

Coatings Technical Service Capabilities

Coatings Additives Division

Solutions for Coatings, Inks, Adhesives, Sealants, and more

King Industries Products for Coatings	
NACURE[®], K-CURE[®]	Acid Catalysts for Amino-Crosslinked Systems
K-PURE[®]	Catalysts, Resins and Additives for Electronics
K-KAT[®]	Tin-Free Catalysts for Urethane and Silane Systems
K-FLEX[®] & K-POL[®]	Specialty Resins & Resin Modifiers
NACORR[®]	Corrosion Inhibitors
K-STAY[®]	Rheology Modifiers
K-SPERSE[®]	Dispersants
DISPARLON[®]	Rheology Modifiers and Surface Control Additives
DEOLINK[®] & DEOGRIP[®]	Silanes & Soft Feel Additives

Coatings Additives Division

Technical Service & Development

- Assist customers with application and formulating needs.
- Develop new products based on the needs of the customers.

Research & Development

- Develop innovative new products and chemistries for CASE and Foam markets.

Coatings Technical Service & Development

Laboratory Test Capabilities

Film Hardness



Pencil Hardness
ASTM D 3363



Pendulum Hardness
ASTM D 4366



Bayshore Hardness

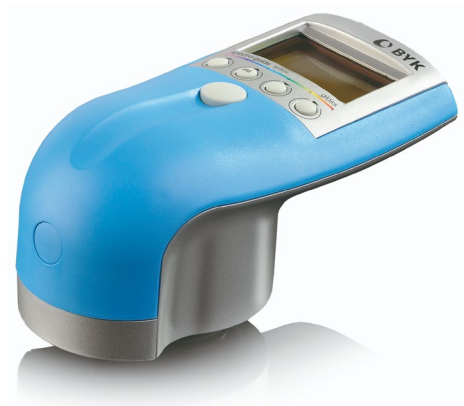
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Laboratory Test Capabilities

Gloss, Color, and Clarity



Gloss
ASTM D 523



Color



Clarity

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Laboratory Test Capabilities

Degree of Cure



MEK Resistance
ASTM D 5402

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Laboratory Test Capabilities

Adhesion



Crosshatch Adhesion
ASTM D 3359

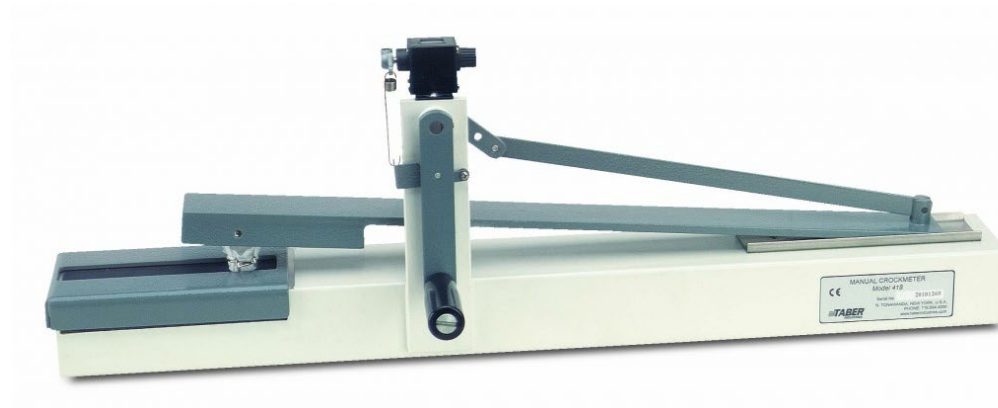
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Abrasion Resistance



Taber Abrasion
ASTM D 4060



Crockmeter
ASTM D 6279

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Tensile Strength



Instron
ASTM D 412

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Exposure Testing
Corrosion



Humidity Chamber



Salt Fog Chamber

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Exposure Testing
UV-Durability



QUV



Xenon Arc



Florida Exposure

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Flexibility



Impact Resistance
ASTM D 2794



Mandrel Bend
ASTM D 522/ D 522M



GE Elongation

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Degree of Dryness



Erichsen Drying Time
Tester

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Viscosity



Brookfield Viscometers



Rheometers

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Rheometer Evaluations

Liquids Testing

- Viscosity
- Shear-Thinning Curves
- Hysteresis Loops
- Structure Recovery
- Cure Profiles
- Sol-Gel Transition

Solids Testing

- Modulus
- Residual Cure
- Glass Transition
- Decomposition
- Elongation

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Drawdowns



Sag Charts

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Analytical Tools



**Differential Scanning
Calorimeter**



**Thermogravimetric
Analyzer**

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Surface Appearance and
Finish Assessment



