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Policy
for
Equipment Decontamination

REVISION

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5	DCN1273	Updated entire procedure	2-8-16	L. Chen	T. Diamond

Prior revision history, if applicable, is available from the Document Control Office.

1 PURPOSE AND SCOPE

- 1.1 The purpose of this [policy](#) is to provide instruction for the decontamination of all equipment and support systems in a manner consistent with applicable codes, [regulations](#), [manufacturer's instructions](#) and sound engineering practices.
- 1.2 This process ensures that equipment is decontaminated in a manner that will [minimize EHS](#) risk to employees, operations, [or the environment](#).
- 1.3 This [policy](#) applies to [contaminated](#) capital equipment and machinery used directly or indirectly in the testing, [research](#), and development of products or in the operation of the facility or production support systems at [SUNY Polytechnic Institute \(SUNY Poly\)](#) and includes but is not limited to:
- Diffusion Furnaces,
 - Photoresist Spin Tracks and Developers,
 - Etchers and Ashers,
 - Chemical Vapor Deposition Systems,
 - Ion Implanter,
 - Sputters,
 - Ovens,
 - Wet Pumps,
 - Dry Pumps,
 - Acid Sinks,
 - Stripper Sinks,
 - Solvent Sinks,
 - Lead Contaminated Equipment,
 - Process Gas Lines,
 - Acid Drain Lines,
 - Exhaust Ventilation Ducting,
 - Floor, Walls, Trenches,
 - Gas Cabinets,
 - Spin Rinse Dryers (SRD),
 - Tube Cleaners,
 - Chemical Mechanical Polishing (CMP).
- 1.4 By necessity, this document is limited in scope. The [Facilities Engineer](#) or [Equipment Engineer](#) shall apply professional judgment and knowledge above that which is included in this specification.
- 1.5 [Semiconductor equipment and parts that were or may have been exposed to hazardous materials and are intended for further use \(reuse, repair,](#)

etc.) must comply with the SEMI S12- Environmental, Health and Safety Guideline for Manufacturing Equipment Decontamination.

- 1.6 Any equipment that will be decommissioned and removed, must comply with EHS-00030, Policy for Equipment Decommissioning.

2 RESPONSIBILITIES

- 2.1 The SUNY Poly Employees, Tenant, Contract or Sub-Contract Equipment Engineers are responsible for performing the appropriate decontamination procedure, in a safe and timely manner, and disposing of materials generated appropriately. They are also responsible for posting the Equipment Decontamination Certification form, EHS-00037-F1, at or near the subject equipment after decontamination is completed.

3 ASSOCIATED DOCUMENTS

- 3.1 SEMI S12-0298 Standard, "Guidelines for Equipment Decontamination".
- 3.2 EHS-00037-F1 EHS Equipment Decontamination Certification
- 3.3 EHS-00030-F1 Equipment Decommissioning Sign-off Checklist
- 3.4 EHS-00008 Lockout/Tagout Program
- 3.5 EHS-00015 SUNY Poly Respiratory Protection Program

4 SAFETY

- 4.1 All hazardous energy source(s) must be locked out and tagged out so the equipment is isolated from the hazardous energy source(s) (e.g., electrical, chemicals, pneumatic, pressurized pipes). The Lockout/Tagout Procedure (EHS-00008-F1) or equivalent procedure must be followed.
- 4.2 Safety Data Sheets (SDS) are available for all chemicals used at SUNY Polytechnic Institute. Consult the SDS before conducting decontamination to better understand the hazards and needed precautions for chemicals involved.
- 4.3 Proper personal protective equipment must be worn at all times when decontaminating equipment. The following PPE may be required depending on the type and level of contamination:
- Chemical resistant gloves
 - Safety glasses
 - Face shield

- Arm guards
- Chemical apron
- Cartridge respirator- for solvent fumes, corrosive fumes, CMP particulates, dusts
- Airline respirator or Self Contained Breathing Apparatus - toxics
- Tyvek Suit and Shoe Covers- to prevent contamination of clothes and tracking it to other areas.

4.4 Some decontamination work may require the use of a respirator. Any employee who wears a respirator must comply with the Respiratory Protection Program (EHS-00015).

4.5 Exhaust ducting from certain processes may contain a variety of hazards depending on the process chemistries such as liquid residuals, energetic, reactive byproducts or arsenic dust. Ducting associated with tools using pump oil, solvents, or stripper may involve flammable or combustible vapors. Evaluation of potential hazards and appropriate controls must be established prior to work.

