

Standard operation procedure for Oriel/Newport 300 W Xe arc lamp-based solar simulator

Hazards present: Bulb explosion, Exposure to UV and intense visible light, High temperature

Personal Protective Equipment Required: Lab Coat, Safety Glasses, UV-blocking Safety Glasses*, Transparent Face Shield* and Nitrile/Latex Gloves* (*For bulb replacement/alignment)

1. Before the operation, verify that Xe arc lamp housing, power supply, and the shutter control unit are connected with appropriate cables. Verify that power cords for the power supply and the shutter control unit are plugged into 120V/60Hz grounded outlet and power cords insulation is not damaged. Verify that the Xe arc lamp housing is secured on the bench surface and all covers are in place.
2. Energize the Xe arc lamp power supply using the main power switch. Check number of lamp "on" hours by pressing "Display/Select" button and selecting "Lamp Hours" settings. If the value is greater than 1000 hours, the arc bulb must be replaced. Do not operate the bulb in excess of 1000 hours because of the increased bulb explosion risk.
3. Energize the shutter control box and verify that the shutter switch is on "closed" position.
4. Using "Display/Select" button, select "Power" setting. Press "Set/Enter" button and verify that the power setting is in the range 270-330 W. If it is outside this range, use arrow buttons while holding "Set/Enter" button to set the lamp power within the safe range.
5. Ignite the bulb by pressing "Lamp Start". To improve the output power stability, warm up the lamp for about 10 minutes.
6. Position the collimator output/fiber orifice so that the output beam is contained safely and there is no risk of direct eye exposure.
7. Open the shutter by using the switch on the shutter control unit. There is an additional manual flag shutter on the fiber collimator which may need to be opened to enable the light output.
8. During the work never direct the light output directly into eyes or stare into the fiber orifice. The light should be blocked at short distance using non-flammable screens. Short, indirect exposure to the output light is not harmful to eyes and does not require special eye protection. Be aware that intense light generates a lot of heat and can set certain materials on fire. Watch out for the temperature increase in illuminated areas.
9. After the use, close the lamp shutter using the switch on the control unit. Turn off the lamp using "Lamp OFF" button on the power supply, but leave the power supply energized until the fan on the lamp housing stops. Turn off the power supply and the shutter control box using corresponding power switches.

Special circumstances:

1. If the Xe arc bulb needs to be replaced and/or realigned, the work must be performed by qualified personnel following service procedures outlined in the user manual. Xe arc bulb must be handled with extreme caution using face shield and new nitrile/latex gloves. All contaminants must be removed from the quartz envelope immediately using an alcohol wipe. Non-essential personnel is not allowed in the vicinity of the lamp housing during the bulb replacement/alignment.
2. Lamp alignment must be performed by a person familiar with the procedure and wearing UV-protective eyewear (For example, laser safety glasses with OD>5 for wavelength shorter than 500 nm).