Wavescan

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Coil Coatings



NACURE® CATALYSTS FORMULATION PM-11



LTC COIL COATING CATALYST STUDY

Formulation PM-11 demonstrates advantages using NACURE XC-311 in a coil coating topcoat that requires rapid cure time and lower cure temperatures than typically found in coil coating applications. NACURE XC-311 provides good hardness and solvent resistance using a 25 second bake schedule with peak metal temperatures ranging from 170°C to 200°C. The coating also passes zero T-bend tests and shows higher gloss, better humidity resistance and durability to yellowing and gloss changes on QUV exposure tests in comparison to a neutralized p-TSA catalyst.

MATERIAL	DESCRIPTION	POUNDS
GRIND		
Polymac 220-1935 ¹	Polyester	19.30
Disperbyk 110 ²	Dispersant/Wetting Aid	1.18
<i>Mix, then add</i>		
Ti-Pure R-960 ³	Titanium Dioxide	29.52
<i>Grind to 7+ Hegman</i>		
LETDOWN		
Polymac 220-1935		29.00
Hexamethoxymethylmelamine ⁴	Amino Resin	5.72
Ethyl 3-Ethoxy Propionate (EEP)	Solvent	5.08
Xylene	Solvent	10.00
Byk 310 ²	Flow/Leveling Aid	0.20
TOTAL		100.00

FORMULATION CHARACTERISTICS

Polyester/Melamine (solids)	85:15
Pigment/Binder ratio	0.8:1.0
Resin Solids	37.12%

APPLICATION CONDITIONS	I	II
Substrate	Alodine 1500 treated Aluminum ⁵	Bonderite 1000 CRS ⁵
Cure Schedule	25 seconds/ 200°C PMT	25 seconds/170°C. PMT
		25 seconds/185°C. PMT

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Laboratory Test Capabilities

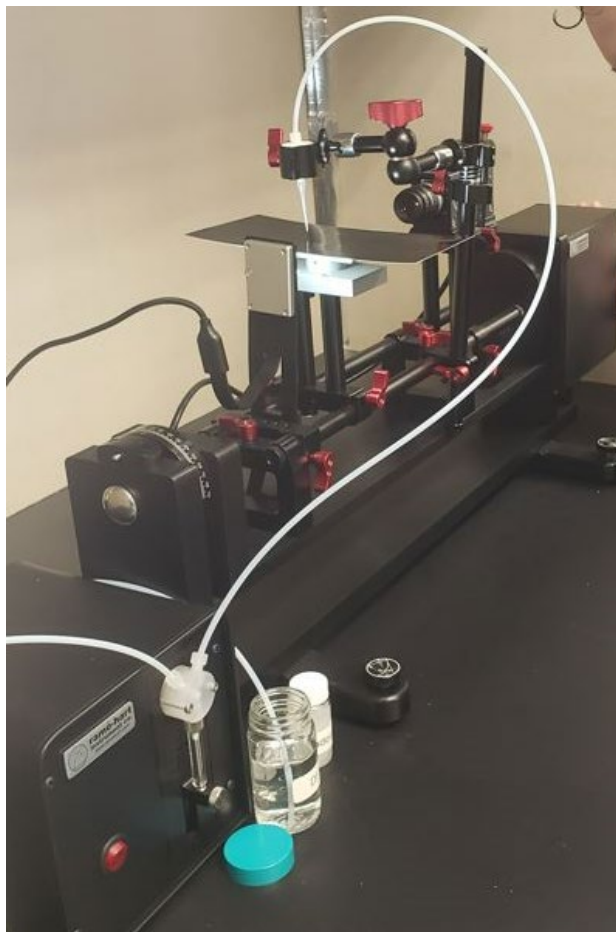


GE Impact Tester ASTM 6905

Measures a coating's elastic and adhesive characteristics using spherical impacts with different radii

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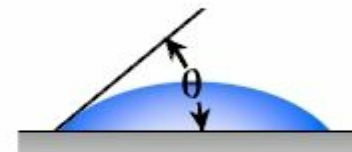
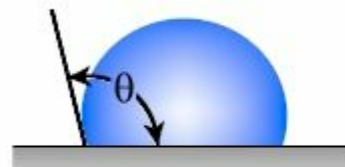


Contact Angle / Goniometer ASTM D7334-08(2022)

Measures contact angle of a droplet to determine the liquid's ability to wet the substrate.

