



SPRINT FLEX

Roll-to-Roll Thin Film
Deposition System



Designed for a wide range of flexible roll-to-roll deposition processes, full range of deposition sources and multiple substrate options, with precision single side touch material handling.

TYPICAL APPLICATIONS

- Molybdenum
- CIGS
- CdTe
- CdS
- TCO

Free span roll-to-roll configuration with deposition on both front and back side of the substrate in a single pass to provide maximum flexibility.

Configurable with up to 4 front and 3 back side deposition sources with independent recipe driven control over each source including the ability to execute multiple passes alternating materials.

Substrate heating and pretreatment options such as ion bombardment, AC/DC/RF or plasma bombardment to optimize surface energy of substrates

Flexible Configurations based on Mustang's proven industrial system platform

Dual direction deposition

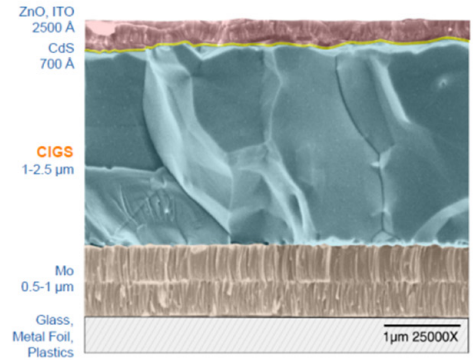
- .01 – 3 M/min precision roll speed
- Substrates 20-40CM wide / 20-150 M lengths
- Custom and larger substrate options available

Base vacuum 10x-7

- Mechanical or dry roughing pumps
- Oil diffusion or Turbo pumps
- Cryogenic vacuum / water pump

Film thickness monitoring

Sprint Heat rapid annealing



Custom Size PVD Planar or Rotatable Cathodes



Deposition Uniformity (+/- 3%)

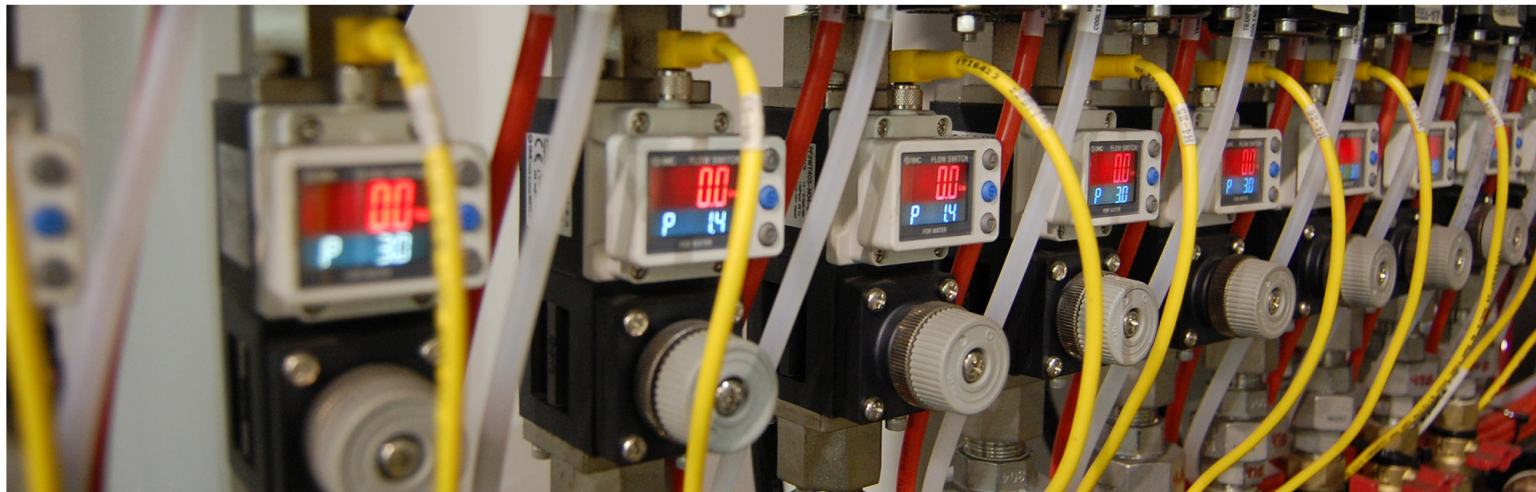
Ag, Al, Cr, Cu, ITO, Ni, NiCr, NiV, Ti, SS, Al₂O₃, Nb₂O₅, SiN, SiO₂, Ta₂O₂, TiN, TiO₂, ZnO

Applications

PV-Mo, CIG, CIGS, TCO(ITO/ZnO)

TCO Touch Screen

OLED cathode layer, evaporation of low



Configuration Process specific configurations for Sputter, Co-Evaporation, Selenium, Thermal Annealing and custom.

Orientation Horizontal or Vertical roll to roll free span web material orientation

Web materials Mylar, PET, BOPP, Kapton, thin metals, etc.
System is not web material dependent.

Maximum web temperature 350° C.

Ultimate Vacuum Better than 8.0×10^{-7} Torr within 24 hours or less.

Operating Vacuum Between 9×10^{-7} & 3.5×10^{-3} Torr. (process dependent)

System Dimensions 3.6 m (11' 10") wide by 3.9 m (12' 10") deep by 3.04 m (10.0') tall.

Utilities

Air: 80 psi (5.5 bar) @ 20 cfm

Electrical: 480V/3P/50Hz/250 FLA, fully outfitted, other power configurations available.

Water: 50 GPM (220 liters / min) @ 60-80O F (15-26 O

Grounding: Two (2) ¾" diameter copper clad steel rods, driven through the floor, into the earth, by 8'. Ground rods to be placed at 6 feet apart with a re-sistance reading of less than 3 ohms.

Chemical composition	ZnO:Al	In ₂ O ₃ :SnO ₂
Sheet resistance (Ω/□)	15	10
Resistivity (10 ⁻⁴ Ω-cm)	15	10
Thickness (nm)	1000	1000
Transmission (%) (500-900nm)	>75	>80
Uniformity, resistivity (%)	< 2	< 2
Uniformity, transmission (%)	< 1	< 1
Uniformity, thickness (%)	<3	<3

Chemical composition	Mo
Sheet resistance (Ω/□)	0.2
Resistivity (10 ⁻⁵ Ω-cm)	2
Thickness (nm)	1000
Uniformity, resistivity (%)	< 2
Uniformity, thickness (%)	<3
Coating Stress	Films are slightly compressive