PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

Coatings, Trends and Technology
Rosemont, IL
September 10th- 11th

# EASY DISPERSIBLE PIGMENT POWDER PREPARATIONS

**David White**
**VP Technical Services**
**Pan Technology**
**117 Moonachie Ave.**
**Carlstadt, NJ 07072**
**201-438-7878 ext. 7140**

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

**Easy**
**Dispersible**
**Pigment**
**Powder**
**Preparations**

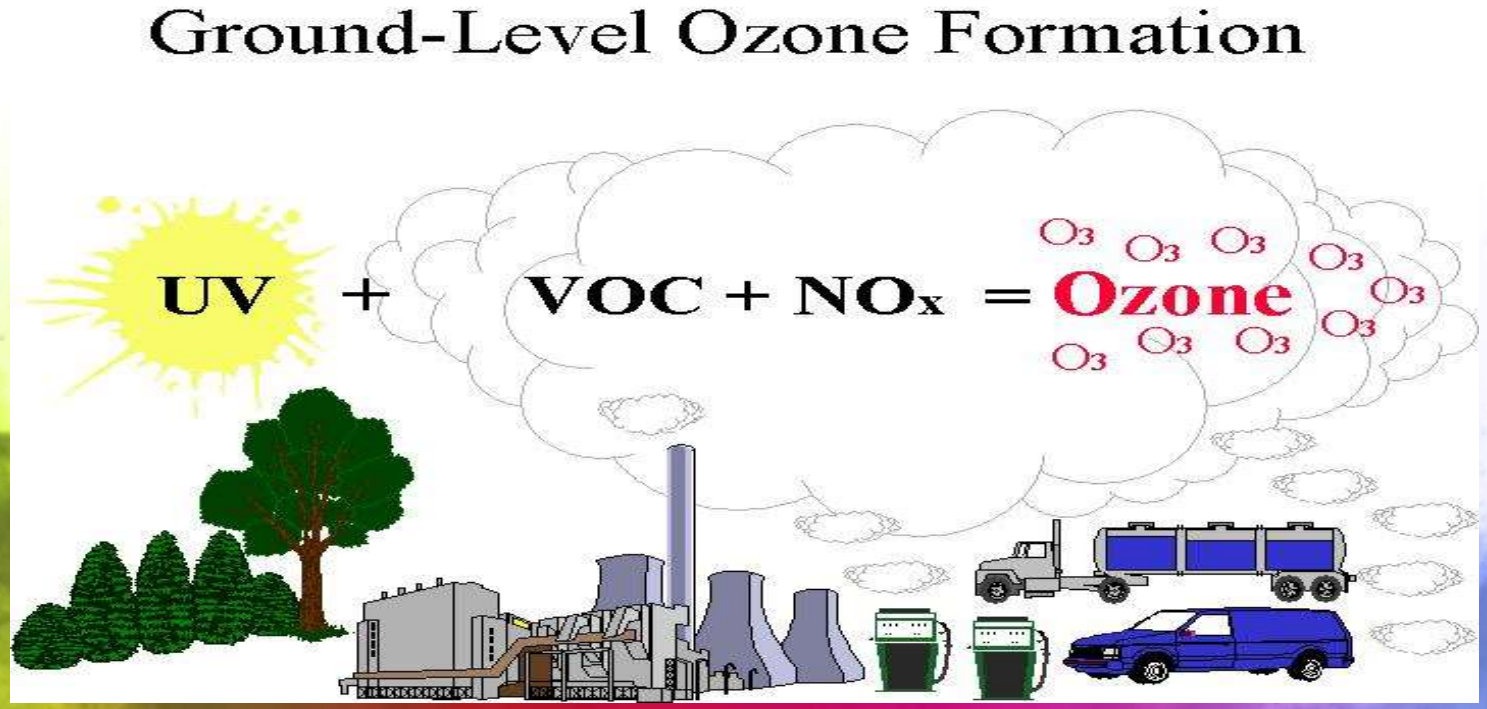
- Sustainable Manufacturing
- Reduces Your Carbon Footprint
- Zero VOC
- Energy Efficient
- Mix Only no Milling Necessary

