

New Developments in Coatings with Soybean Oil

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American Coatings Association Classification

- Architectural
- DIY type paints/coatings
- Industrial
- Special Purpose
- Industrial maintenance
- Aerosols
- Traffic marking
- Marine

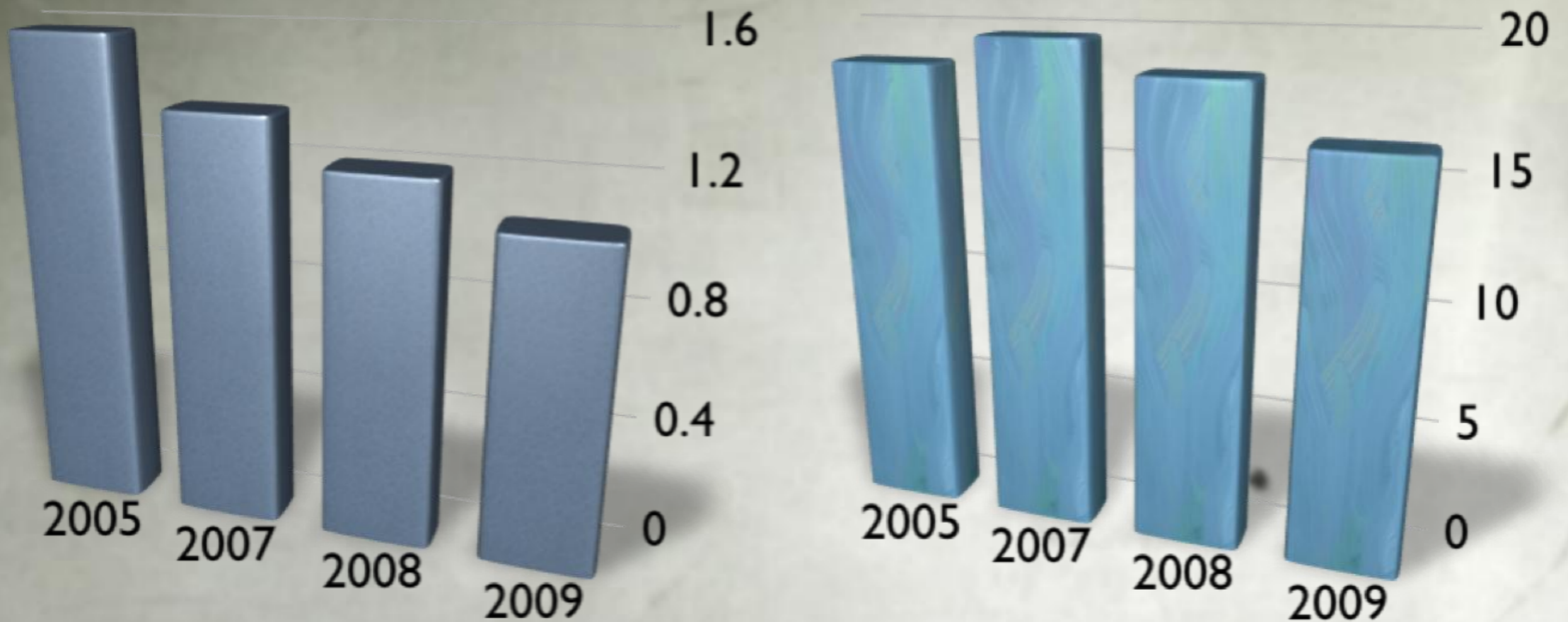
Areas of Architectural Finishes

- Interior Products
 - Paints – wall and trim
 - Wood stains
 - Polyurethanes
- Exterior Products
 - Paint - siding
 - Deck stains
 - Waterproofers and sealers
 - Concrete coatings

