

King Industries, Inc.

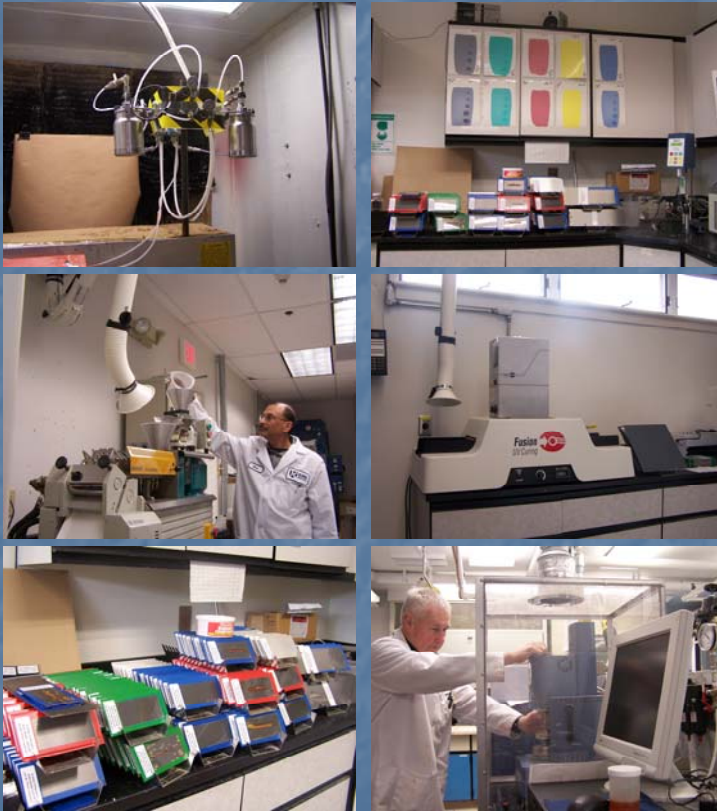
Coatings Additives Division
*Innovative Products Backed
By Inventive People*



Coatings Technical Service Capabilities



Coatings Technical Service



- Coatings...All Types
 - Solvent Born
 - Waterborne
 - High Solids
 - Powder
 - UV
- Adhesives
- Inks
- Sealants

Laboratory Test Capabilities

Film Hardness...

Pencil
Hardness

ASTM D 3363



| FILM PROPERTIES | | | |
|--------------------------------|--------------|--------------|-------------|
| | K-CURE® 1040 | NACURE® 5076 | NACURE 1051 |
| Cure Schedule: 5'/93°C (200°F) | | | |
| Catalyst Level, % on TRS | 3.2 | 4.2 | 3.6 |
| Pencil Hardness | 2H-3H | H-2H | H-2H |

Pendulum
Hardness

ASTM D 4366



| APPLICATION CONDITIONS AND TEST RESULTS | | | | |
|---|-----------------------------|-------------|-------------|-------------------------|
| Cure conditions: | 6 minutes at 400 °F (204°C) | | | |
| Substrate: | Tin free plate | | | |
| Dry film thickness: | 0.15 mil | | | |
| Catalyst addition: | Based on resin solid | | | |
| Catalyst | Catalyst % | Gloss 20° % | Gloss 60° % | Pendulum hardness (sec) |
| No catalyst | 0 | 55 | 95 | 141 |
| NACURE XC-9206 | 0.25 | 95 | 100 | 187 |
| NACURE XC-9206 | 0.5 | 95 | 100 | 194 |
| NACURE XC-9206 | 1.0 | 95 | 100 | 193 |
| NACURE XC-9206 | 1.5 | 95 | 100 | 193 |
| NACURE XC-9206 | 2.0 | 95 | 100 | 203 |
| 2-Ethylimidazole | 0.5 | 95 | 100 | 191 |
| Amine ADMA-10 | 0.5 | 95 | 100 | 190 |
| Phosphonium salt* | 0.5 | 95 | 100 | 187 |

* ETPI is an ethyl triphenyl phosphonium iodide catalyst.

Laboratory Test Capabilities

Film Hardness...