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Zero VOC

**General definition of VOC**
**“any volatile compound of carbon”**

**EPA Test Method 24**



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# APE Free

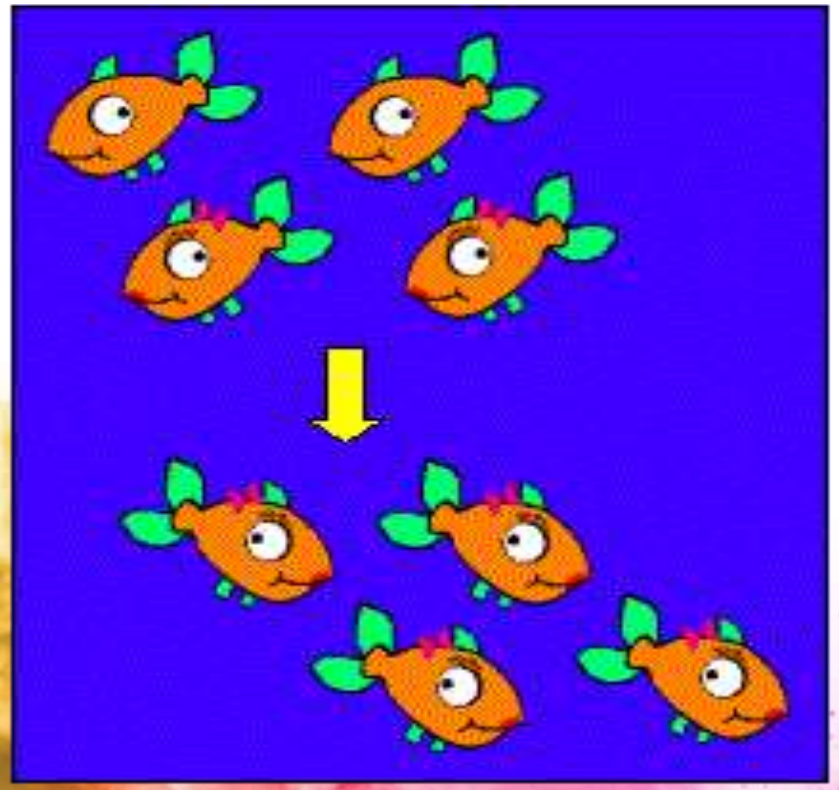


**Figure 2.** Feminization of fish populations.

Initial European regulations

Spreading globally

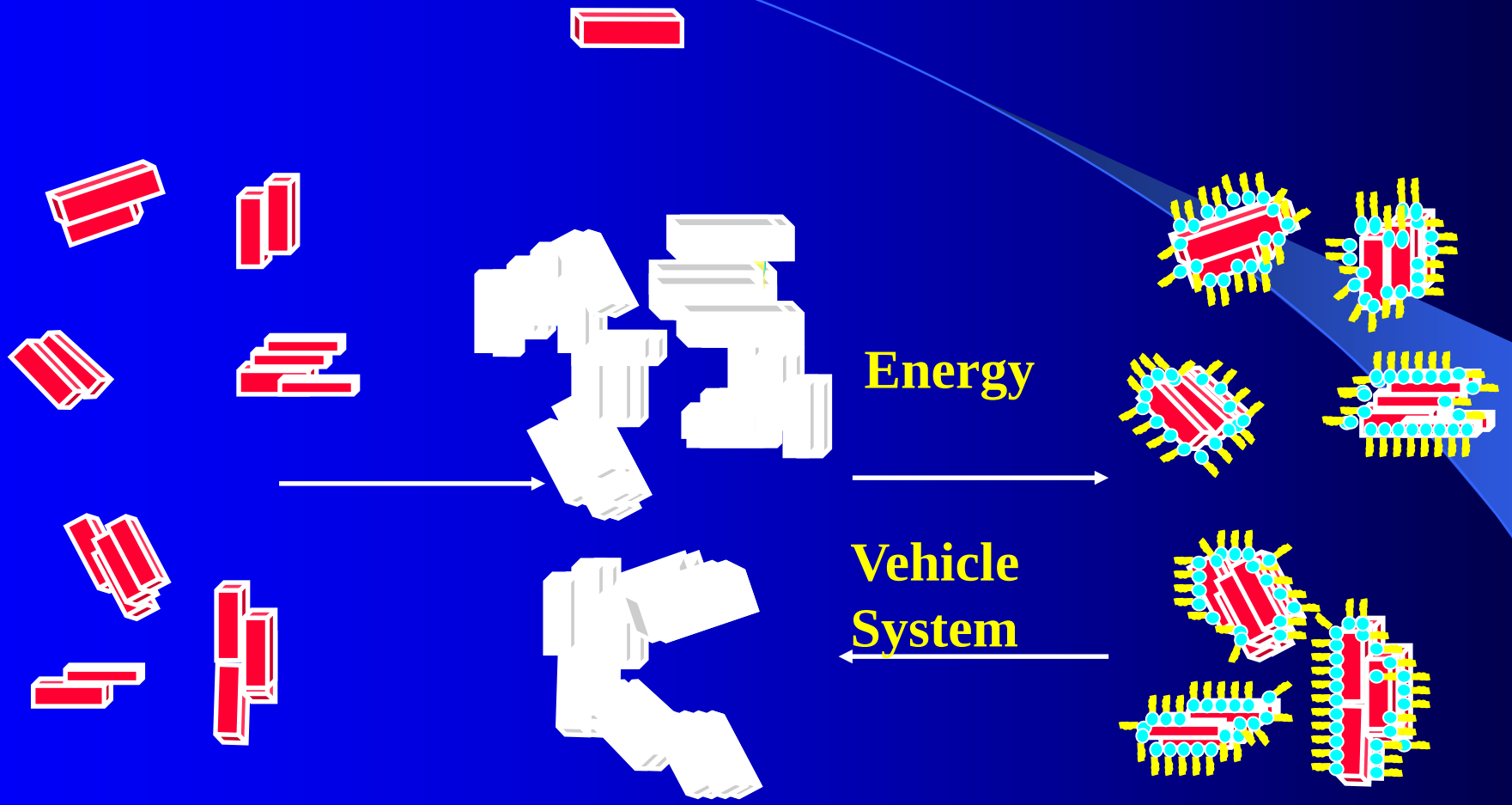
No hormonal disruption

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations Composition

- **Pigment**
  - Organic, Inorganic and Carbon Black
- **Resin or Resin Free**
  - Specially Selected Resins for Compatibility
- **Surfactant**
  - Synergistic Blend of Nonionic, Anionic and Polymeric Surfactants
- **Non Caking, Free Flowing, Low Dust**

# Primary Pigment Particle Size




**Aggregates** **Agglomerates** **Aggregates**

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations
## Milling vs. High Speed Mix

- **Milling**
  - Pre-mix- Depending on Pigment and Batch Size Can be 1 – 5 Hours or More- Need Additives to Pre-Disperse Pigment
  - Let Down to Milling Solids
  - Milling- Based on Pigment and Batch Size Can be 5 to 24 Hours or More
  - Let Down to Finished Dispersion Solids
  - Add to Paint

- **Easy Dispersible Pigment Powder Preparations**
  - High Speed Mix on Disperser- Optimize Viscosity for Quickest Results
  - Let Down
  - Finish Paint Formula or add Let Down to Paint

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

## Milling vs. High Speed Mix

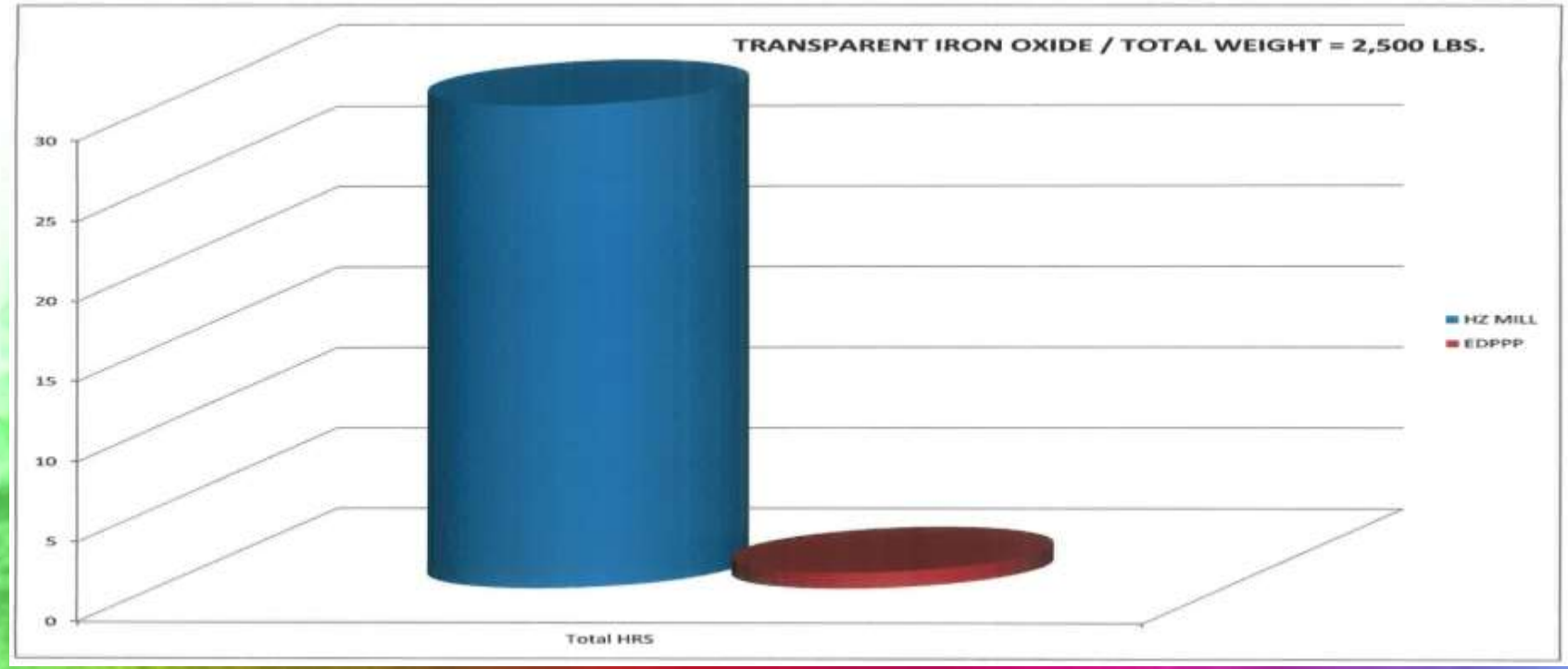
- **Milling**
  - May Not Reach Optimal Dispersion Therefore Leading to Decreased Tinting Strength and Increased Cost
  - More Grinding Cost Time and Money
- **Easy Dispersible Pigment Powder Preparations**
  - Optimal Degree of Dispersion and Stabilization of Aggregates- Increased Tinting Strength and Decreased Cost

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

## Milling vs. High Speed Mix

**Whether Making 100 Lbs. or 10,000 Lbs. EDPPP is 30 Minutes To 1 Hour- You Can't Say that About Liquid Dispersions- Grinding Time is Dependent on Batch Size.**



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

## Transportation Cost keep Rising While Trucker Availability Dwindles

Take a Typical 25% Liquid Dispersion vs. an Easy Dispersible Pigment Powder Preparation

**40,000 Lbs.**

**vs.**

**12,500 Lbs.**

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

## No Hazards Associated with EDPPP's

**Having Trouble getting a Trucker to Pick Up Carbon Black Pigments?**

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

- Ease of Incorporation
- Broad Range of Compatibility
- Color Acceptance, Color Strength & Stability
- Transparency
- Viscosity Stability
- Gloss Retention
- Able to Reach High Pigment Loading where Demanded

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

## Ease of Incorporation

- Minimal Agitation
- Low to Moderate Speed Mixing
- 10 minutes to 1 hour incorporation depending on system
- Can be cut in straight water or solvent or added directly to a batch
- Mixing paste is critical and ladder studies should be conducted

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

## Ease of Incorporation

- Eliminates the Dispersion Process
  - Lower Processing Cost
  - Reduction in Energy Use
  - Paint Companies Make Money by Making Paint not Dispersions

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

# Ease of Incorporation

**Different types of dispersion equipment, Old antiquated 3 roll mills, horizontal mills or high speed mix. You might ask what about basket mills? You are limited by the viscosities you can run and therefore the pigment loading you can achieve**

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

## Ease of Incorporation

- **Other Costs Usually not Considered**
  - Expensive Media for Horizontal Mills
  - Time of dispersing using 3 Roll or Horizontal Mills
  - Labor Cost of Running These Machines
  - For a Hard to Grind Pigment Like a Transparent Iron Oxide it can Take 7 – 10 Passes to Achieve Strength and Transparency
  - With a Easy Dispersible Pigment Powder Preparation it will be a Maximum of 1 Hour Mixing with Much Shorter Times Expected

