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|  | [**Task Hazard Analysis**](https://www.jlab.org/ehs/ehsmanual/Glossary.htm#THADef) **(THA) Worksheet****(See** [**ES&H Manual Chapter 3210 Appendix T1**](http://www.jlab.org/ehs/ehsmanual/3210T1.htm) [**Work Planning, Control, and Authorization Procedure**](http://www.jlab.org/ehs/ehsmanual/3210T1.htm)**)** | **Click****For Word Doc** |
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| **Author:** | Marcy Stutzman | **Date:** | January 14, 2020 | **Task #:****If applicable** |  |
| **Complete all information. Use as many sheets as necessary** |
| **Task Title:** | DC sputter stand | **Task Location:** | Test Lab 1137 or other CIS space |
| **Division:** | Accelerator | **Department:** | Center for Injectors and Sources | **Frequency of use:** | Daily when operating |
| **Lead Worker:** | Philip Adderley |
| **Mitigation already in place:**[**Standard Protecting Measures**](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#SPMDef)[**Work Control Documents**](http://www.jlab.org/ehs/workcontrol.html) |  |

| **Sequence of Task Steps** | **Task Steps/Potential Hazards** | [**Consequence Level**](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#ConsequenceLevel) | [**Probability Level**](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#ProbabilityLevel) | [**Risk Code**](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#RCDef) **(before mitigation)** | **Proposed Mitigation****(Required for** [**Risk Code**](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#RCDef) **>2)** | **Safety Procedures/ Practices/Controls/Training** | [**Risk Code**](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#RCDef)**(after mitigation** |
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| 1 | Vent vacuum chamber with dry nitrogen using pressure relieved dry nitrogen source / potential pressure hazard  | M | L | 2 | All vent lines are equipped with a 1 psi pop valve to prevent pressure from exceeding this threshold.  | All vacuum systems are vented with pressure relieved systems to avoid overpressure potential.  | 1 |
| 2 | Prepare sputter wire for installation by twisting with drill and shaping to “cage” shape / chemical hazard from metals such as Ti, Zr, and V including fire and skin/eye irritation | M | L | 2 | Avoid generating dust – no machining of the metalsWear gloves to avoid skin contact | * Use sharp wire cutters for cutting wire.
* Avoid sanding or generating dust as dust can be flammable.
* Metal fires should not be extinguished with water.
* Do not touch wires with bare hands – use cleanroom compatible gloves (skin irritant and vacuum cleanliness issues
* Have a fire extinguisher compatible for metals available
 | 1 |
| 3 | Install NEG wire to isolated electrical feedthroughs in system to be sputtered: chemical hazard for flamability & skin irritation | L | L | 1 | Avoid contact with bare skin | Handle wire using cleanroom gloves  | 1 |
| 4 | Seal and evacuate system with rough pump | L | L | 1 |  |  | 1 |
| 5 | Bake system as needed with commercial heat tapes or heater bars: potential thermal burn hazard | L | L | 1 |  | * Avoid hot surfaces.
* Add signage for hot surfaces that are not apparent.
* Ensure that the table and system are electrically grounded in case a heater tape would short to the system during operation
 | 1 |
| 6 | Connect sputter power supply (either ion pump supply or DC variable voltage supply) / electrical exposure potential | M | L | 2 |  | * Cables connecting the power supply and the sputter stand are all commercial products rated for the potential voltage
* Ensure the system is grounded
* Do all power connections while the power supply is de-energized and unplugged from AC power.
 | 1 |
| 7 | Establish Kr or Ar gas flow through the system at a pressure in the 1-100 mTorr range: inert gas, potential pressure hazard | M | L | 2 |  | * Kr gas is only supplied through a regulator that is kept at a pressure below 15 psig
* Kr inlet to the system is through a variable conductance leak valve to limit gas into the system
* Remember that the gauges are not accurate for noble gases so do not approach atmospheric pressure reading on the gauge
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| 8 | Energize sputter power supply and adjust voltage, current and pressure  | L | L | 1 |  | Ensure the system is still grounded.  |  |
| 9 | Shut down system: power off, Kr flow off | L | L | 1 |  |  |  |
| 10  | Vent system for testing and/or installation / pressure hazard, potential dust generation during sputtering leads to fire hazard | M | M | 3 |  |  |  |

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| **Highest** [**Risk Code**](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#RCDef) **before Mitigation:** | 3 | **Highest** [**Risk Code**](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#RCDef) **after Mitigation:** | 2 |

When completed, if the analysis indicates that the [Risk Code](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#RCDef) before mitigation for any steps is “medium” or higher (RC≥3), then a formal [Work Control Document](http://www.jlab.org/ehs/ehsmanual/Glossary.htm#WCDDef) (WCD) is developed for the task. Attach this completed Task Hazard Analysis Worksheet. Have the package reviewed and approved prior to beginning work. (See [ES&H Manual Chapter 3310 Operational Safety Procedure Program](http://www.jlab.org/ehs/ehsmanual/manual/3310.html).)

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| **Form Revision Summary****Periodic Review – 08/29/18 –** No changes per TPOC**Periodic Review – 08/13/15 –** No changes per TPOC**Revision 0.1 – 06/19/12 -** Triennial Review. Update to format. **Revision 0.0 – 10/05/09 –** Written to document current laboratory operational procedure.

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|  | **ISSUING AUTHORITY** | **TECHNICAL POINT-OF-CONTACT** | **APPROVAL DATE** | **REVIEW DATE** | **REV.** |  |
|  | ESH&Q Division | Harry Fanning | 08/29/18 | 08/29/21 | 0.1 |  |

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