Hydrophobic
Surface

Hydrophilic
Surface



high
poor
poor
low

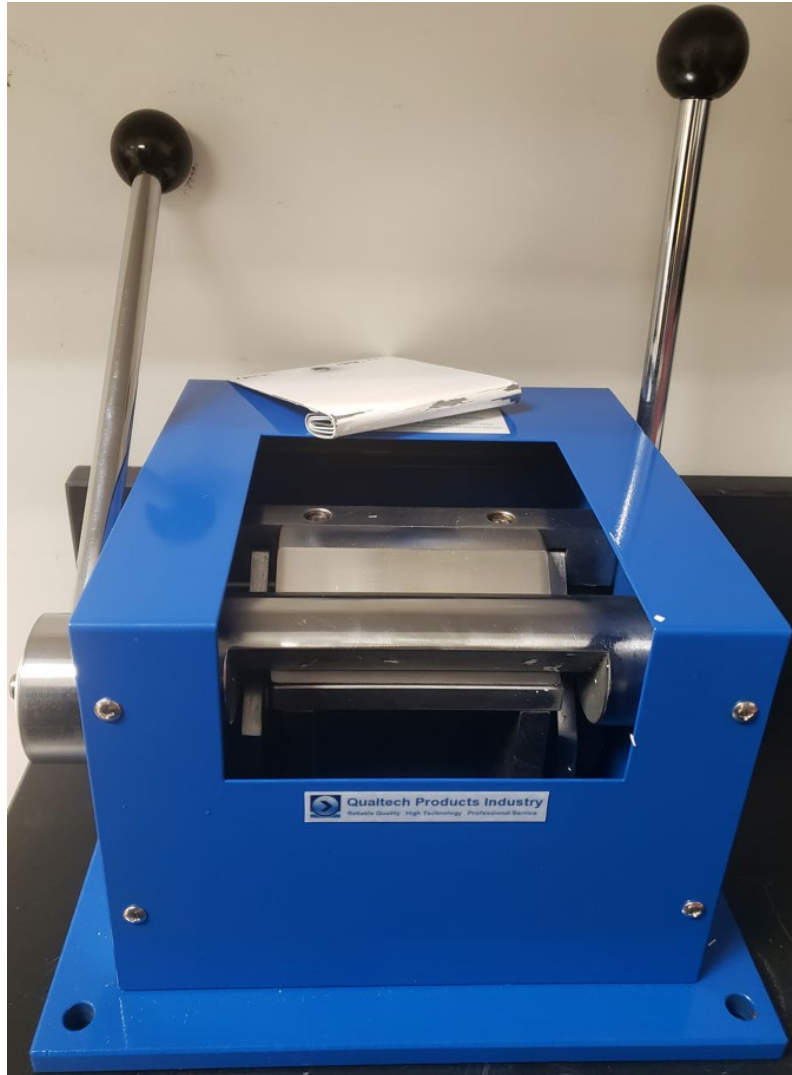
contact angle
adhesiveness
wettability
solid surface free
energy

low
good
good
high

ramé-hart instrument co.

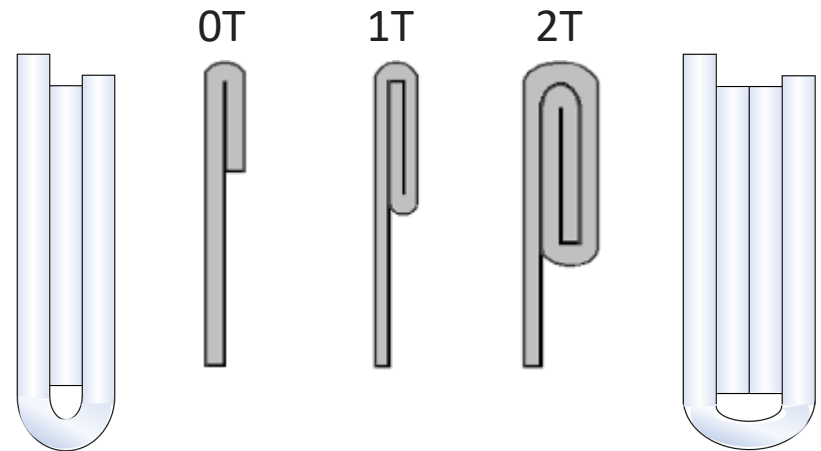
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T-Bend Tester ASTM D4145

Film flexural strength, strain/stress
Film stress/strain is reduced as bends increase



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MEK Tester ASTM D4752

Film solvent resistance, crosslinking

MEK is a small molecule that attacks between molecules of a coating causing under-cured coatings to swell and degrade.