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Ease of Incorporation

## Water Based Easy Dispersible Pigment Powder Preparation

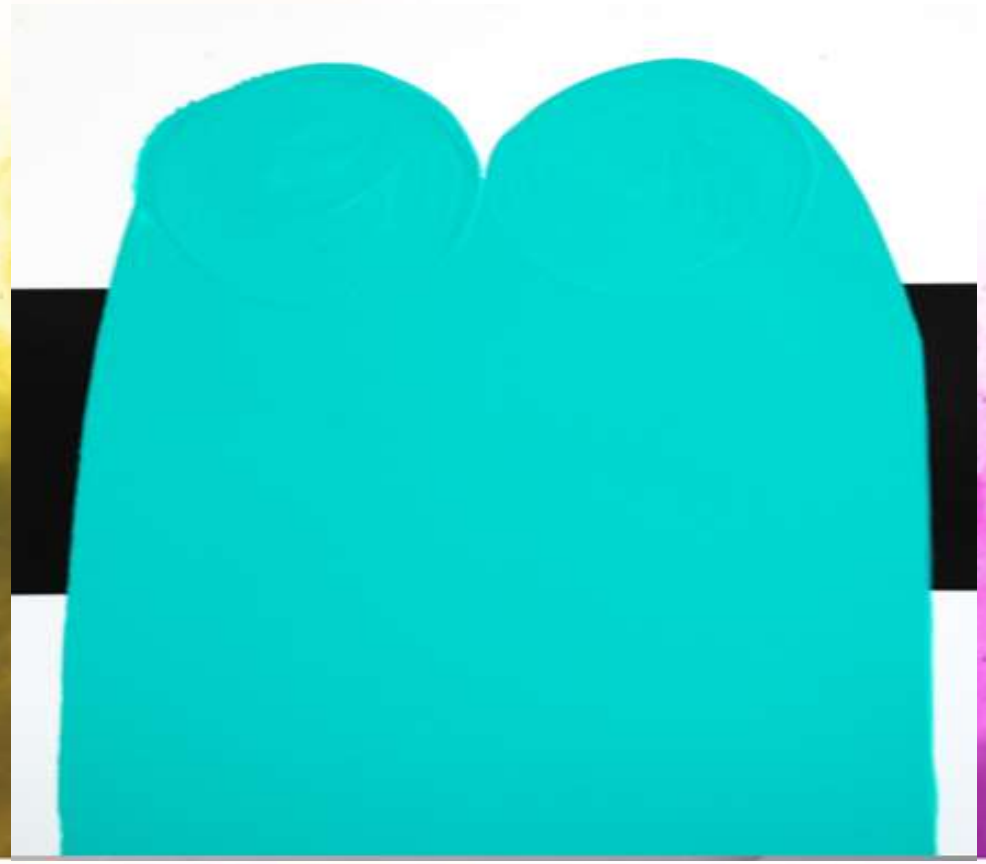
Shaker 5 Minutes  Disperser 10 Minutes

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Ease of Incorporation

## Water Based Easy Dispersible Pigment Powder Preparation

Shaker 10 Minutes  Disperser 10 Minutes



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Isoindoline Yellow 139 in 2K Solvent Based Epoxy Cut With Butyl Acetate

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Isoindoline Yellow 139 in 2K Solvent Based Epoxy Mixed for 45 Minutes

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Isoindoline Yellow 139

### For Solvent-Borne Systems as Tested

| |
|---|
| Solvent Based White Polyester |
| Solvent Based Clear Polyester |
| High Solids Low VOC Short Oil White Alkyd Enamel |
| High Solids 2K Polyamide Epoxy Coating |
| High Solids 1K Aliphatic Moisture Cure White Urethane |
| High Solids 1K Aliphatic Moisture Cure Urethane |
| Solvent Borne White Urethane |
| Solvent Borne Urethane |

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Phthalo Blue R/S in High Solids 2K Polyamide Epoxy Coating

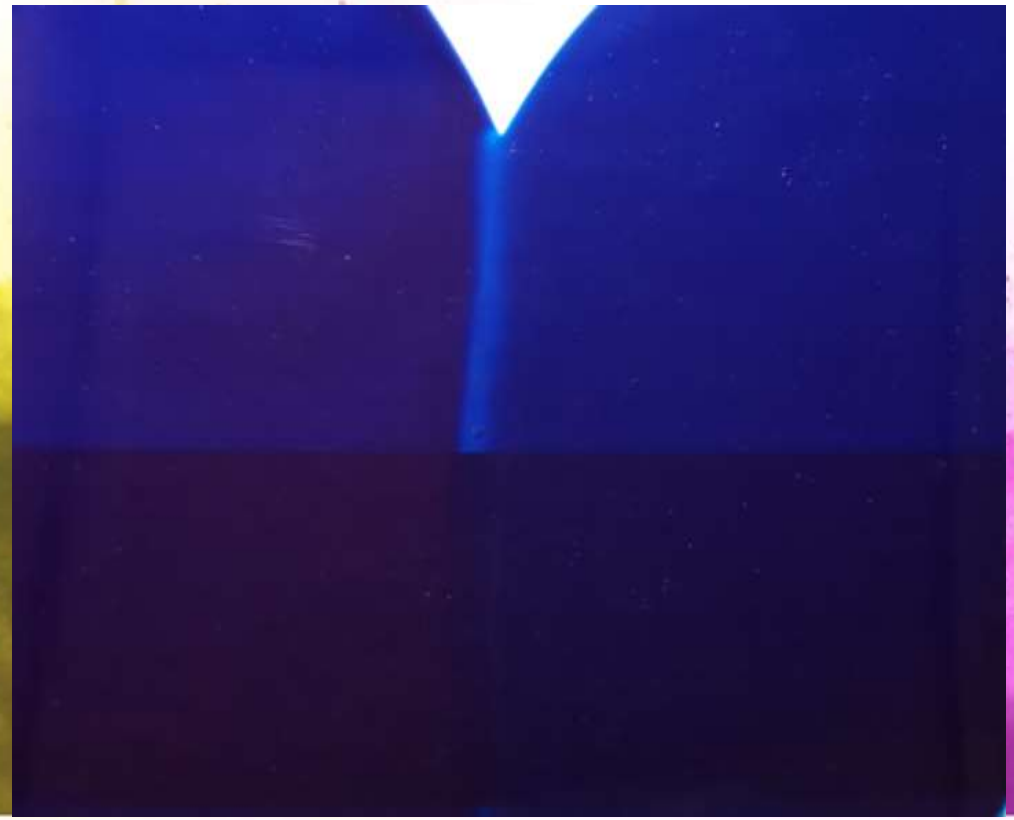
EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Phthalo Blue R/S in High Solids 2K Polyamide Epoxy Coating

EDPPP vs. Liquid Dispersion



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Phthalo Blue 15:2

### For Solvent-Borne Systems as Tested

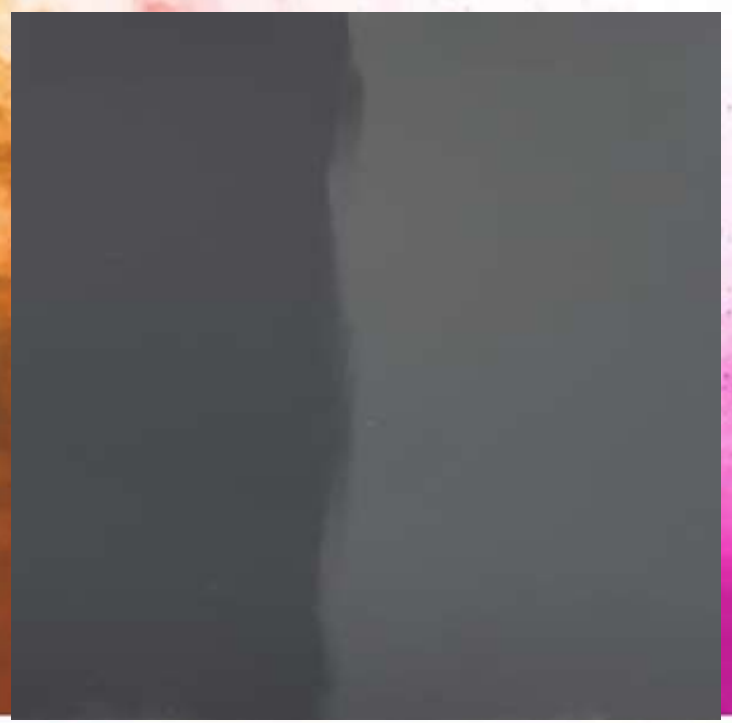
| |
|---|
| Solvent Based White Polyester |
| Solvent Based Clear Polyester |
| High Solids Low VOC Short Oil White Alkyd Enamel |
| High Solids 2K Polyamide Epoxy Coating |
| High Solids 1K Aliphatic Moisture Cure White Urethane |
| High Solids 1K Aliphatic Moisture Cure Urethane |
| Solvent Borne White Urethane |
| Solvent Borne Urethane |

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Carbon Black in Acrylic Alkyd Modified White Base

EDPPP vs. Liquid Dispersion



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Carbon Black in Acrylic Alkyd Modified

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## Carbon Black 7

### For Solvent-Borne Systems as Tested

| |
|---|
| Fast Drying Metal Finishing Enamel White Base |
| Fast Drying Metal Finishing Enamel Base |
| Solvent Based Polyester White Base |
| Solvent Based Polyester Base |

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## DPP Red in Single Component Water Based Urethane White

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## DPP Red in Single Component Water Based Urethane

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

## DPP Red 254

### For Water-Based Systems as Tested

| |
|---|
| Acrylic Alkyd Modified White Base |
| Acrylic Alkyd Modified Base |
| Interior Acrylic Gloss White Base |
| Interior Acrylic Gloss Base |

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

- **Water-Based Systems That are Compatible in:**

  - Water Reducible (WR) Acrylics
  - Water Borne (WB) Acrylics
  - Acrylic & Vinyl Acrylic Latexes
  - Styrene Butadiene
  - Styrene Acrylic

  - WR Alkyd
  - WR Polyester
  - WR Epoxy
  - Polyvinyl Acetate
  - WR Urethanes
  - WR Epoxies
  - Etc., Etc., Etc.