Paint and Coatings Market

■ B Gallons

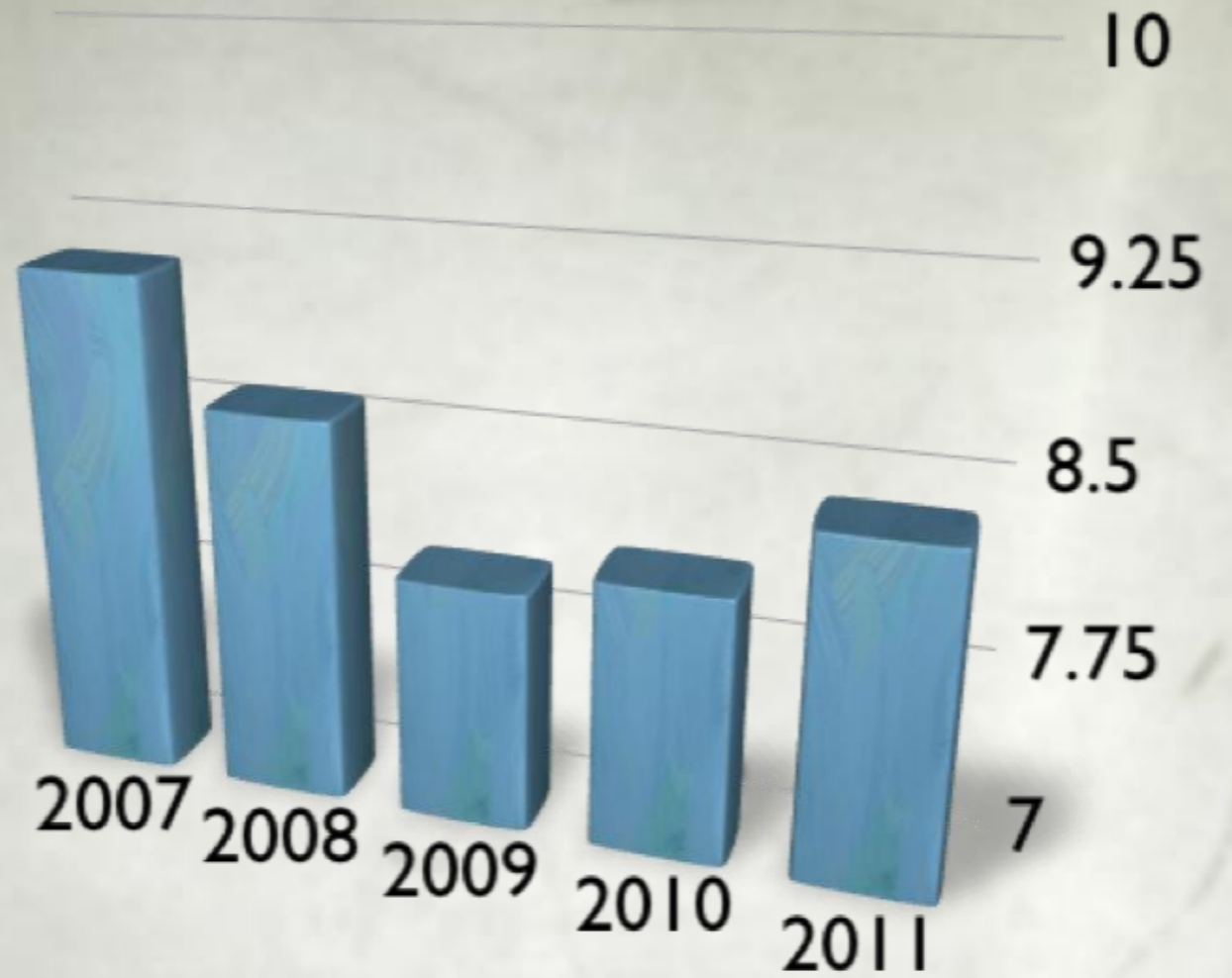