MEK Rubs
ASTM D 5402



| TEST RESULTS | | | | | | | |
|---------------------------------|-------------------|--------------------|-------------------|--------------|-------------------|------------------|--|
| 30 Minutes Gradient Cure | | NO CATALYST | | DBTDL | | K-KAT 348 | |
| Temperature, °C | Pendulum Hardness | MEK 2X Rubs | Pendulum Hardness | MEK 2X Rubs | Pendulum Hardness | MEK 2X Rubs | |
| 104 | 21 | 3 | 41 | 5 | 43 | 5 | |
| 116 | 36 | 5 | 73 | 20 | 73 | 20 | |
| 127 | 49 | 10 | 115 | 41 | 122 | 62 | |
| 138 | 82 | 15 | 132 | 100+ | 131 | 100+ | |

Laboratory Test Capabilities Resistance Properties...

Impact
Resistance
ASTM D 2794



| FILM PROPERTIES | | | |
|--------------------------------|--------------|--------------|-------------|
| | K-CURE® 1040 | NACURE® 5076 | NACURE 1051 |
| Cure Schedule: 5'/93°C (200°F) | | | |
| Catalyst Level, % on TRS | 3.2 | 4.2 | 3.6 |
| Pencil Hardness | 2H-3H | H-2H | H-2H |
| MEK rubs (2X) | 100 | 90 | 100 |
| Impact Resistance (in. lbs.) | | | |
| Direct | <80 | >80 | >80 |
| Reverse | 50-60 | >80 | >80 |

Taber Abrasion
Resistance
ASTM D 4060



| FILM PROPERTIES | CONTROL | K-FLEX 188 Modified |
|--|---------|---------------------|
| Taber Abrasion Resistance (mg weight loss) | 109.4 | 78.2 |

Laboratory Test Capabilities

Resistance Properties...

Crockmeter
ASTM D 6279



| FILM RESISTANCE PROPERTIES | K-FLEX XM-332 | |
|---|---------------|-----------|
| Forward/Reverse Impact, in. lbs.@ RT | 40/5 | 160+/160+ |
| Forward/Reverse Impact, in. lbs.@ -20° C | 30/5 | 160+/160+ |
| Abrasion Resistance Crockmeter, ASTM D 6279 (Scale 1 =10, 1 = Best) | 8 | 4 |

Laboratory Test Capabilities

Adhesion Properties...

Crosshatch
Adhesion

ASTM D 3359

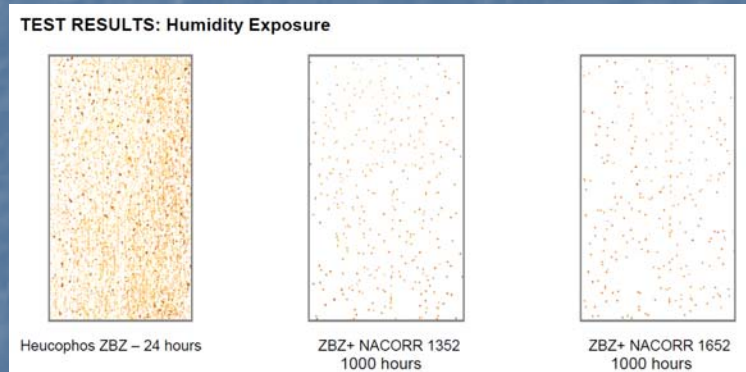


| CLEARCOAT, 27.9 μ(1.1 mils) | BARE STEEL | | BONDERITE¹⁰ 1000 | |
|---|-------------------------------|-------------------------------|------------------------------------|-------------------------------|
| FILM PROPERTIES (1 Week Air Dry) | DESMOPHEN R-221-75 | K-FLEX[®] 188 | DESMOPHEN R-221-75 | K-FLEX[®] 188 |
| Taped Crosshatch Adhesion, % | 33 | 95 | 100 | 100 |

Laboratory Test Capabilities Rust & Corrosion...

