POWDER COATING SUMMIT
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Tried and Tested Powder Coating for Heat Sensitive Substrates

Welcome!

- Todd Gragg
- 30+ Years of coating experience – liquid and powder
- Industrial wood coatings distribution and manufacturing
- Live in Olathe, KS. with my wife, Gretchen and our Dog - Mila
- Sales background, so delving into the various industry specific specifications for coatings and other testing criteria used in the lab or field has been surprisingly “fun”

Why powder coating?

Powder Coating is a Proven Technology!

- Powder Coating has many advantanges
  - Durability
  - Technical performance
  - Economics
  - Sustainability
  - Ease of application
  - Competitive to other technologies
  - Additional functionality e.g. anti-microbial
  - A simple, repeatable finish process

Why now ?

Previous industry attempts at powder for wood for many years:

Early 1990s: UV-cured acrylated polyesters	Lack of flexibility, limited uptake
Mid 1990s: UV cured unsaturated polyester-urethane powders	Good flexibility but curing issues limited size /shape / colors
Early 2000s: thermoset powder has good success in furniture market	Outgassing, time and limited grades of MDF

Now: Current powder offering overcomes all technical performance hurdles by combining cutting edge resin technology with an efficient application and cure system

Powder for heat sensitive substrates

Powder topcoats and powder primers that are compatible with liquid top-coats

- No yellowing with excellent color and gloss retention
- Wide array of solid colors, metallics and special effects
- Available in various gloss levels with a smooth or textured appearance
- Delivers reduced cost & application efficiencies
- A more sustainable coating option
- Excellent resistance to household cleaners
- Excellent stain resistance
- Excellent moisture and chemical resistance
- Maintains flexibility over time (no brittleness)
- Good storage stability
- Good overbake stability
- Applies uniformly with excellent film build
- Good edge outgassing forgiveness
- Good re-coatability

Market examples

Markets

Closets & Shelving

Kitchen & Bathroom Cabinetry

Store Fixtures

Office Furniture

Doors

Windows

Trim/Molding

Sporting Equipment

Construction Cladding

Modular Housing

Substrates

Engineered Woods

(i.e., MDF, HDF, LDL…)

Hardwoods

Fiberglass

Dry wall

Composites / Plastics

…any material that can handle 265F for about 5 - 6 minutes is a candidate.

Other considerations – not just the coating!

1. Substrate
   - Type – Hardwood, Engineered
   - Various grades
   - Thickness
   - Construction
   - Supply Chain
   - Application and Curing

2. Moisture Content of the substrate

   Too dry = conductivity issues

   Too wet = outgassing more likely

   Destructive test – ASTM D4442
   - Oven drying, Distillation

   Nondestructive test
   - Moisture meter

Technical performance criteria

- Moisture resistance
- Chemical Resistance
- Flexibility
- Stain resistance
- Resistance to yellowing
- Exterior weatherability
- Sandability (primers)

Industry Requirements - Certifications

Different industries with different requirements
Example – metal finishing and AAMA

Kitchen Cabinets - KCMA

Office Furniture - BIFMA

Kitchen Cabinets - KCMA

Categories for testing

- Structural
- Drawer Test
- Door Operation Test
- Finish Test

Finish Test

- **Heat** – 24 hours in hotbox @ 120F and 70% relative humidity – must show no appreciable discoloration, blistering, cracking or any other film failures
- **Hot/Cold** – 1 hr. @120F and 70% relative humidity in hotbox, cool down then 1 hr. @ -5F - this is repeated for 5 cycles - must show no appreciable discoloration, blistering, cold checking or any other film failures
- **Ability to withstand various substances found in a kitchen/bath** – surfaces subjected to vinegar, lemon, orange, juices, ketchup, coffee, olive oil, 100 proof alcohol for 24 hrs. and then mustard for 1 hr. – must show no appreciable discoloration, stain or whitening that can not be wiped off no other film failure
- **Edge Soak** - door edge is exposed to a detergent and water solution for 4-24 hrs. depending on door type – must show no delamination or swelling, no appreciable discoloration, blistering , checking or any other film failure

ANSI/KCMA A161.1

ALL PRODUCTS IMPACT THE ENVIRONMENT
FOR ESP PROGRAM CRITERIA, VISIT KCMA.ORG

Office Furniture - BIFMA

Categories for testing

- Comfort
- Safety
- Sustainability
- Durability

ANSI/BIFMA X7.1-2011(R2021) Standard for Formaldehyde and TVOC Emissions of Low-emitting Office Furniture and Seating. Specifies acceptance levels that define low-emitting furniture independent of construction materials, manufacturing processes, mechanical designs, or aesthetic designs.

ANSI/BIFMA M7.1-2011(R2021) Standard Test Method for Determining VOC Emissions From Office Furniture Systems, Components, and Seating. This test method is intended for determining volatile organic compound emissions from furniture under environmental and product usage conditions that are typical of those found in buildings.

Testing common to powders for metal, heat sensitive substrates and other traditional coatings

- Cross hatch
  - Test method is the same as with metal
  - Film thickness variable
- Dry film thickness
  - ASTM D6132 on metal – ASTM D5235-18 on wood
    - Destructive DFT test – Tooke Gauge
    - Non destructive – Positector
- Gloss measurement – ASTM D523
- Color measurement – ASTM D1729

Tests not common with traditional coatings

- ASTM D4752 – Solvent rub test
- Determine the degree of cure
- Usually methyl ethyl ketone (MEK)
- Number of double rubs varies by industries
- Interesting discussion with OEMS used to using liquid!

Questions?