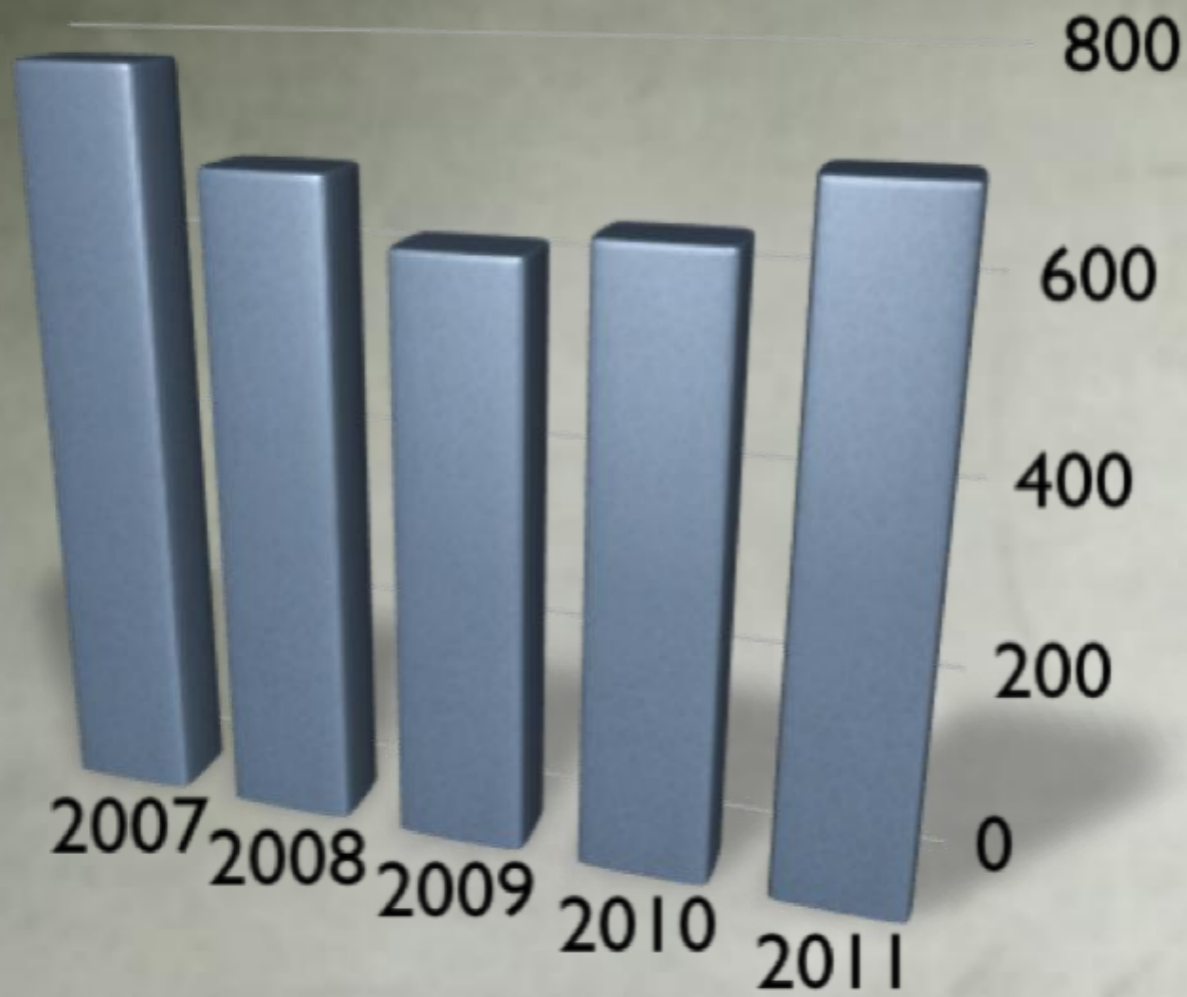
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Architectural Market