PAN®
TECHNOLOGY ISO 9001:2015 CERTIFIED

# Broad Range of Compatibility

- **Solvent-Based Systems That are Compatible in:**
  - Acrylics
  - Acrylate Monomer and Oligomer
  - Vinyl Acrylic
  - Long Oil Alkyd
  - Short Oil Alkyd
  - CAB
  - Vinyl Toluene Alkyd
  - Silicone Alkyd
  - Alkyd Urea
  - Cellulosic Lacquers
  - Chlorinated Rubber
  - Two Component Epoxy
  - Epoxy Ester
  - Polyester
  - Polyurethane & 2K
  - Alkyd Melamine
  - Etc., Etc., Etc.

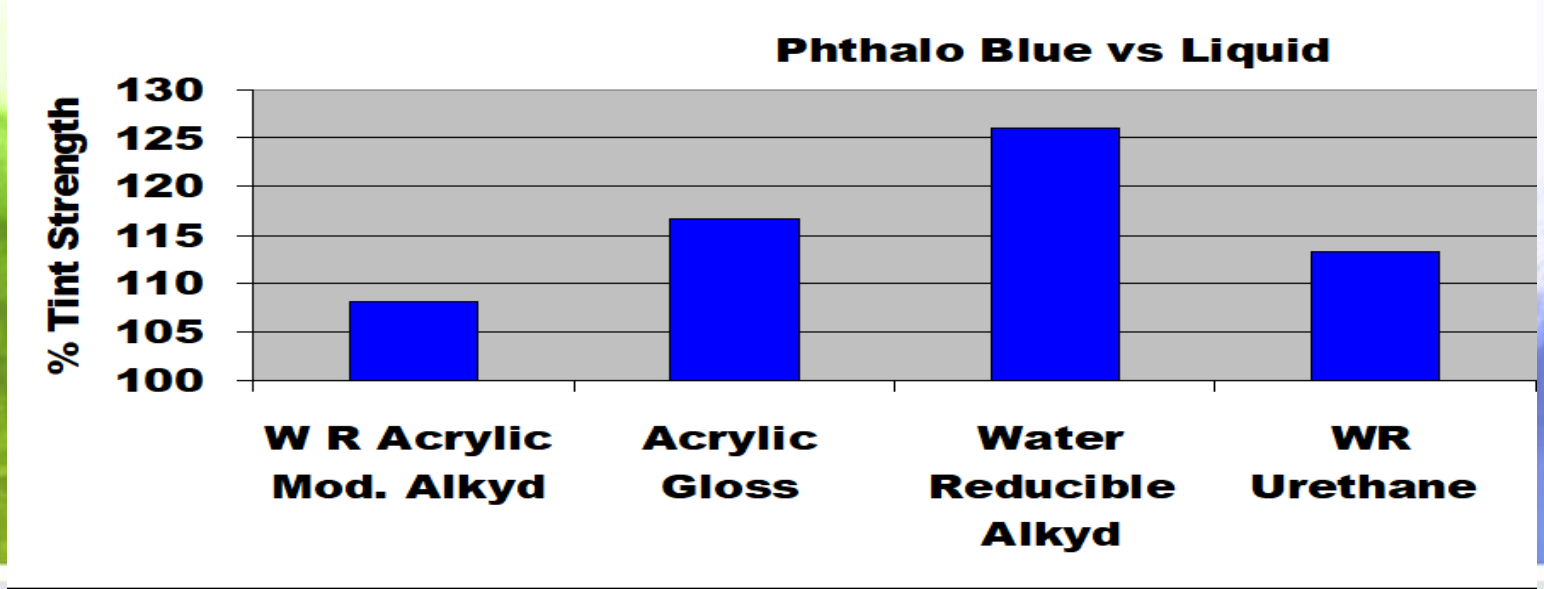
PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Color Acceptance, Color Strength & Stability