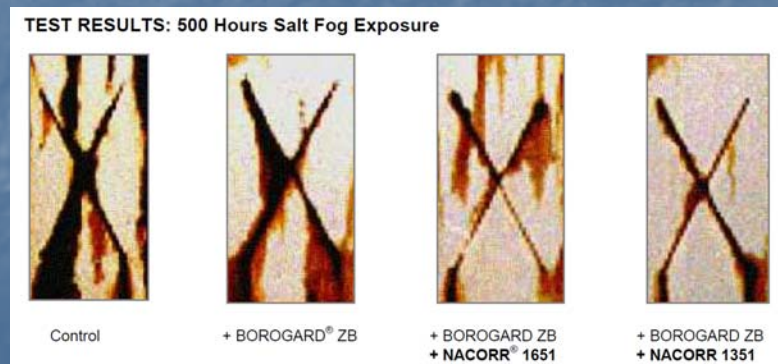
Humidity
Cabinet

ASTM D 2247



Salt Fog

ASTM B 117



Laboratory Test Capabilities

QUV/Gloss...

QUV Gloss
ASTM D 4587



| FILM PROPERTIES | A | B | C |
|-----------------------|---------|----------|----------|
| Epoxy/Polyol/Melamine | 75/0/25 | 60/10/30 | 45/20/35 |
| QUV, 60°Gloss | | | |
| 600 hrs. | 25 | 55 | 95 |
| 1000 hrs. | 15 | 42 | 92 |

Laboratory Test Capabilities Gloss...

Gloss

ASTM D 523



| FILM PROPERTIES (No Catalyst) | A | B |
|-------------------------------|---------|----------|
| Acrylic/Polyol/Melamine | 80/-/20 | 60/10/30 |
| 60° Gloss, % Reflectance | 95 | 97 |

Laboratory Test Capabilities

Color...Yellowing Index

Color

ASTM D 1535

Yellowness Index b^*



TEST RESULTS: Film Properties at 120° C cure – Iron Phosphated Steel

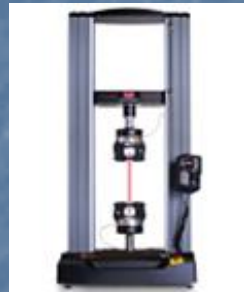
| Dispersant | Dispersant | Dispersant | Dispersant B | K-SPERSE® |
|----------------------|------------|------------|--------------|--------------------|
| **synergist required | A-1** | A-2** | | XD-A503 |
| b^* | -0.15 | 0.18 | -0.14 | -0.55 |