M Gallons

\$ M



Drivers of the Market

- VOC Regulations
- Volatility in petroleum feedstocks
- Monomer shortages 2009-2010
- Water based finishes becoming larger contributor

VOC Regulations

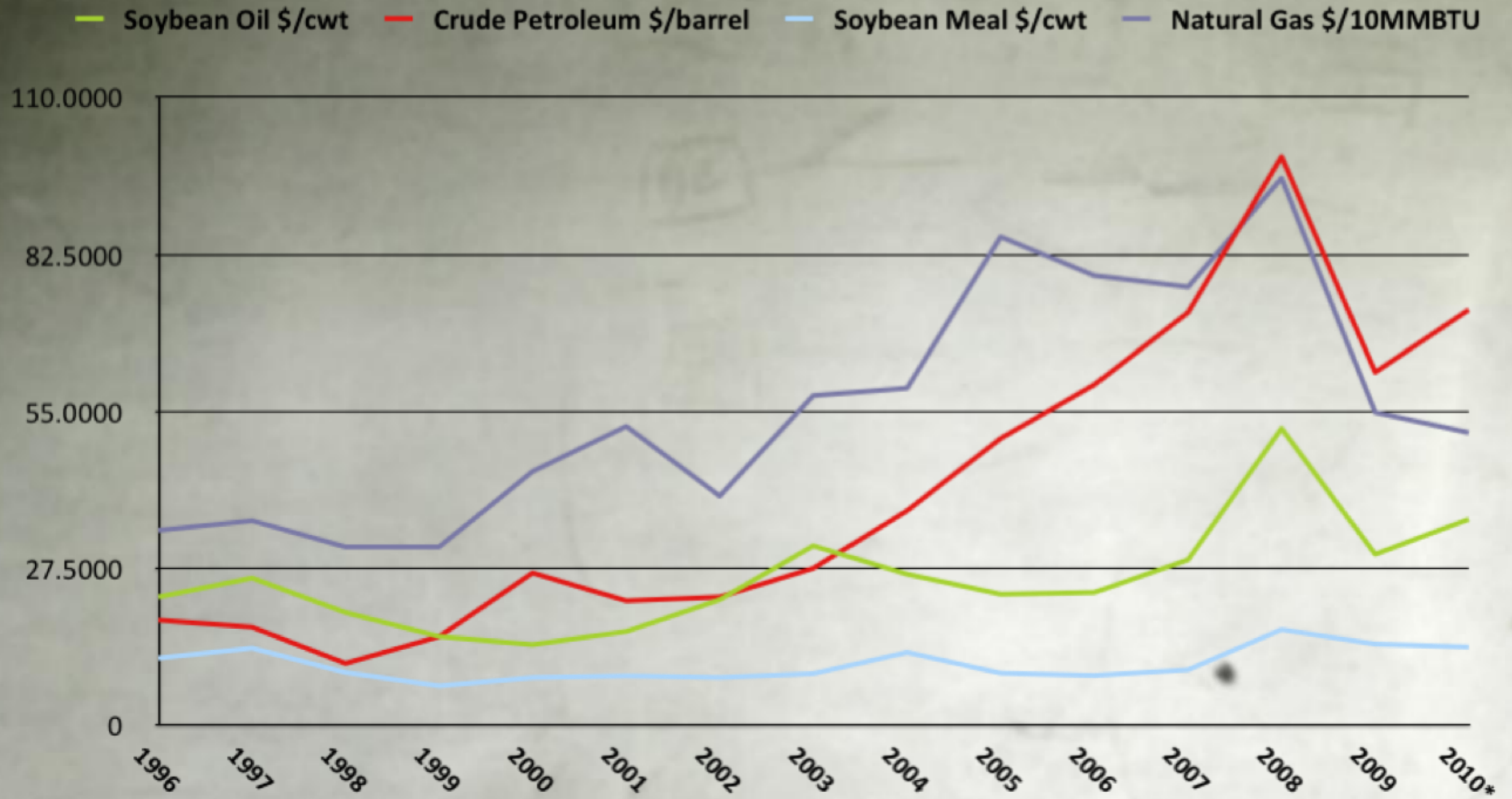
- SCAQMD
 - Most stringent
- US AIM
 - All categories dropping
- CARB - OTC
 - Seem to work in concert with each other
- Air Canada
 - First ever “regulations” on paints

Soy oil - Better than Crude

- Price stability
- Sustainable
- Multiple sources
- Cleaner process
- Contributes to the GDP

Cash Price Changes – FY 1995-2009

USDA or DOE annual average (2009 estimate)



Acrylic Monomer Shortage

- Only a few domestic monomer plants
- Lucite plant shutdown due to fire
- R&H plant shutdown for maintenance
- Market very tight still due to plants producing strictly on demand
- China/EU demand

Traditional Oils used in Coatings Resins

- Soybean
- Linseed
- Castor
- Tall Oil
- Sunflower/Safflower/Canola
- Coconut
- Fish

Soybean Usage Currently

Alkyds

Oil Modified Polys

Acrylics

NEW VARATHANE PREMIUM STAINS' FORMULA IS CLEARLY SUPERIOR.

