Liquid Coating
Determining Weight/Thickness
Aimcal Fall Technical Conference
2010

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Communication is Key to Success in any Project!

- Involve Coating Supplier, Anilox, Printer

- Functionality – What is the purpose of the coating

- Can we measure it?

- Best Method to apply product

- Impact of too little or too much
3 Keys to Achieve a Consistent Coated Product

- Anilox (Chrome or Ceramic)
- Coating Consistency
- Printer Calculation Cooperation
What is an Anilox?

Ceramic coated cylinder or sleeve

Laser engraving of ceramic creates microscopic cells below:

Cells deliver a coating film to plate (Flexo) or directly to substrate (Gravure)
Anilox: Microscopic Cell Structure

Cell Cavity
Cell Wall
Post Area

Cell Depth
Cell Shape
Cell Angle

60°
Anilox Unit of Measure: Micron

- Human hair is .004” or 100 microns in diameter
- One Micron is a millionth of a meter long
- Cells are very delicate.
- Walls are typically 3-5 microns wide
Components of an Anilox

Three main components of an anilox

Cell Count
Volume
Geometry

All are important to anilox function but serve different purposes
What Is Cell Count?

600 cpi or line screen

360 cpi or line screen

Number of cells per linear inch
(Does not change as roll wears)
What Is Volume?

- Amount of coating contained in the cells
- Expressed in BCM (Billion Cubic Microns/sq. inch)
- Can change over time
- Affected by cleanliness and wear
- Determined by Banded Roll, Coating Application
Geometry

60 Degree Hex

30 Degree Hex

45 Degree Quad

45 Degree Tri
Functional Failures

- CELL PLUGGING How important is volume to your process?
  - Determines ACTUAL transferable coating film thickness
  - Failure to maintain will lead to non-conforming product
  - Wear and Cell Plugging; Know the Difference and the Effects

- Wear means permanent volume loss, plugged cells are temporary
Sustaining Coat Weight:

• Make sure you utilize a **clean** anilox
  – If aniloxs have been off line, clean them before setting up any job!
  – *Actual Volume* means more than original volume. Know what you are using!!

Is this 800 2.0 ready to go?
  No!
Importance of Anilox Specifications

• Taking Advantage of Correct Volume Allows:
  • Optimization of Process
  • Coating Efficiency Can Be Realized
  • Cost Savings
Coating Consistency

Established Methods At Press

Understand What We Need for a Verifiable Calculation
Coating Consistency at Press

Anilox Metering System is Calibrated so Excessive Blade Pressure is Not Needed!
Coating Consistency at Press

Solids Content/Distribution is Maintained
Coating Applications 101

What do we need to know?

Coating Specifications
Target Weight
Contact Information
Coating Applications

– Customer fills out coating application
  • We must have it completed fully to calculate
  • Customer will need help to fill out
  • Specs must be confirmed by Tech
    – Communicate with Customer
    – Communicate with adhesive/coating supplier  THIS IS NEEDED!!!!
What Do We Need to Calculate?

– DESIRED COAT WEIGHT, typical units:
  • Pounds per Ream (accurate)
  • GSM (Grams per square meter, accurate)
  • Micron or mil film thickness (inaccurate due to absorption by the web)

– REAM SIZE (area coated, sometimes not 100%)
  • 1000 sq ft (144,000 sq in)
  • 3000 sq ft (432,000 sq in)
  • If not 100% coverage we’ll need to cut out coated/uncoated to get weight
What Do We Need to Calculate?

– PERCENT SOLIDS- Amount present at a printable viscosity
  • **UV (Easy)**: always 100%
  • **Waterbased (Simple)**: *typically ran without reductions*, technical sheet is accurate
  • **Solvent (Tricky)** Customer often determines reduction, *often does not know the resulting solids*. WE NEED TO DETERMINE ORIGINAL SOLIDS CONTENT AND HOW MUCH THEY REDUCE.
What Do We Need to Calculate?

– WEIGHT PER GALLON
  • Solvent Coating: What does it weigh after reduction, not the raw coating.

– HOW IS THE COATING APPLIED*
  • Flexo? - Transfer to plate then substrate
  • Gravure? – Directly to substrate, no plate intermediate
  • *Will double or halve correct volume if wrong!!!
Considerations During Calculation

• **Metallics, Glitter**
  – Particle size accommodation, coat weight irrelevant

• **Raised UV, Doming Compound**
  – Subjective, typically 25 BCM to 75 BCM

• **Waterbased Coatings**
  – Is pH an issue? Must find out so aniloxs get corrosion protection.

• **Solvent Coatings**
  – Laminations: Technical sheets may not match dilutions, throws solids and wt/gallon off.
Considerations after the Calculation

– Can the press dry/cure the coating at press speed?
– Direct or Variable Speed/Reverse?
  • Direct is 1:1, no effect on calculation
  • Variable Speed, major effect on calculation
– When the calculation is done, is Flexo or Gravure possible?
  • 70-75 BCM Max
– Are they using a 2-roll without blade system?
  • Difficult if not impossible to duplicate/specify accurately
In this example

- Target Weight 1.0 – 1.2 lbs per 3000 Sq Ft or 432,000 Sq In.
- Water Base Adhesive 2000 CPS
- Application Flexo
- % solids in adhesive: 50%
- Weight per Gallon 8.5lbs/gallon
- Nothing added before going to press, so solids concentration does not change from dilution!
<p>| | |</p>
<table>
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<td>Anilox Volume Needed</td>
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</table>
BCM Needed 12.37

- Line Screen – Reference Chart 140LS
- Volume – 12.5 bcm
- Geometry 60 degree
Possibility: Banded Roll to Optimize to Coating

An effort to save $$$$ not sacrifice functionality or quality!
Summary

• Communication and Anilox Basics
• Understanding Functional Failures
• Understanding Coating Consistency
• Understanding Calculation Process

• Keep in mind the impact on economics; thinnest layer to achieve desired results!
Thank You for your attention, enjoy the remainder of you conference and safe travels home!

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