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Brookhaven National Laboratory/National Synchrotron Light Source

Subject: Bake-Out			
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*Approval signatures on file with master copy.

[Revision Log](#)

Precaution:

Proper care and planning must be taken before starting any bake-out. Equipment damage may occur if these precautions are not followed. The person responsible for doing the bake-out should contact the owner of the equipment that is to be baked for information regarding the material make-up of the equipment, whether or not there are any water cooled devices within the area, and for the required temperature and duration of the bake. For Example, Optics such as mirrors and gratings are often baked at a maximum temperature of 80 degrees Centigrade to avoid damage. Low temperature bakes such as these should have a longer bake-out duration.

Bake-Out Procedure:

1. Any combustible material or material that will melt in the typical bake-out temperature range must be removed from the bake-out area or isolated from direct heat. (e.g. Plastic water cooling and air lines.) In addition precision mechanical devices (e.g. micrometers) should be protected or removed to avoid damage.
2. Aluminum foil should be applied to items such as view ports to help even the heat distribution between different materials.
3. Aluminum foil should be wrapped around any bellow assemblies to reduce the infiltration of fiberglass heat tape material from entering the convolutions of the bellows.
4. All water cooled devices must have the supply and return water lines removed and the remaining water blown out of the device.
5. The item to be baked should be wrapped with either fiberglass heat tapes or ni-chrome resistive wire. All electrical connections should abide by National Electric Code. Two wire heat tapes must be fitted with two wire plugs, not a three wire plug which would falsely imply that the tape is grounded. A thorough inspection of the equipment being used should be completed. Examples of inspection criteria include identifying frayed wires, exposed conductors, and use of properly rated fuse for variacs.
6. Aluminum foil or heat resistive, fireproof blankets should be used to cover the bake-out area to keep the heat in and evenly distributed.

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7. Variacs, variable AC transformers, should be used to vary the voltage and current applied to the heat tapes, attention should be paid to proper fuse levels on the variacs, wire sizes that are rated to carry expected current levels and the overall load to building circuit breakers.

8. The bake should be started early enough in the work shift to allow the system to reach temperature equilibrium and allow time for adjustments. It is recommended that a **Monitor Request Form** be filled out in the NSLS control room describing the work in progress and request that the NSLS OPCO's check the system during their rounds of the building. Contact information from the requestor is required.

9. It is also recommended that a log of the time, temperatures and pressure be kept. This log will be very helpful when subsequent bakes of the same equipment are done and can be very helpful in troubleshooting a poor performing vacuum system.

10. After the bake-out is completed, turn off all power sources. Adequate time should be allowed for the system to return to ambient temperature before removing foil and blankets.

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A	Initial Document	3/24/2008