

EDWARDS ACCELERATOR LAB

OPERATOR 2 TRAINING FLOW CHECKLIST

Operator Candidate Name: _____ **Date:** _____

| <u>Subject</u> | <u>Source Material for Subject</u> Location: <i>Procedure or Document</i> | <u>Candidate Initials for Receipt and Understanding</u> |
|--|--|---|
| Operator 1 | Pre Requisite | N/A |
| Types of Lab Personnel | Training Book: <i>Personnel Classifications</i> | _____ |
| Information Location | Training Book: <i>Control Room Books</i> | _____ |
| Accelerator Handbook Wiki Page | Instructor links to page and presents content and function | _____ |
| Fundamentals of vacuum | Internet Search, or Class Handouts and Hardware Presentation: <i>Rough, High, Ultra High</i> | |
| Levels of vacuum | | |
| Measurement Devices | Gauge, TC, Ion, Penning | |
| Mechanical Pumps | <i>Oil sealed rotary pumps</i> | |
| High Vacuum Pumps | | |
| Diffusion | <i>Principles of Operation, Precautions</i> | |
| Cryopumps | <i>Principles of Operation, Regeneration</i> | |
| Turbo | <i>Principles of Operation, Precautions</i> | |
| Vacuum Connections | <i>Dependex, ConFlat, KwikFlange</i> | |
| Gate Valves | <i>Manual & pneumatic</i> | _____ |
| OUAL Tandem Accelerator | Wiki Reference Materials: | |
| Internal Structure | <i>Tank, Tubes, & Column</i> | |
| Charge Exchange, gas & foil | <i>Terminal Stripping</i> | |
| Pelletron Charging System | <i>Theory of Operation, OUAL Installation</i> | |
| Terminal Potential Stabilization (TPS) | <i>Function & Components of Control System</i> | |
| Control Modules | <i>Panel front controls and labeling</i> | |
| Operations | Operating Procedures Book: <i>Startup, Shutdown, Changing E, Sparks</i> | _____ |

Sources

Cesium Sputter Source
Duoplasmatron He Source

Operating Procedures Book:

Sputter Source
Alpha Source

Electrostatic Components

Einzel Lenses
Gridded Lenses
Steerers

Wiki Reference Materials:

Einzel Lenses
Gridded Lenses
Electrostatic Steerers

Magnets

Bending
Quadrupole
Computer Controls

$$\mathbf{F} = q(\mathbf{v} \times \mathbf{B})$$

Inflection, Analyzer, Switcher, Swinger

Wiki Reference Materials: *Quadrupoles*

Operating Procedures Book: *Computer Control of Quads*

Beam Measurement

Faraday Cups
Current meters
Beam Profile Monitors
Beam Pick Off
Beam Current Integrator

Wiki Reference Materials:

Faraday Cups
Current meters
Beam Profile Monitor
Beam Pick Off

Operating Procedures Book: Beam Current Integrator

Components of the Common Beam Lines

Wiki Reference Materials: *Lab Layout, Walking tour*

Beam Tuning

Beam Optics
Tuning Goals
Slits and Energy Resolution
Calculating Injection Energy
Calculating Beam Energy

Internet Search

Internet Search

$$dE/E = 2(dR/R) \quad ! R=28", dR=\text{aperture size}$$

Source Diagrams

$$E = \text{Terminal}(\text{Charge State}+1) + \text{Injection}$$

Practical Exam: Non-analyzed Beam tuned to Analyzer Cup Pass / Fail Date: _____

Signature of Accelerator Staff: _____

Operation and Control Written Test Pass / Fail Date: _____

Signature of OU Accelerator Staff: _____

Certification as Operator 2 Complete Date: _____

Signature of TALC Chair: _____