## Easy Dispersible Pigment Powder Preparations Color Strength Vs. Liquid

## Stronger Color

Liquid Dispersion is 100% Strength Baseline- Lb. per Lb. of Pigment



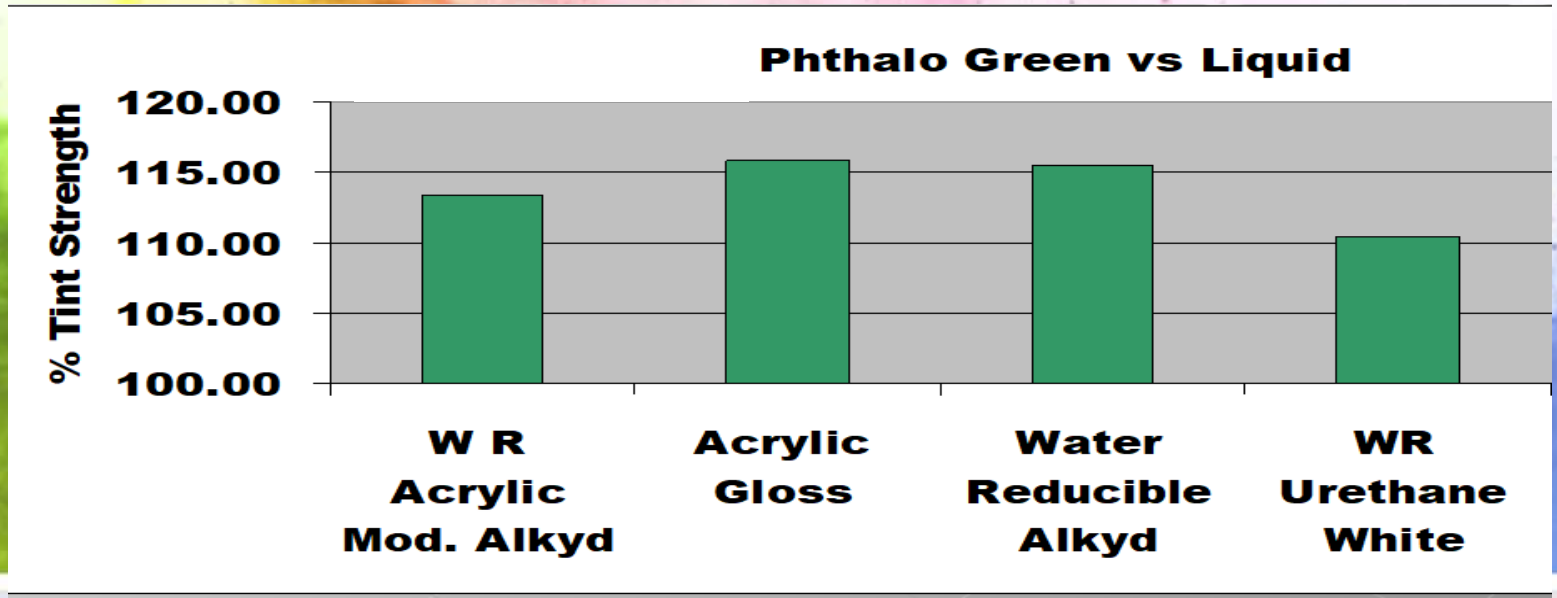
PAN®
TECHNOLOGY ISO 9001:2015 CERTIFIED

# Color Acceptance, Color Strength & Stability

## Easy Dispersible Pigment Powder Preparations Color Strength Vs. Liquid

## Stronger Color

Liquid Dispersion is 100% Strength Baseline- Lb. per Lb. of Pigment



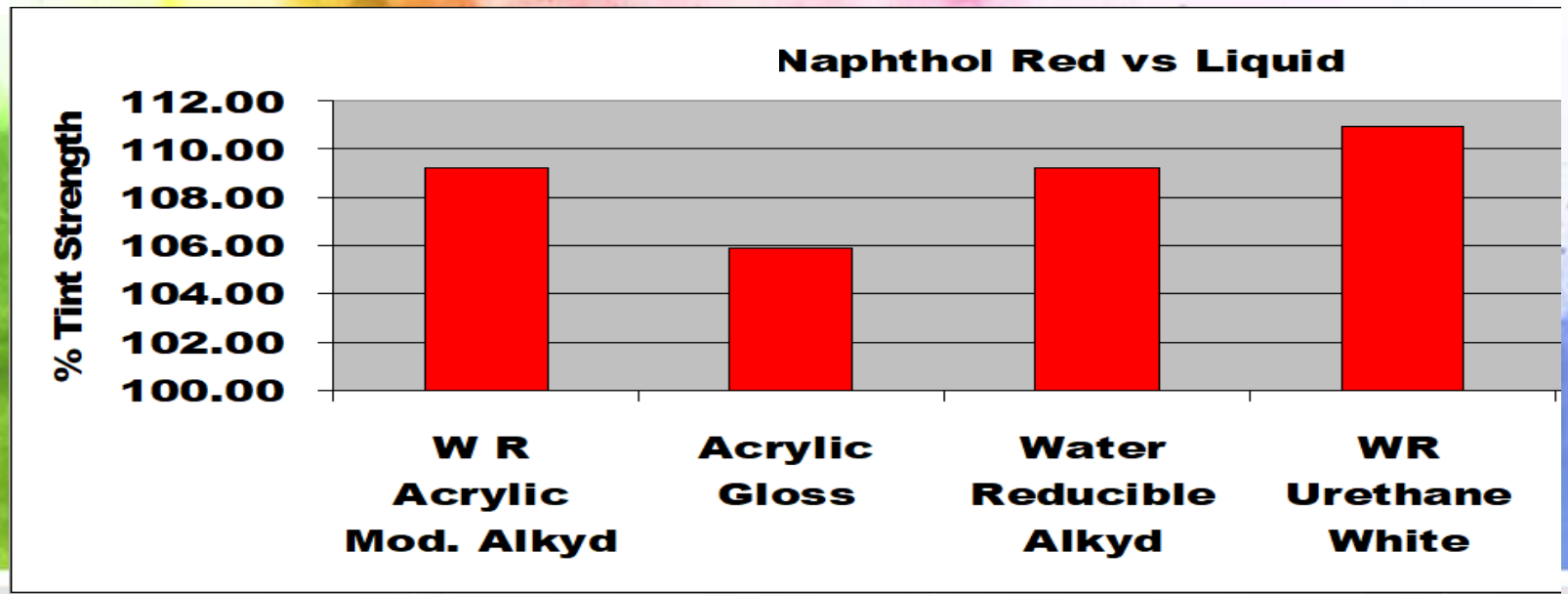
PAN®
TECHNOLOGY ISO 9001:2015 CERTIFIED

# Color Acceptance, Color Strength & Stability

## Easy Dispersible Pigment Powder Preparations Color Strength Vs. Liquid

## Stronger Color

Liquid Dispersion is 100% Strength Baseline- Lb. per Lb. of Pigment



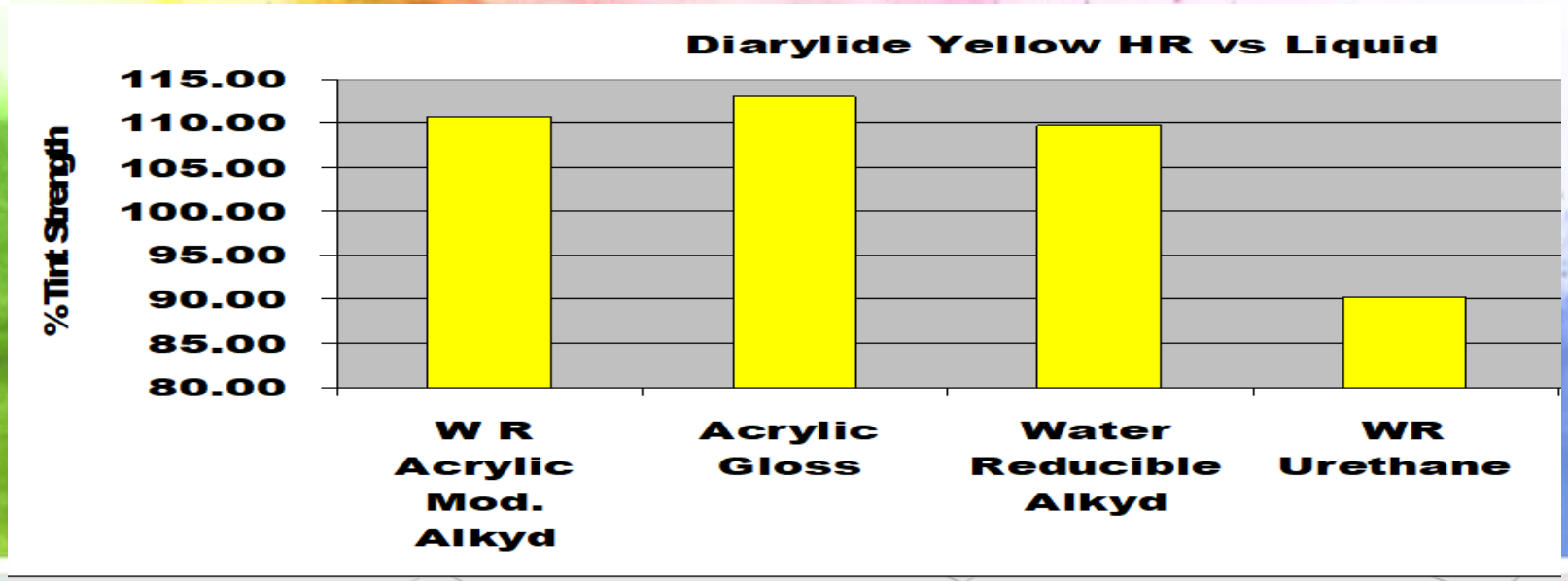
PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Color Acceptance, Color Strength & Stability

## Easy Dispersible Pigment Powder Preparations Color Strength Vs. Liquid

## Stronger Color

Liquid Dispersion is 100% Strength Baseline- Lb. per Lb. of Pigment



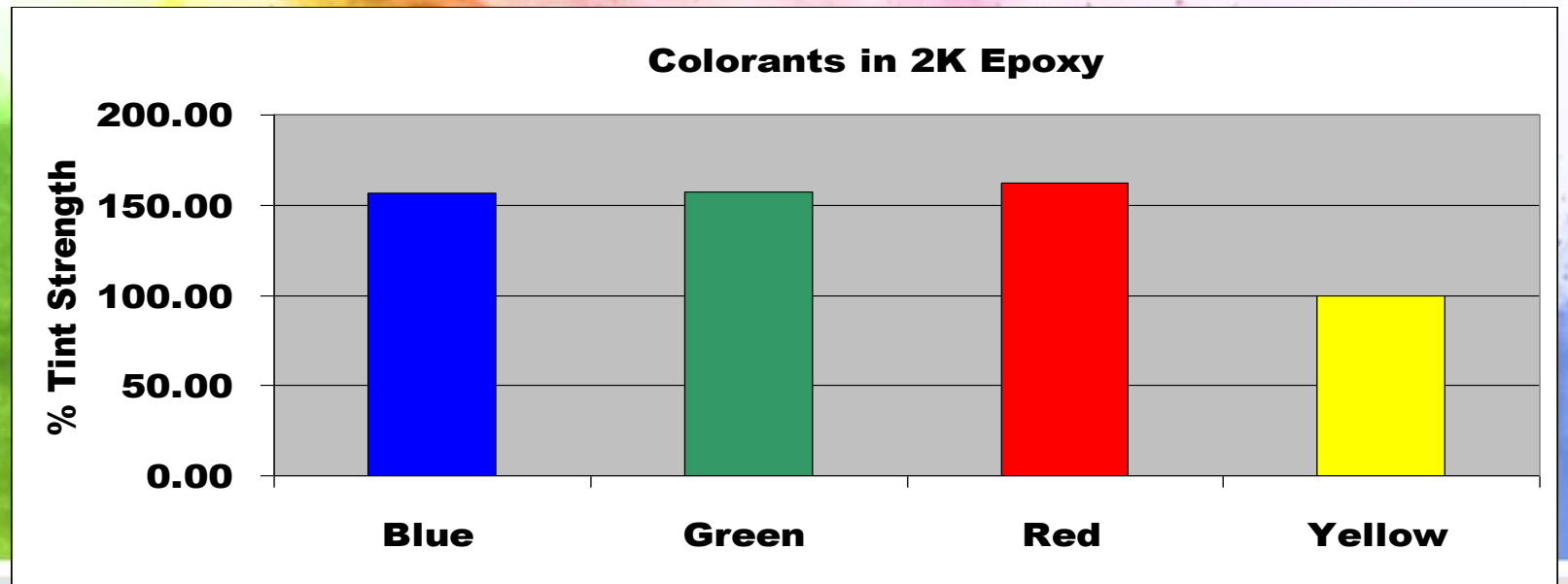
PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Color Acceptance, Color Strength & Stability