Most all stains are made with linseed oil. Varathane Premium Wood Stains are made with their exclusive ultra-clear soy oil. Unlike linseed oil, which mats or even covers up the wood's actual richness.

THE STORY OF OUR SUPERIOR STAINS.

STARTING WITH A TOUR OF THE PLANT.

Varathane's exclusive formula offers superior color suspension, which means excellent color control and even color coverage. And unlike stains that often require up to six coats to achieve the color shown on their can, Varathane colors can be achieved in just two coats.

RECEIVE YOUR FREE TRIAL-SIZE VARIETY PACK TODAY.

Log on to www.woodenewers.com. The first 5000 requests will receive complimentary trial size packets of all 24 Varathane Premium Wood Stain colors. With new Varathane stains, you'll not only be revealing your wood's true beauty and richness, you'll be revealing your own sense of style and craftsmanship. For your next project, treat the name that's been the premium wood care leader for almost five decades. And soon to be the premium leader in wood stains as well.

the translucent pigments of Varathane's soy oil formula allows the true beauty of your wood to show through. Plus, it offers deeper penetration - which means better grain enhancement. And because soy oil doesn't contribute unwanted color to the stain, Varathane provides richer, clearer, brighter colors.

"WOULD YOU LIKE A NICE CABERNET?"

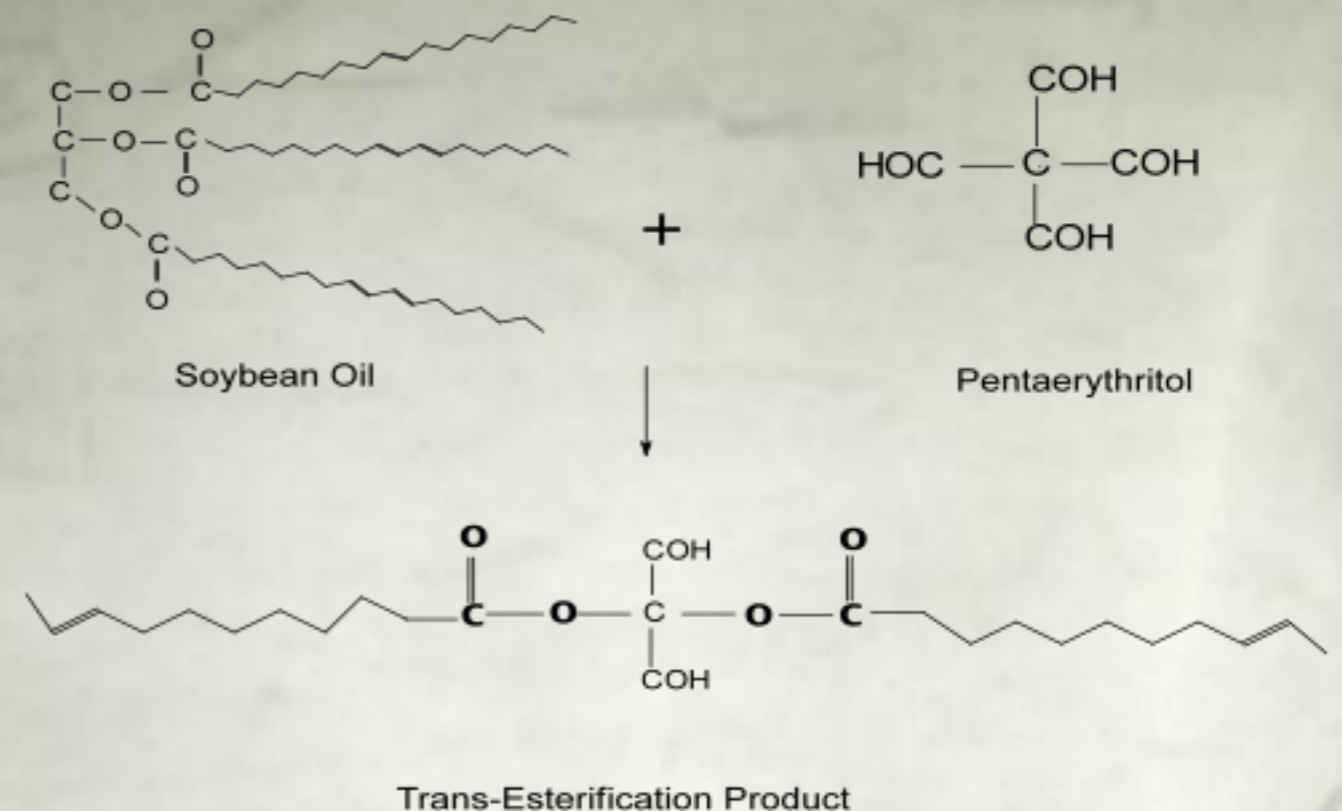
Or Dark Walnut? Or Mission Oak? Varathane Premium Wood Stains are available in the colors that wood doctors most desire. Twenty-five colors in all.

