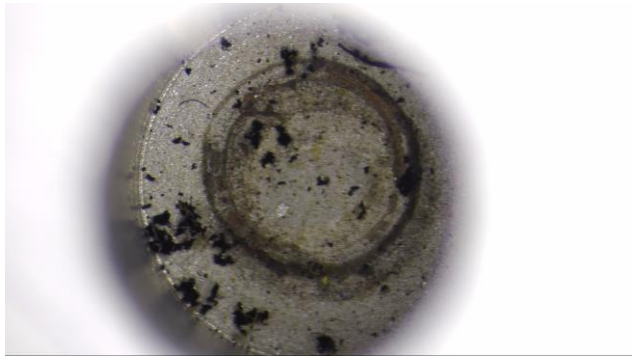


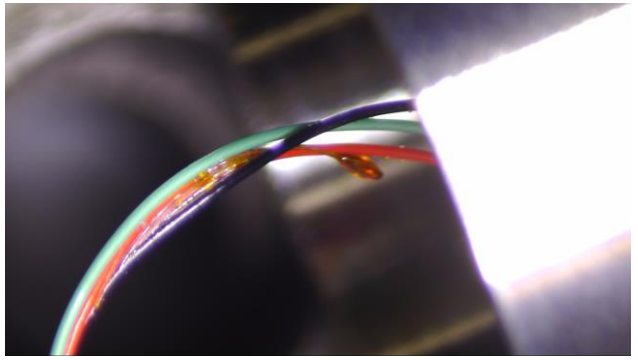
# Contaminated Parts

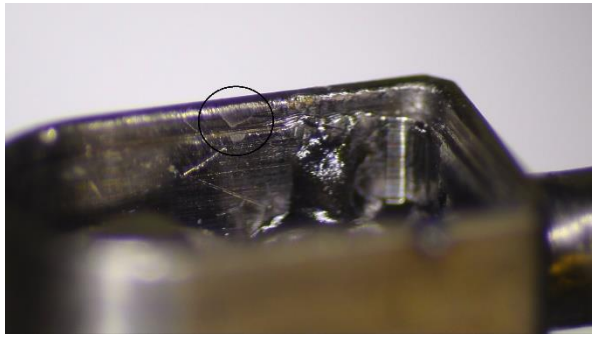


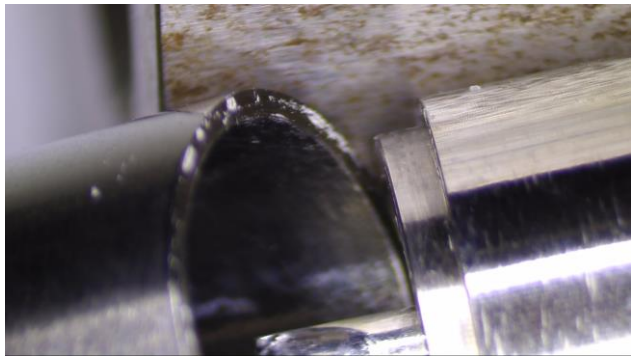




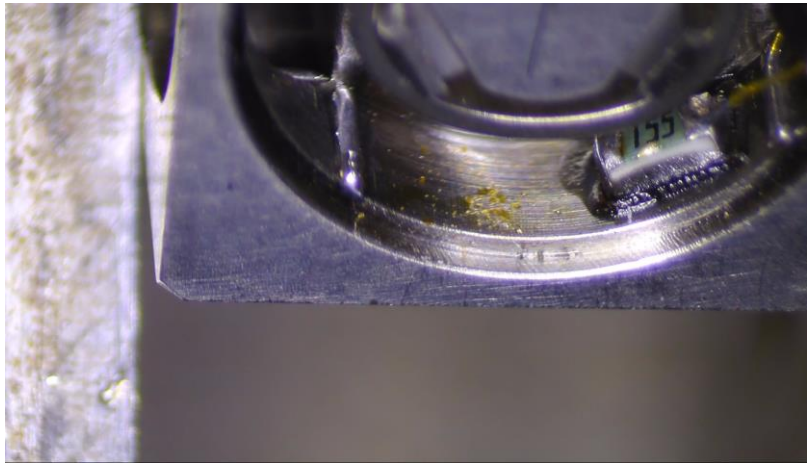



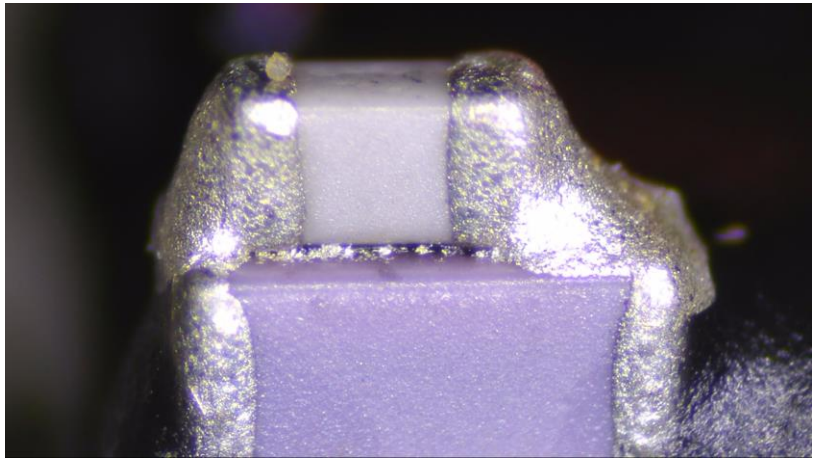


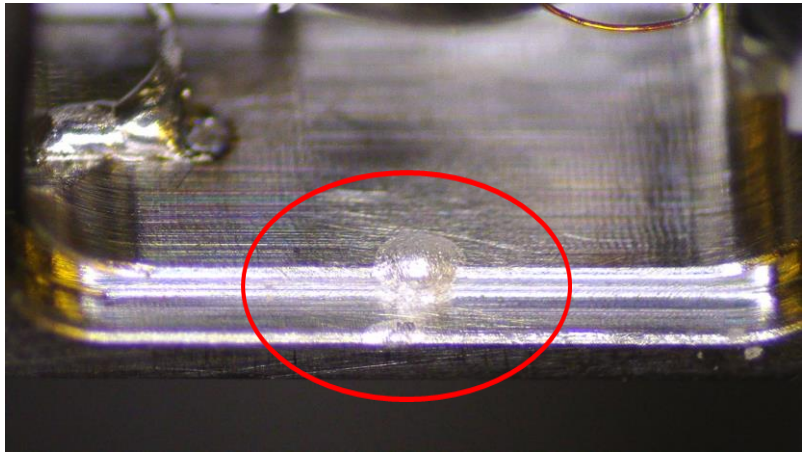


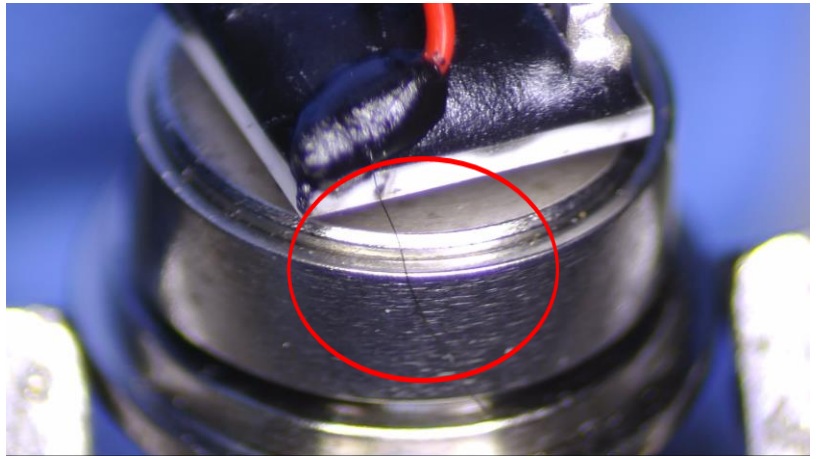



# Contaminated Parts found in Welding Line









# Summary

- Cleaning Reminders – Tools, Equipment & Fixtures at a minimum, must be cleaned by wiping with alcohol to prevent contamination during the assembly process.
- Preflight TA129 – daily and weekly check. Make sure brushes are not expired and container lids are wiped.
- Finger Cots or Gloves – must be worn after parts are cleaned and changed when contaminated.
- Follow proper cleaning process called out in the procedure and/or router.
- Inspecting – 10X microscope (Solder Joints, Welding areas, Cavities, holes, sleeves and recesses) making sure no FOD is present. MUST BE DONE AFTER ALL CLEANING STEPS