4.6 Any questions regarding decontamination procedures should be referred to the Equipment Engineer, Decontamination Service Provider, or EHS Department at cnseehs@sunypoly.edu .

5 DECONTAMINATION GUIDELINES

Tool specific procedures must be followed for decontamination. General requirements in addition to the above requirements include:

5.1 All chemical/gas sources to the equipment must be removed prior to decontamination.

5.2 It may be necessary to disconnect internal lines to enable “gravity flow” drainage of residual liquids from pumps and lines. Chemical liquid lines must be flushed and decontaminated.

5.3 Gas lines must be cycle purged and disconnected. Cap off gas lines at the gas cylinder and the equipment end.

5.4 Local exhaust should be left in place until it is determined that chemical contamination is no longer present. If dust contamination is present, remove particles with a HEPA vacuum or wet wipe the area.

5.5 Surfaces must have a pH of between 5 and 9. If necessary, use liquid neutralizers. Fluoride surface contamination should be checked with SPILFYTER strips. Fluoride should be non-detectable.

- 5.6 Drain all oil and remove pumps equipped with oil filters and/or drains that will permit draining the oil with the pump in place. Dispose as hazardous waste. **WARNING:** Filters can contain toxic process byproduct solids. Pump oils can contain absorbed process gases that can outgas.
- 5.7 Sinks (e.g., Corrosive, Solvent) must be cleaned while still connected to drains (if connected to appropriate waste drain lines) and exhaust. Depending on contamination, wash with high pressure, hot water to remove residues for corrosives. IPA or Acetone wipes can be used to remove any solvent residues. If necessary, use a scrapper (i.e., non-spark producing) to remove dried photoresist. Discoloration is allowed.
- 5.8 For disassembly of HPM drain lines, a low point in the line should be identified and a hole carefully drilled into the bottom portion to ensure all free liquids have been drained out. Any liquid collected must be tested for pH to determine the level of contamination remaining inside. Liquids should be disposed in the acid neutralization treatment system no matter the pH. **Note: Fluoride bearing liquids must go to the fluoride removal system.**
- 5.9 If the piping cannot be adequately decontaminated or a conservative approach is needed, parts or lines may need to be containerized and sent off-site as hazardous waste. Smaller pieces should fit into a 55-gallon open top drum; larger jobs may need to go into a disposal bin.
- 5.10 For exhaust ventilation ducts, ensure the entire length of affected ducting is inspected for the presence of free liquids prior to disturbing. If free liquids are identified, they must first be drained by carefully drilling a drain hole at a low spot. Collect the liquids and dispose as hazardous waste.
- 5.11 After decontamination, remove all chemical identification labels and warning/danger signs from the outside of the tool.
- 5.12 If the **equipment** will be reused at another location, wrap the components with shrink-wrap to maintain cleanliness and place in a yellow hazardous materials bag with legible and clear information at a minimum containing the following:
- An appropriate **identification** label,
 - The source of the material (i.e. tool, system the material is from),
 - A contact name and number and,
 - The date on which the bag was created
- 5.13 If the tool or contaminated components (such as the scavenger exhaust) will be disposed, **place in the appropriate container/bag**, label and seal.

Dispose as hazardous waste. Non-contaminated components can be sent out as metal scrap.

- 5.14 All hazardous waste materials generated from decontaminations must be properly handled, bagged, sealed, and labeled in accordance with Hazardous Waste Management Plan. Examples include decontamination wipes, residues removed from equipment, parts which cannot be cleaned, and used personal protective equipment.
- 5.15 Ensure floor and wall surfaces are wiped down in accordance with clean room protocols.

6 TRAINING

- 6.1 SUNY Poly, Tenant, Contract, or Sub-Contract employees can perform tool decontamination, as long as appropriate training courses have been completed and are up to date such as but not limited to:
- Cleanroom or Laboratory Safety,
 - Hazardous Waste Handling,
 - Respirator Safety (if a respirator must be used),
 - Lock-out/Tag-out,
 - Equipment/Task-specific training

7 RECORDS

- 7.1 The SUNY Poly Equipment Engineer, Tenant, Contract or Sub-Contract Equipment Engineer is responsible for maintaining records of completed Equipment Decontamination Certification (EHS-00037-F1) for one year and forwarding a scanned copy to EHS.