[THE SOYBEAN]

Varathane
WOOD'S FIRST CHOICE®

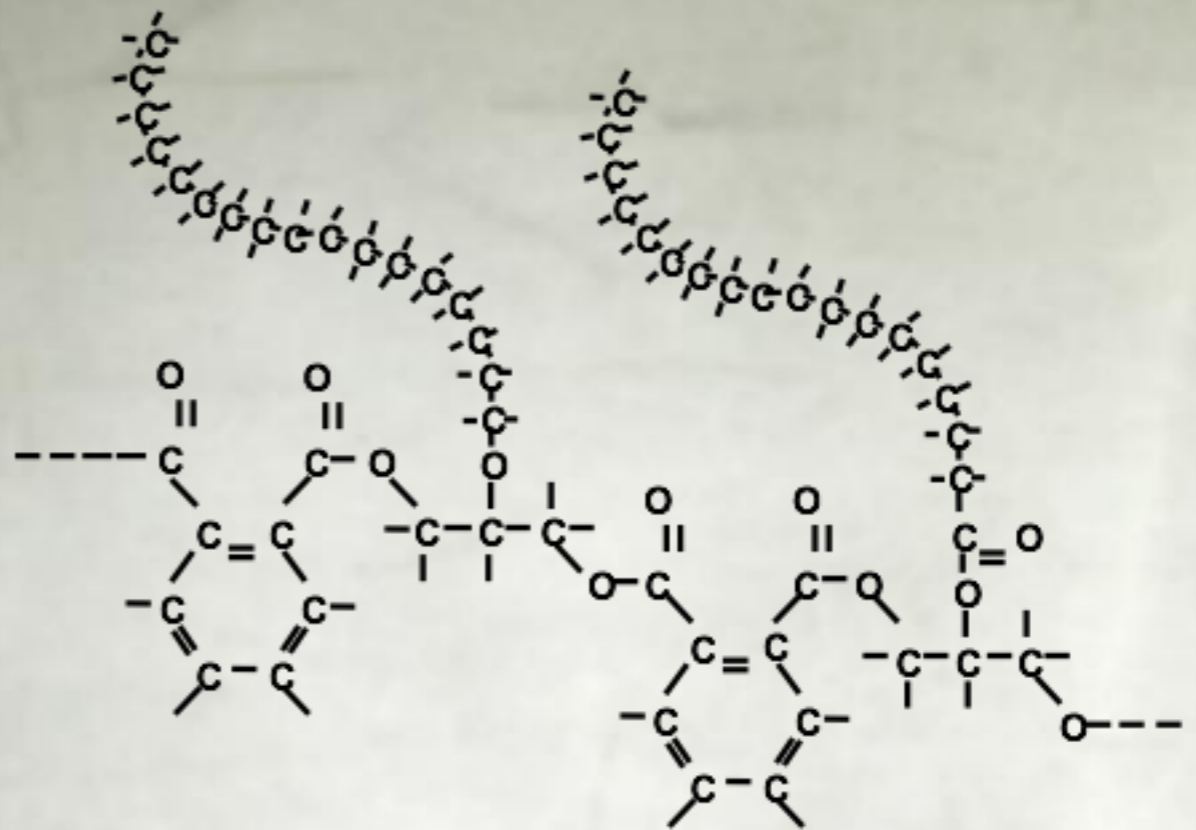
Alkyd Evolution

- Oil created in 1927
- Waterborne 1950s
- Reaction of-
 - Phthalic anhydride
 - Polyol
 - Fatty acid oil
 - Solvent



