Slot Die Coating Technology and Process Improvement

Mark D. Miller
Coating Tech Service
&
BJ Kays
EDI

Coating Tech Service

Extrusion Dies Industries, LLC
Slot Die Coating Technology

• Background
• System
• Technique
• Process
• Summary
Background

- Slot Die basics
- Closed system
- Maintain temperature
- Distribute fluid uniformly
- Define coat width
Background

• Slot Die Advantages

• Increased production speeds

• Positive coat weight control

• Improved waste management

• Cross-web distribution control
Background

• Slot Die applications
• Viscosity
• % Solids
• Coating thickness
• Particle Size
• Coating width
• Line speed
Background

- Slot Die design
- Rheology
- Manifold
- 2 body sections
- Flow control
System

- Slot Die
- Positioner / Support stand
- Backing roll
- Fluid delivery system
- Substrate
System

• Slot Die
  – Manifold design
  – Manufacturing tolerances
  – Lip offset
  – Lip geometry

* Increase Coating Process Window
System

• Flex lip
  – Contact coating technique
  – Up to 2000 fpm (600 mpm)
  – Up to 450 F (230 C)
  – 12 - 1270 microns wet

• Fixed lip
  – Non-contact coating technique
  – Up to 300 fpm (100 mpm)
  – Up to 180 F (80 C)
  – 1 -254 microns wet
System

• Positioner
  – Attack angle
  – Position to roll
  – Repeatability

* Increase Coating Process Window
System

• Backing roll
  – TIR
  – Diameter
  – Cocentricity

* Increase Coating Process Window
System

- Fluid delivery system
  - Positive displacement
  - Rheology of fluid
  - Surface tension

* Increase Coating Process Window
System

• Substrate
  – Variation (RTY)
  – Surface energy
  – Surface treatment

* Increase Coating Process Window
Technique

Contact Coating
- 10-14 inch (254-355 mm) roll
- 1-2 mil (25-50 microns) gap

Non-contact Coating
- 6-10 inch (152-254 mm) roll
- Up to 12 mil (300 microns) gap
Technique

- Direct coating (contact)
Technique

• Indirect coating (contact)
Technique

• Free-span coating (contact)
Technique

• Curtain coating (non-contact)
Technique

• Draw coating (non-contact)
Process

• Full width coating
• Lane coating
• Intermittent coating
• Multi-layer coating
• Dual-sided coating
Summary

- System
- Technique
- Process
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Mark D. Miller
Coating Tech Service
100 South Fifth Street
Suite 1900
Minneapolis, MN 55402
(612) 605-6019
mark@coatingtechservice.com
www.coatingtechservice.com

BJ Kays
Extrusion Dies Industries
911 Kurth Road
Chippewa Falls, WI 54729
www.extrusiondies.com