## Easy Dispersible Pigment Powder Preparations Color Strength Vs. Liquid

## Stronger Color

Liquid Dispersion is 100% Strength Baseline- Lb. per Lb. of Pigment



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

# Transparency

Transparent Red Oxide for Water-Based Applications

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

# Transparency

Transparent Red Oxide for Water-Based Applications

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

# Transparency

Transparent Yellow Oxide for Water-Based Applications

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations

# Transparency

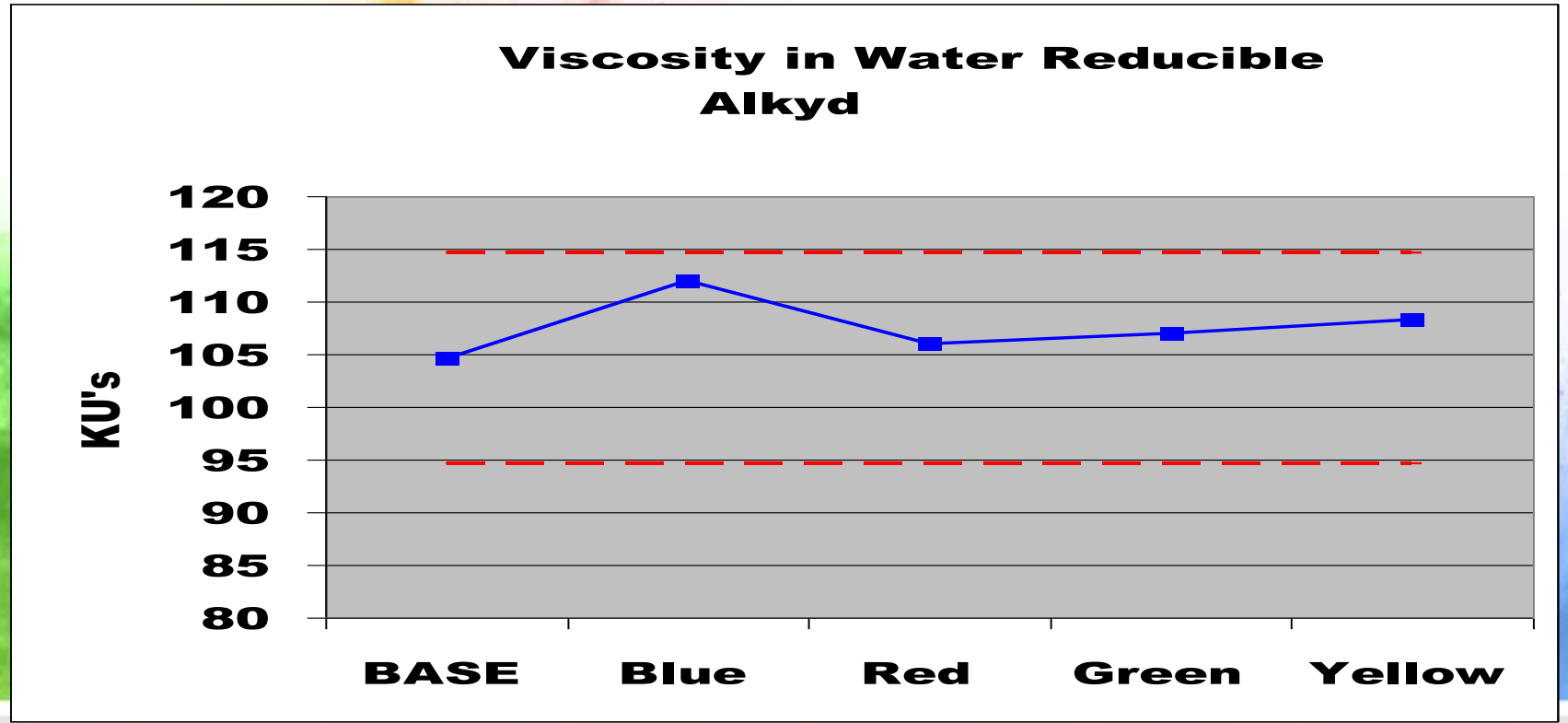
Transparent Yellow Oxide for Water-Based Applications

EDPPP vs. Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Affect on Viscosity

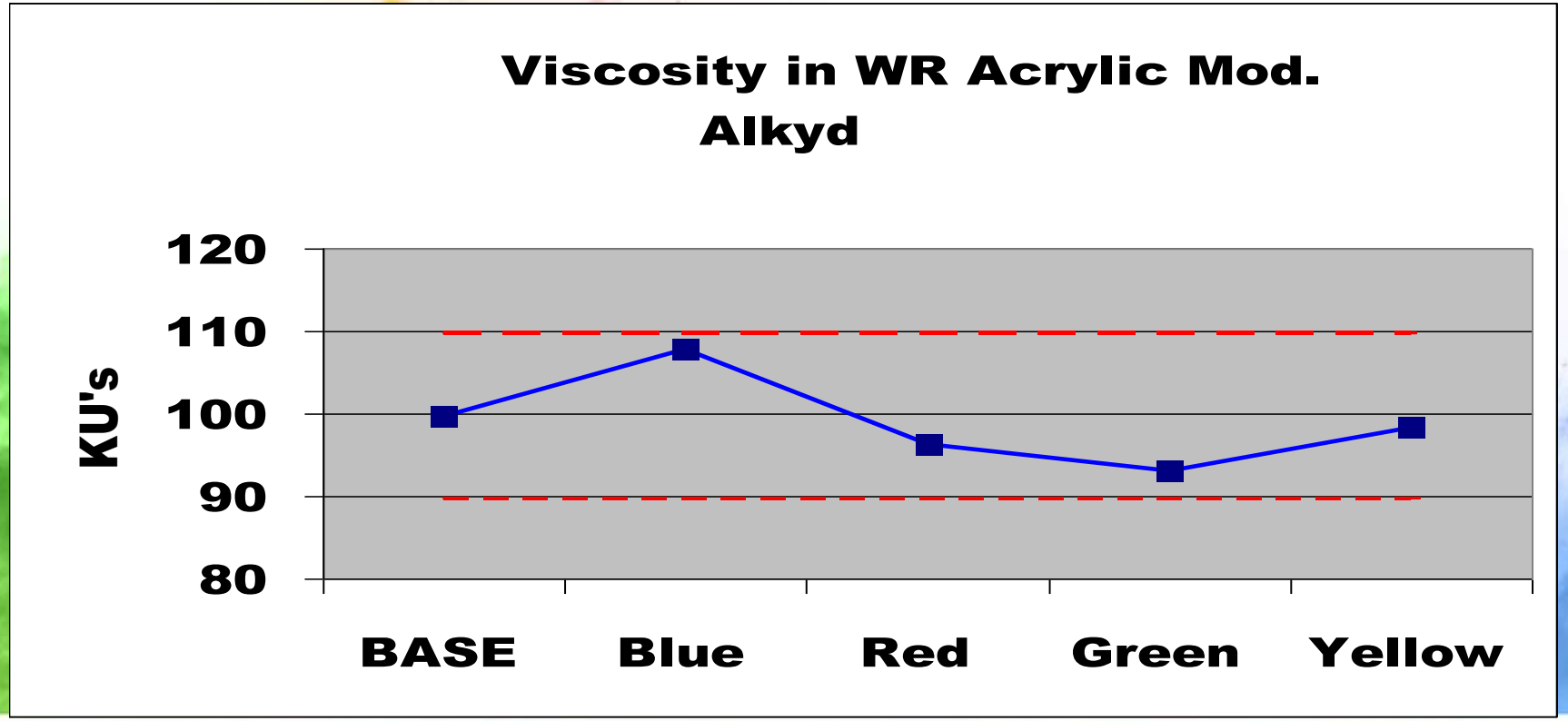
## Easy Dispersible Pigment Powder Preparations