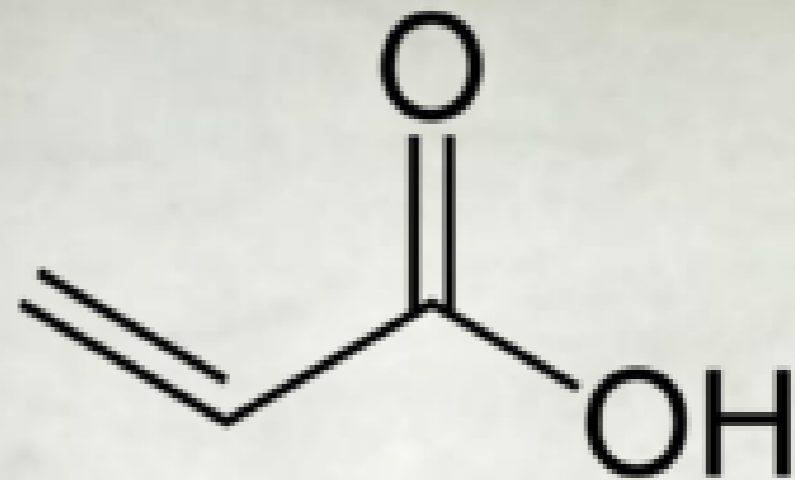
Polyurethane Evolution

- Oil created in 1937
- Waterborne 1950s
- Reaction of-
 - Fatty acid oil
 - Isocyanate
 - Solvent



Acrylic Evolution

- Created in 1933
- Reaction of-
 - Acrylic acids
 - Methacrylates
 - Other monomers



