



PLD T100



PVD Products PLD T100 Tape machine has been designed for both R&D and long-length production of YBCO High Temperature Superconducting tapes and buffer layers up to 100 meters long. This computer controlled Reel-to-Reel system will meet your most demanding deposition requirements and is compatible with a wide variety of metallic tape compositions, tape widths, and tape thickness.

The three-chamber design includes two reel chambers and one main deposition chamber. All chambers are fabricated as rectangular boxes with front mounted hinged doors for easy access to all internal parts. The doors provide for easy reel insertion and removal, tape

spooling, target changes, and system maintenance. Multiple Conflat flanged ports for user accessories and view ports for plume and target monitoring are provided. The chambers are all mounted on an integral steel tube frame that includes two electronic racks housing all the system electronics.

Programmable tape velocities from below 0.5 m/hour to over 10 m/hour are available. The tape can move in both the forward and reverse directions for *in-situ* post-deposition annealing and rewinding for multi layer film growth. Programmable tape tension is available to keep the axial force on the tape constant during the entire deposition



process. The system can handle tape widths from 0.5 mm up to 2 cm wide.

Idler-mounted encoder monitors the actual tape velocity and tracks the coated tape length. Non-slip idlers have minimal contact with backside of tape.

Utilizes a unique multi-zone substrate heater based on PVD Products non-contact IR lamp radiation design. Nothing touches the tape through out the heater assembly. Uniform or graded temperature profiles for proper film growth are achievable to temperatures in excess of 850°C throughout the 6 cm deposition zone. The heater is housed in a water-cooled assembly to minimize the thermal load on the ablation target surface and deposition chamber. The heater is run via computer with DC power supplies in a closed-loop temperature control mode.

Easily adjustable target-substrate distances ranging from 40 to 100 mm via motorized Z-stage.

The target assembly includes three 6-inch (150 mm) diameter targets inside the main deposition chamber (smaller diameter targets can be easily accommodated). The targets all sit below a large water-cooled plate to minimize cross contamination. The assembly utilizes a unique target motion to eliminate plume tilting during high power laser operation over extended periods of time. The manipulator also provides fast target indexing for quick target changes in 10 seconds.

The system comes with a complete optical train to take the laser beam from the laser to the target. The optical train includes a fully programmable PVD Products Intelligent Window for extended deposition time with our *in-situ* fluence monitor. Optical trains for either

248-nm or 308-nm are available. The optical train is enclosed in a laser safe box and appropriate view ports are covered with laser absorbing filters. The angle of incidence of the laser beam with respect to the target normal is 60°.

The pumping stack includes a Pfeiffer 1,000 L/sec turbo drag pump, backed by a Leybold D-25B mechanical pump. A base pressure below 5×10^{-7} Torr is guaranteed. Includes a Granville Philips Ion Gauge controller with one Bayard Albert Ion gauge and two Convectron gauges. Also includes a heated MKS Capacitance Manometer and VAT PM-5 stepper motor controlled VAT gate valve for precise pressure control. Two MKS MFC units with shut-off valves are provided. With this package the deposition pressure can be accurately set and maintained via computer control from below 1 to over 500 mTorr. All valves are electropneumatic and controlled via the computer.

A rack mounted Pentium IV computer with flat panel display utilizes LabVIEW™ software and National Instruments boards for complete system control and data logging. The user interface provides easy viewing and control over tape speed, tape tension, substrate temperature profile, target motion and target changes, gas flow, laser operation, base or deposition pressure, vacuum valves, MFC valves and flow along with full data logging. Recipes can be stored and recalled or easily changed.

The system comes complete with Power Distribution box, water manifold, and pressure regulators for both chamber venting and pneumatic valves.

