

**STATEMENT OF WORK FOR  
Repair, Maintenance and Calibration Services for Sciaky Electron Beam Welder**

Repair, maintenance and calibration services are requested for a Sciaky Electron Beam Welder, Model VX.4-108x78x100 W200, S/N 11629. This shall include the following:

Preventive Maintenance:

The contractor shall check the following to verify the system is within factory performance specifications. Corrective maintenance shall be performed on any items found to be out of tolerance to bring within factory performance specifications. Calibrations shall be made against NIST-standards and certified test equipment.

- Computer System:
  - Check all computer power supplies are operational
  - Computer fans and computer cabinet cooling operational
  - Check all cables are securely fastened
  - Check analog and digital signals are operational
  - Calibrate D/A within +/-1%
  - Clean/replace filters
- High Voltage/Electron Beam System:
  - Check high voltage oil
  - Check high voltage connections are securely fastened
  - Check high voltage cable (inside and outside vacuum chamber, vacuum feedthru)
  - Check water cooling connections are securely fastened and not leaking
  - Check fans and electronics cabinet cooling operational
  - Calibrate filament, bias, accelerating voltage, beam focus, and beam deflection power supplies to +/-1%
- Vacuum System:
  - Check vacuum chamber door seals and sliding seals for ram cross-head
  - Check vacuum door mechanisms are in good working condition
  - Check vacuum gages and valves are in good working condition
  - Leak check vacuum chamber and connections/vacuum feed-thrus
  - Check roughing pump oil and diffusion pump oil levels and cleanliness
  - Check roughing pump fans and belts are operational
  - Check diffusion pump temperature gages are operational and set to proper levels
  - Check diffusion pump heaters and cooling system for proper settings and operational levels
  - Check connections and operations of vacuum valves
  - Check pump down time to operational vacuum levels
  - Check overnight pump down and leak up levels
- Mechanical Positioning System: (all 6 axes – X, Y, Z linear translation, table rotation, table tilt and gun tilt)
  - Check motors and associated linkages and belts are in good working condition

- Check power, command and encoder connections are securely fastened and in good working order
- Check, clean, and oil ballscrews and bearing tracks
- Calibrate and tune as necessary speed and positional accuracy to +/-1% for all 6 axes
- Dual Wire Feed: (check both wire feeders)
  - Check wire feed mechanisms and motors are fully operational
  - Check wire feed controls are fully operational
  - Check wire feed connections are securely fastened and aligned for smooth operation
- Safety System:
  - Check high voltage tank interlocks
  - Check vacuum chamber internal interlocks
  - Check windows for ionizing radiation levels

#### Repairs:

The X-axis is having difficulty with smooth operation, positioning precision and repeatability. During the preventive maintenance, the leadscrews should be inspected for appropriate alignment and wear. Leadscrew compensation may be required to be performed on the X, Y, and/or Z axes, depending upon the condition assessed during the preventive maintenance.

The electron beam gun is experiencing multiple beam current overload faults upon shutting off the beam, particularly during operations at the beginning of the shift. Diagnostics shall be performed to identify the cause of the faults, and appropriate repairs performed to correct this recurring fault.

The vacuum pumpdown times have steadily gotten worse over time, even after thoroughly cleaning metal vapor deposition residue which has accumulated within the entire vacuum chamber. Diagnostics shall be performed to identify the cause of degrading vacuum quality and appropriate repairs recommended to reduce the pumpdown times back to factory operational conditions.

#### Documentation:

Upon completion of the service, a report, including a certificate of calibration and other documentation collected to assess calibration and identify how much out-of-specification were changed to bring these axes back into factory specifications.