

# nRad

## Research and Development System for High Performance Slot Die Coating



### Prove Your Process on a Truly Scalable Platform

- ❖ *Highly efficient material utilization with minimal waste*
- ❖ *Patented slot-die based deposition technology*
- ❖ *Coating thickness range from 20nm to 100  $\mu$ m*
- ❖ *Uniformities of  $\pm 3\%$  and edge effect of less than 5mm achievable*
- ❖ *Coating technology proven scalable to large area processing*

#### Supports a Variety of Substrates:

- ❖ Rigid or Flexible
- ❖ Glass
- ❖ Plastic
- ❖ Metal Foils
- ❖ Silicon Wafers

#### Perfect for Many Applications

- ❖ Flat Panel Displays
- ❖ OLED's
- ❖ Photovoltaics (Thin Film and Si)
- ❖ Flexible Electronics
- ❖ Optical Films

# Unmatched Performance & Value in an R&D System

## FEATURES

- Patented technology and proprietary design provide reliable performance in a small package
- Simple yet flexible design and operation, capable of depositing a wide range of materials for a variety of applications
- Compact system is compatible with most standard glove boxes and laboratory benchtops
- Fully automated coating process controlled through recipe programmable parameters
- Linear servomotor driven air bearing stage assures smooth operation and accurate coating
- User friendly controls with on board touch screen and PC based software
- Extremely low fill volumes ideal for testing small samples of material
- Programmable coating gap (micron resolution), measured and adjusted for every substrate processed.
- Programmable priming step to establish coating bead immediately prior to deposition on the substrate

## PROCESS ADVANTAGES

- Slot die coating technology maximizes coating fluid utilization without the waste associated with alternative methods
- Efficient use of materials minimizes environmental impact and disposal costs
- Process is suitable for development applications and scalable to larger production sizes
- Process can also be adapted to a roll to roll platform
- Precise, programmable control of coating gap and die motion profile provides highly uniform coatings and excellent control of coating edge profiles
- Effective adjustable coating speed 0-2m/min

## OPTIONS

- Full atmospheric or inert isolation to allow processing in low oxygen/low moisture environment
- Vacuum chucks are available for a wide variety of substrates, including display glass and flexible plastic film as well as silicon PV wafers
- Independent temperature control of process material and substrate (replace existing bullet)
- Slot dies manufactured out of various alloys for processing with corrosive materials.
- Substrate lift mechanism for Robotic load/unload.

## SYSTEM SPECIFICATION

<b>Substrate Size</b>	Standard 150 mm <sup>2</sup> Maximum 210 x 300 mm 150 or 200mm wafer option
<b>Substrate Type</b>	Glass, plastic, metal foils, silicon wafers Rigid or Flexible
<b>Substrate Thickness</b>	Rigid: 0.5 to 6mm Flexible: > 100µm
<b>Coating Thickness Range</b>	20nm to 100 µm (dry) (depending on material & system options)
<b>Coating Uniformity*</b>	± 3% or better for films over 150nm ± 5% or better for films 50 and 150nm
<b>Leading/Trailing Edge Effect*</b>	5-10 mm or better
<b>Coating Material Viscosity Range</b>	Standard 1 to 70 cP Upto 10,000cP with high viscosity pump
<b>System Fill Volume*</b>	As low under 10 ml
<b>System Dimensions</b>	L: 911mm W: 578mm H: 645mm 170 kg / 380lbs
<b>Certification</b>	UL & CE Compliant

\*Performance achievable with materials optimized for slot die coating. This metric is highly material dependent