Laboratory Test Capabilities

Tension...Tensile Strength

Instron

ASTM D 412

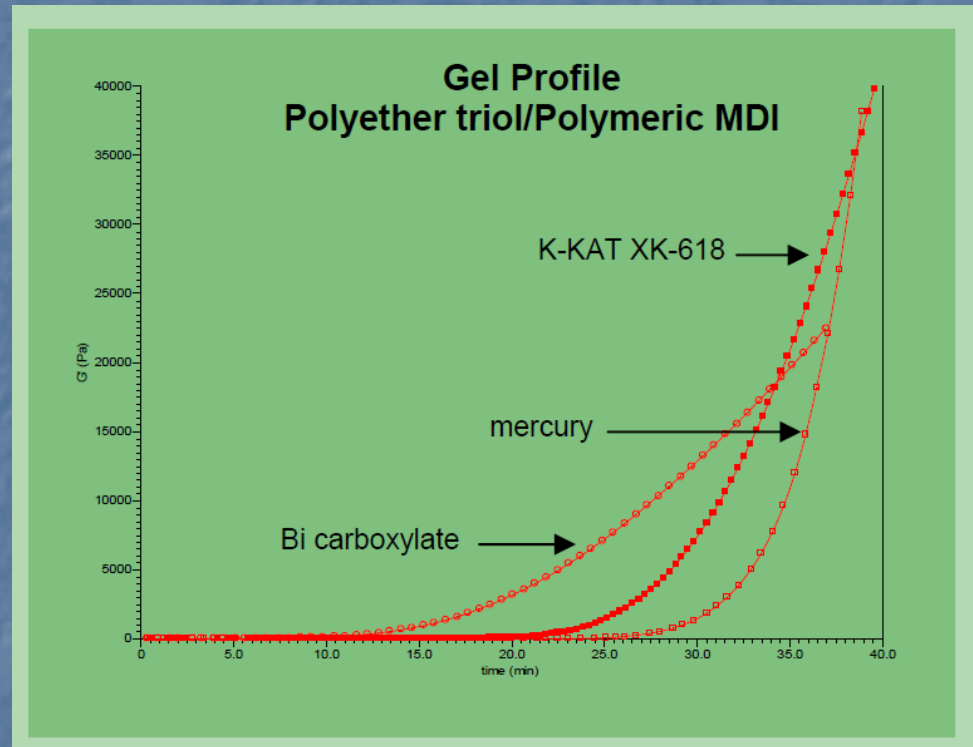


| Mechanical Properties | ASTM Method | K-FLEX 199 | K-FLEX A007 | K-FLEX A008 | K-FLEX XM-010 | K-FLEX XM-002 | K-FLEX XM-237 | PPG 400 | DEG Adipate | Tone™ 0201 |
|------------------------|-------------|------------|-------------|-------------|---------------|---------------|---------------|---------|-------------|------------|
| Tensile Strength*, psi | D 412 | 3,093 | 786 | 2,108 | 1,274 | 778 | 4,236 | 658 | 856 | 638 |
| Strain*, % | D 412 | 137 | 83 | 134 | 123 | 50 | 94 | 60 | 59 | 30 |

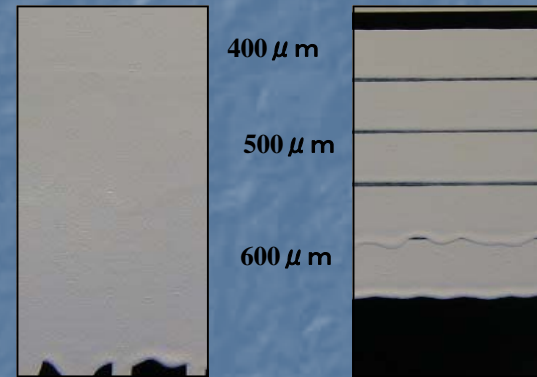
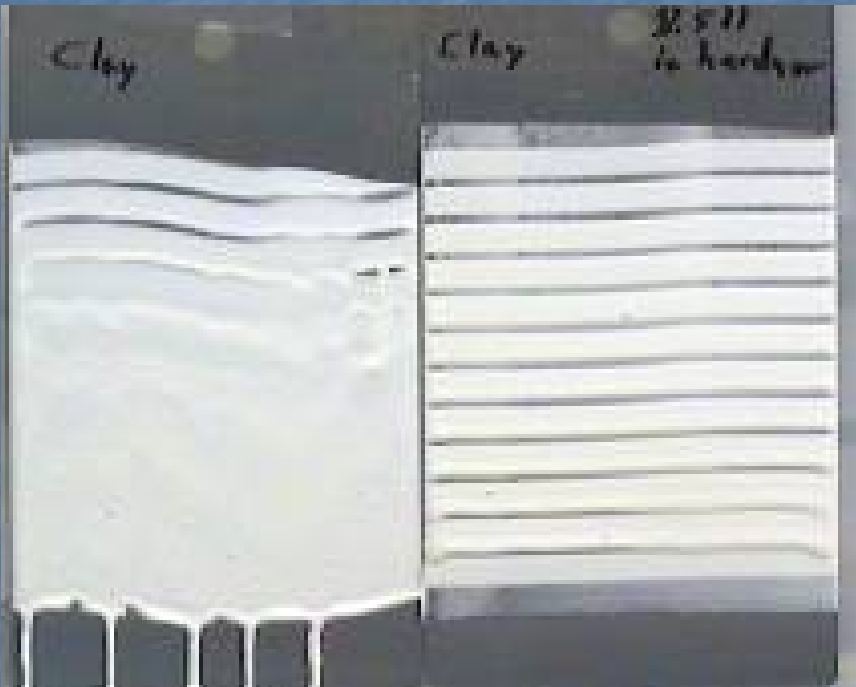
Rheometer



Gel Profiles



Drawdowns - Sag Charts



Additional Tests

- Stain Resistance
- Gasoline Resistance
- Detergent Resistance
- Water Soak Test
- Knoop/Tukon Hardness
- Lap Shear Strength
- Mandrel Bend
- Florida Exposure
- Bayshore Resistance