Soy Acrylic Emulsion

Created in 2008

Reaction of-

Soy fatty acid

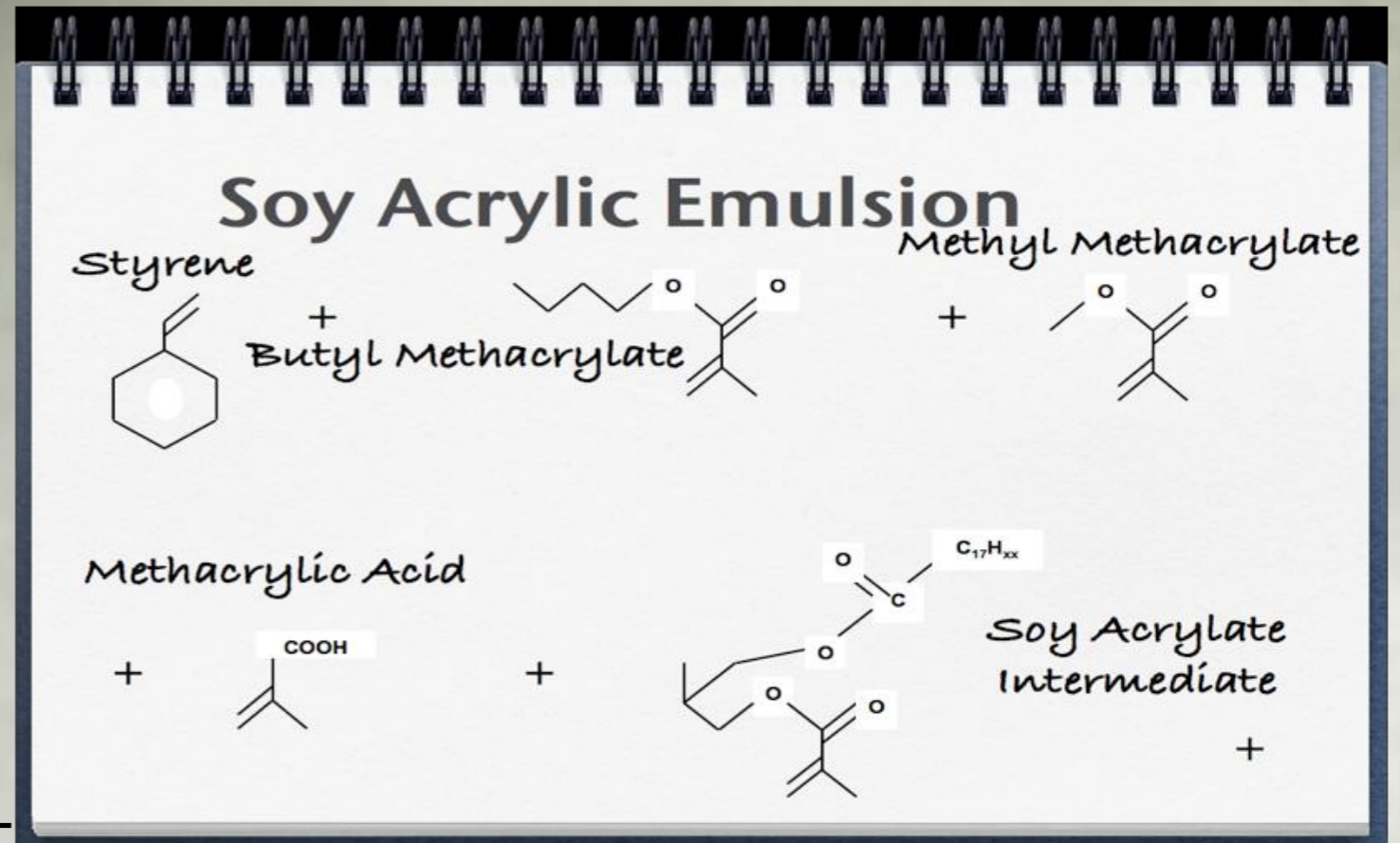
Epoxy acrylate

Styrene

Butyl methacrylate

Methyl methacrylate

Methacrylic acid



Water based Soy Alkyd Applications

- Metal finishes
- General purpose
- Wood Products
- Decking
- Siding
- Concrete coatings



Water vs Oil Alkyd Testing

Property	Oil Based	Water Based
Soy Content	65%	60%
Solids	60%	55%
VOC at 125 cps	375 g/l	50 g/l
Sward Hardness (Higher is harder)	20	20
Composite Chemical (50 points total)	50	49
Dry Time	8 hours	4 hours
Gloss Potential (For high gloss product)	93	88

Water based Soy Poly Applications

- Wood Products

- General purpose

- Flooring

- Concrete coatings



Water vs Oil Poly Testing

Property	Oil Based Product	Water Based Product
Soy Content	51%	40%
VOC at 125 cps	470 g/l	180 g/l
Hoffman Scratch (Higher is better)	3000 grams to rupture	2800 grams to rupture
Taber Abrasion (1000 grams & 1000 cycles)	125 mg loss	100 mg loss
Sward Hardness (Higher is harder)	30	31
Composite Chemical (50 points total)	50	48
Dry Time	6 hours	4 hours
Gloss Potential (For high gloss product)	93	87

Water based Soy Acrylic Applications

- Wood Products
- General purpose
- Flooring
- Decking
- Metal coatings
- Concrete coatings
- Stains



Soy Acrylic Physical Testing

Test	Soy Water Product	Oil Based Product	Water Based Product
Soy Content	28% (55% of the product at 50% of the polymers)	51% (85% of the product at 60 % of the polymer)	0%
Petro Content	22% (coalescent, additives, polymer)	49% (solvent, additives, polymer)	38% (coalescent, additives, polymer)
Hoffman Scratch (Higher is better)	3200 grams to rupture	3000 grams to rupture	2800 grams to rupture
Taber Abrasion (1000 grams & 1000 cycles)	48 mg loss	125 mg loss	64 mg loss
Sward Hardness (Higher is harder)	26	24	24
Composite Chemical (50 points total)	48.5	50	48
Dry Time	2 hours	4 hours	2 hours
Gloss Potential (For high gloss product)	91	93	84

Future for Soy water based resins

- Performance comparable with oil counterparts
- More options for resins as suppliers are working with these materials
- Volatility in petroleum used in many oil systems as well as water based acrylic