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Affect on Viscosity

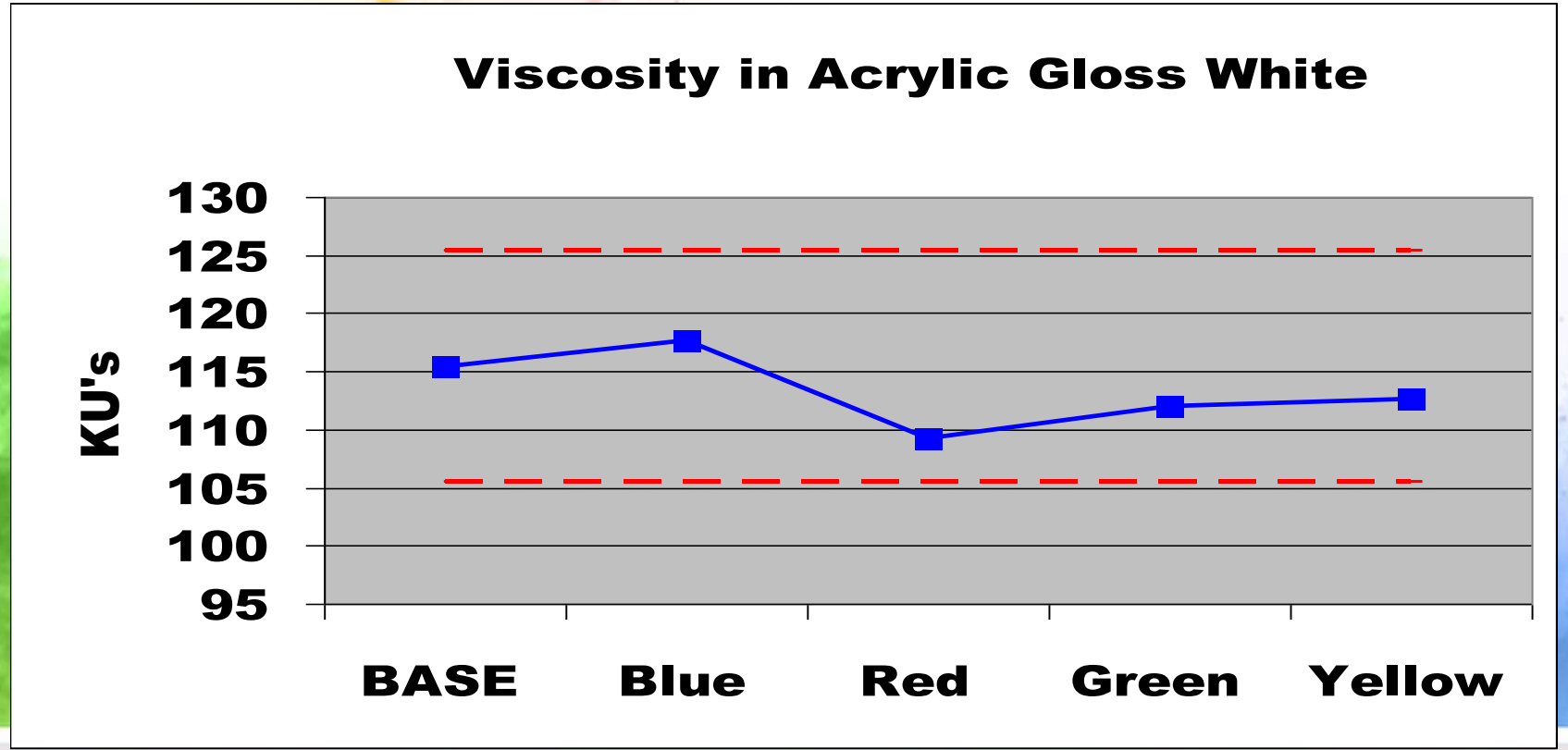
## Easy Dispersible Pigment Powder Preparations



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Affect on Viscosity

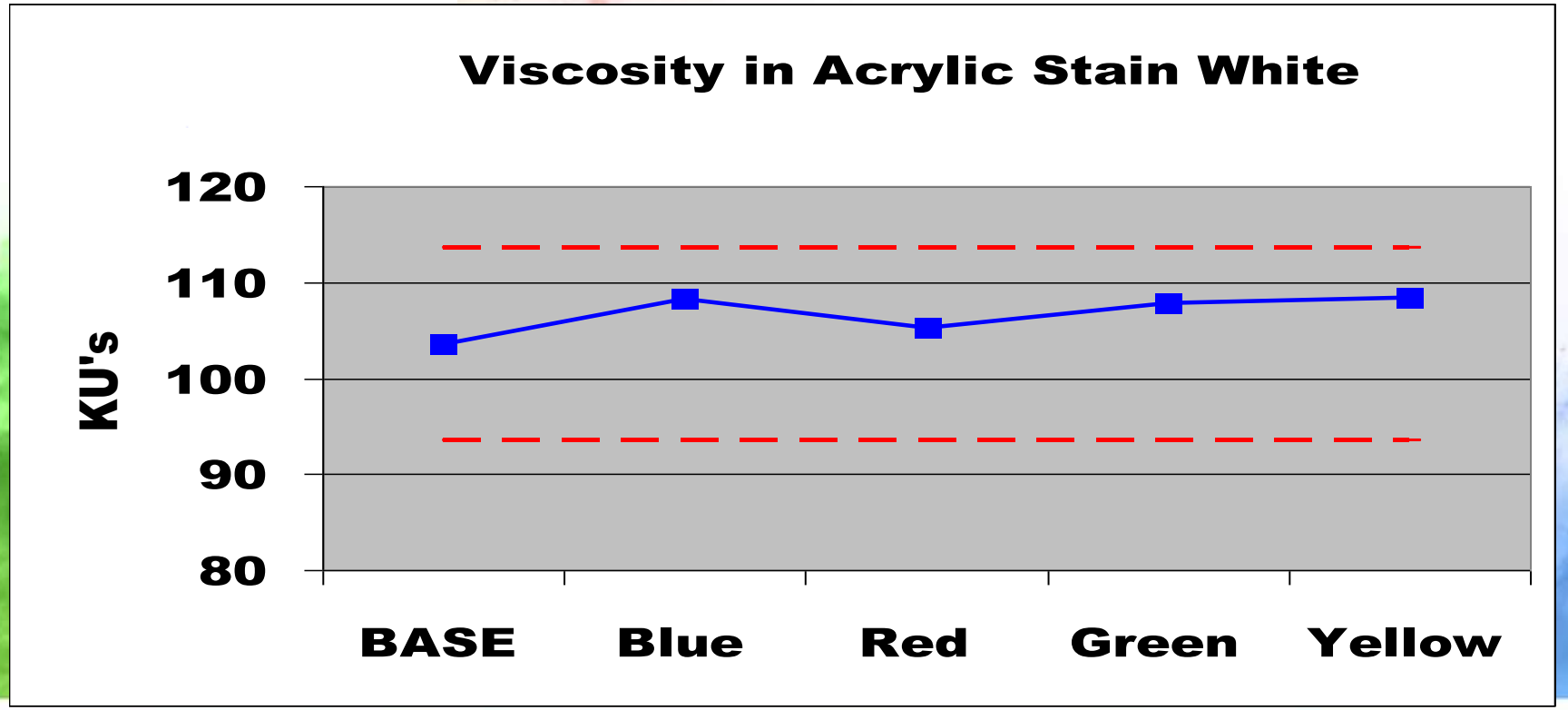
## Easy Dispersible Pigment Powder Preparations



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Affect on Viscosity

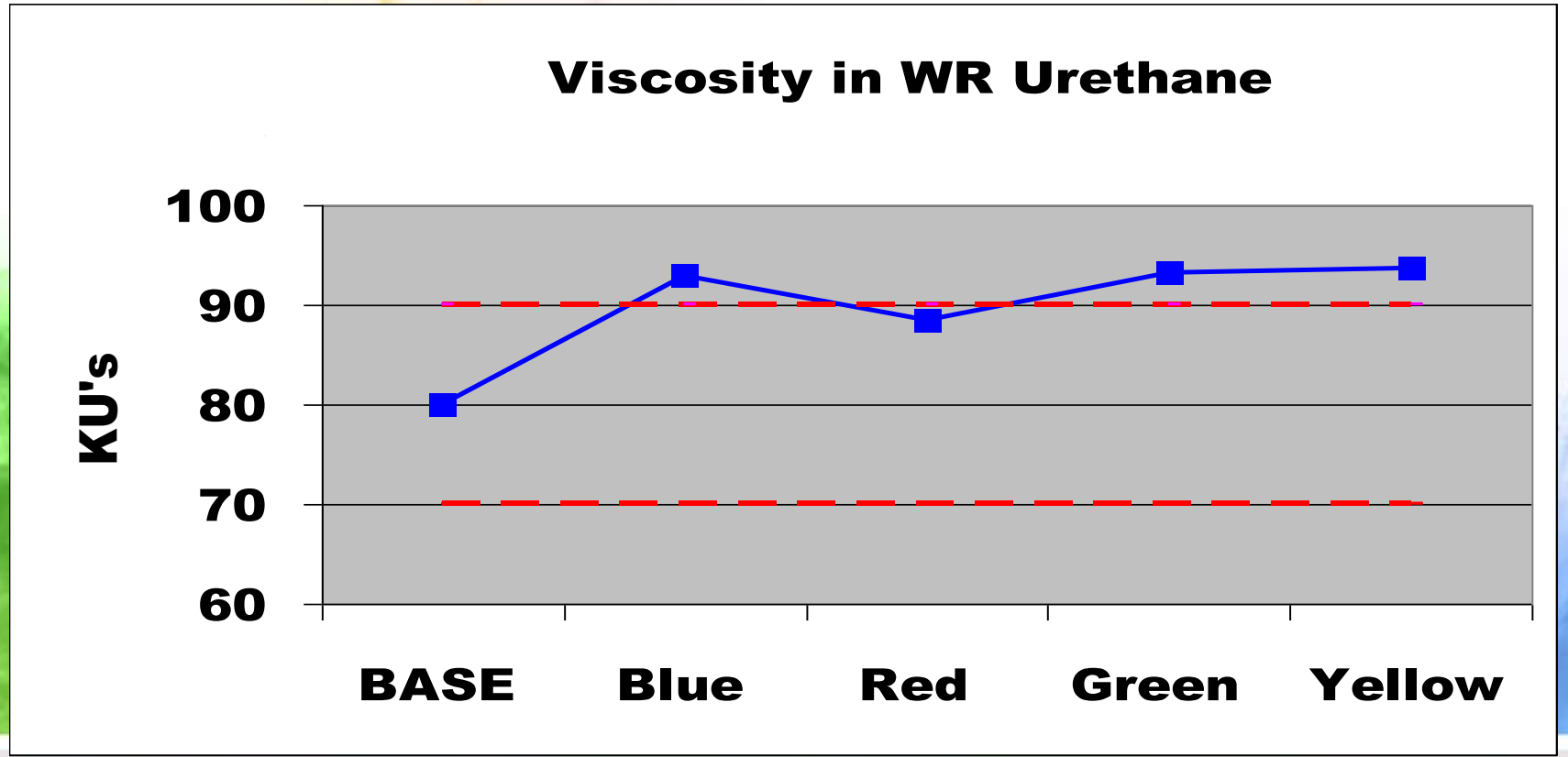
## Easy Dispersible Pigment Powder Preparations



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Affect on Viscosity

## Easy Dispersible Pigment Powder Preparations

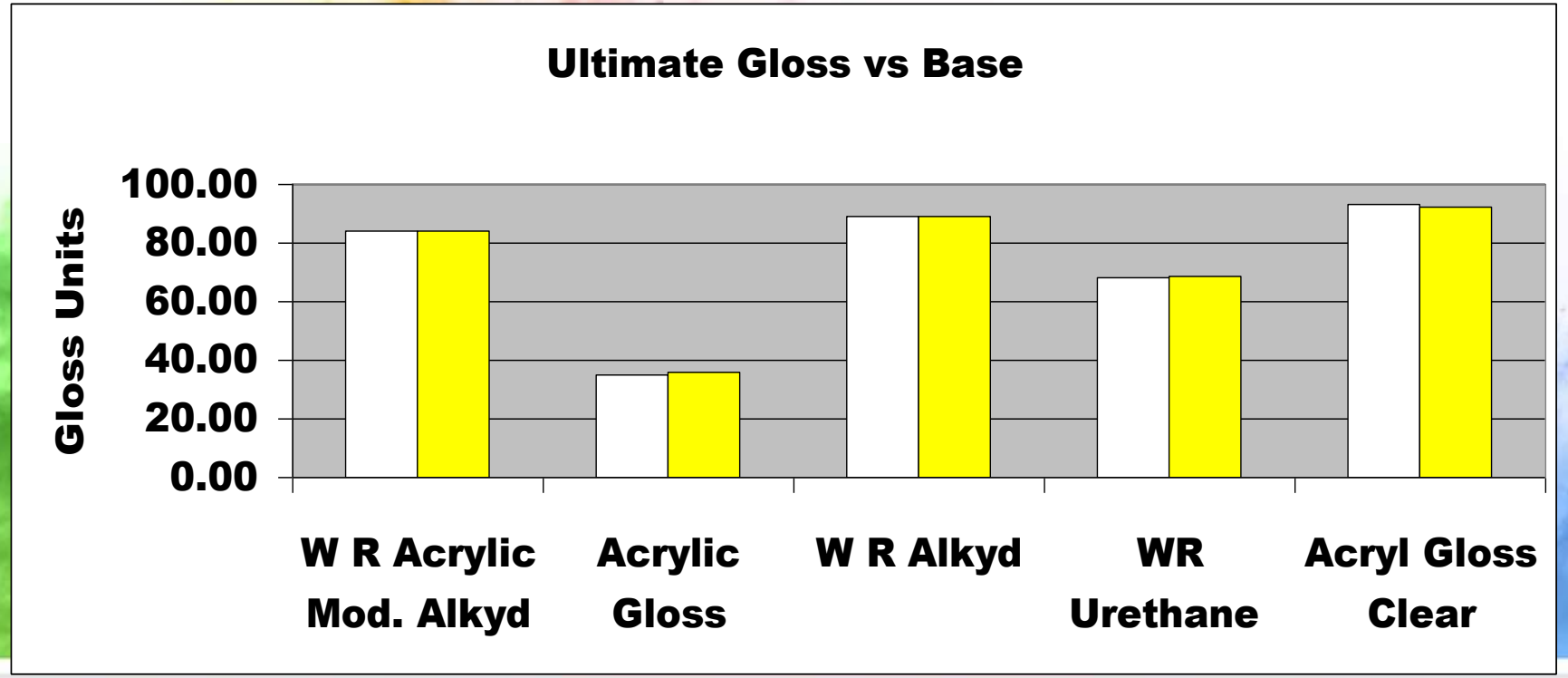


PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Gloss Retention

## Easy Dispersible Pigment Powder Preparations

= Base Gloss



PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Able to Reach High Pigment Loading Where Demanded

## Equal Parts Easy Dispersible Pigment Powder Preparations to Liquid Dispersion- Much Deeper Color with Less Effect on Coatings Property

5.8/100 EDPPP vs. 5.8/100 Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Able to Reach High Pigment Loading Where Demanded

## Equal Parts Easy Dispersible Pigment Powder Preparations to Liquid Dispersion- Much Deeper Color with Less Effect on Coatings Property

5.8/100 EDPPP vs. 5.8/100 Liquid Dispersion

PAN®
TECHNOLOGY ISO 9001:2015 CERTIFIED

# Able to Reach High Pigment Loading Where Demanded

## Equal Parts Easy Dispersible Pigment Powder Preparations to Liquid Dispersion- Much Deeper Color with Less Effect on Coatings Property

5.8/100 EDPPP vs. 5.8/100 Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Able to Reach High Pigment Loading Where Demanded

## Equal Parts Easy Dispersible Pigment Powder Preparations to Liquid Dispersion- Much Deeper Color with Less Effect on Coatings Property

5.8/100 EDPPP vs. 5.8/100 Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Able to Reach High Pigment Loading Where Demanded

## Equal Parts Easy Dispersible Pigment Powder Preparations to Liquid Dispersion- Much Deeper Color with Less Effect on Coatings Property

5.8/100 EDPPP vs. 5.8/100 Liquid Dispersion

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations Advantages

- Stronger Color vs. Liquid Dispersions
- No Effect on Gloss
- Superior Transparency
- Excellent Water Resistance
- Durability
- Stable Rheology

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations Advantages

- Lower Energy Usage Reducing Manufacturing Cost
- Less Manpower Required Reducing Cost
- No Expensive Media Needed
- Reduction of Carbon Foot Print
- Waste Water Reduction- Less Cleaning
- TIME
- More Streamlined Viscosity Profile
- No Drying or Skinning of Product, Extremely Long Shelf Life
- Able to Reach High Pigment Loading where Demanded

PAN®
TECHNOLOGY ISO 9001:2015 CERTIFIED

# Easy Dispersible Pigment Powder Preparations Advantages

- No Loss of Material in Grinding Apparatus- Mill, Pumps, Hoses
- No Chance of Cross Contamination
- No Blown Batches
- Consistency of Color- With Milling All of These Affect the Tint Strength- Media Loading, Temperature, Mill Pressure, Pre-mix, Milling Speed- There is A Lot That Can go Wrong When Milling
- You Can Blend 2 or 3 EDPPP's- If you where making a Liquid Dispersion you would need to make 2 or 3 Dispersions as Co-Grinding Usually Leads to Inconsistent Results

PAN®
TECHNOLOGY
ISO 9001:2015 CERTIFIED

# Thank You!

**Thanks To Regi Williams, Chevon Brown, Victor Munoz, Dan Coleman, and Ken Caldwell who made this presentation possible.**

**Pan Technology**
**117 Moonachie Ave.**
**Carlstadt, NJ 07072**
**201-438-7878 ext. 7140**
**David White**
**VP Technical Services**