

# M-PP AUTODEPOSITION 966 COATINGS AND UV CURABLE POWDER COATINGS

Todd Coggins Henkel Corporation

Mike Knoblauch Keyland Polymer UV Powder



# Abstract

Bonderite M-PP 966 coating has achieved high levels of performance on Neutral Salt Spray (NSS) testing and automotive Original Equipment Manufacturer (OEM) cyclic corrosion tests. This epoxy-acrylic urethane coating has excellent thermal stability, topcoatability, edge protection, and flexibility while maintaining a low-cure temperature. Bonderite M-PP 966 when used in combination with Keyland Polymer's UV-cured powder coatings offers the end user high levels of corrosion and finish performance; significant energy, plant footprint and resource savings and increased productivity. This presentation will illustrate and demonstrate the performance attributes of each material and the synergistic process benefits when they are used in combination.

# M-PP Autodeposition 966 Coating

***BONDERITE***

The background features a dynamic, abstract graphic design. A prominent red and grey wave-like shape curves across the middle of the page. Below this, a grid of white lines is visible, with some squares highlighted in grey. The overall aesthetic is modern and technical.

# Engineered Solutions for Automotive Challenges

## Henkel Solutions

Body Sealing & Coating

Assembly Adhesives

Acoustics & Structurals

Engineering Adhesives

Surface Treatment

Cleaners & Lubricants

Powertrain



Chassis



Body In White



HVAC



Electronics

Exterior



Interior

Market Needs

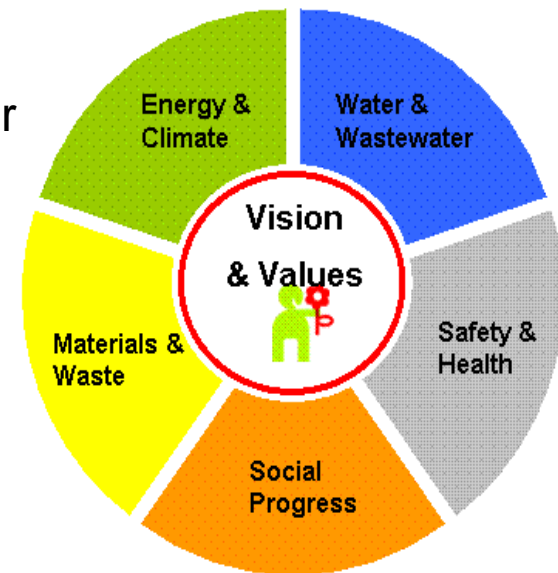
## The BONDERITE® M-PP Process (former AQUENCE)

### Metal Pre-Treatment - Paint Process

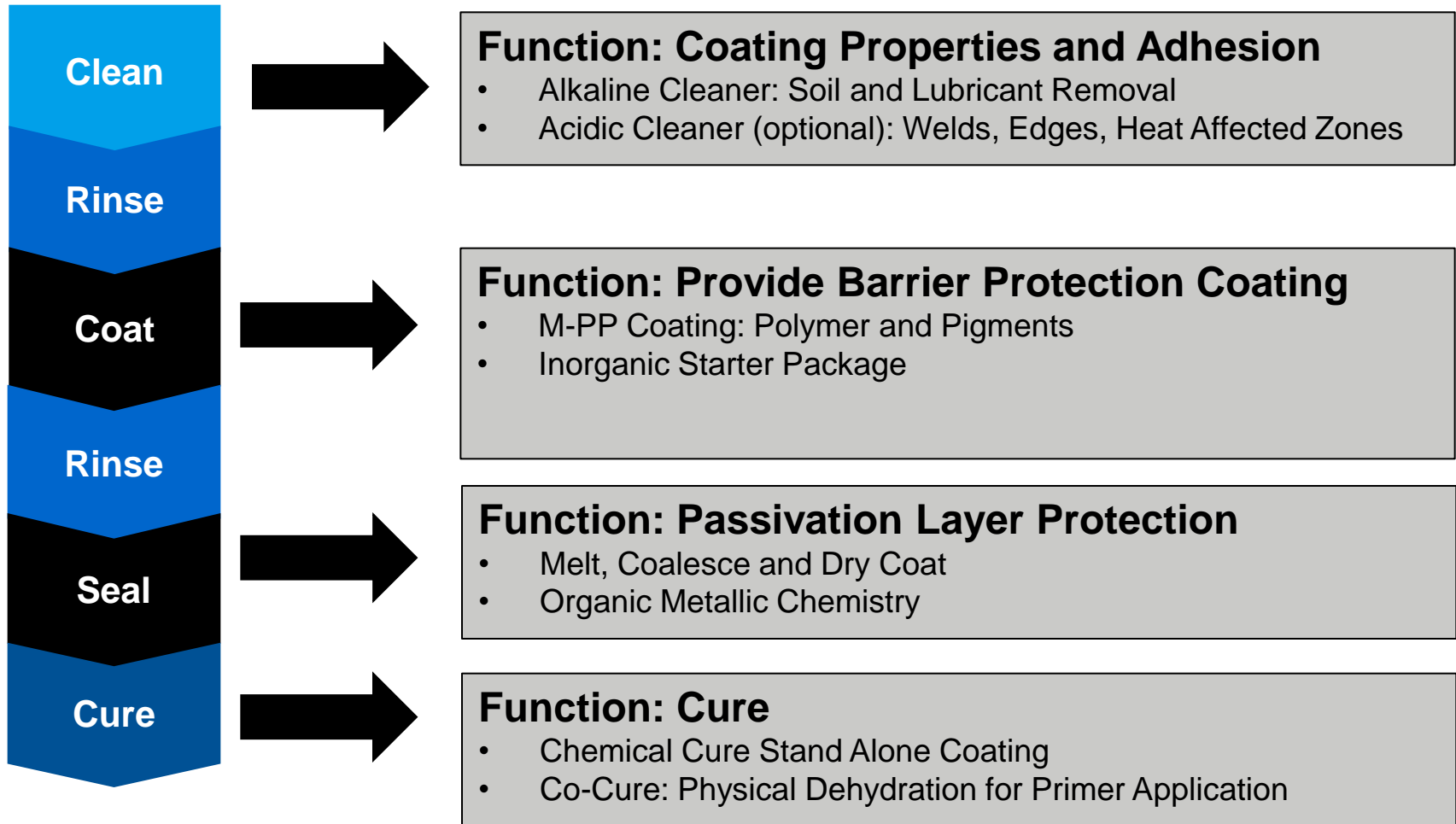
BONDERITE Metal Pre-Treatment Paint Process is a chemical coating used in a process where an organic polymeric emulsion chemically deposits on the surface of a clean metal substrate. BONDERITE Metal Pre-Treatment Paint Process (BONDERITE M-PP) is known as the "simple solution" because it reduces the number and complexity of stages involved in painting parts.

# Bonderite® M-PP 966 Technology

- Bonderite M-PP Coatings are environmentally responsible
- Very Low Volatile Organic Compounds (VOC) and eliminates hazardous air pollutants (HAPs)
- Alkyl Phenol Ethoxylates (APE) free
- Compliant to various regulatory directives or registrations: RoHS, ELV and WEEE
- No toxic heavy metals as supplied
- Significant process improvements
- Decreased energy consumption
- Simplify wastewater treatment and disposal
- Smaller equipment footprint



# Bonderite<sup>®</sup> M-PP 966 Process Functions

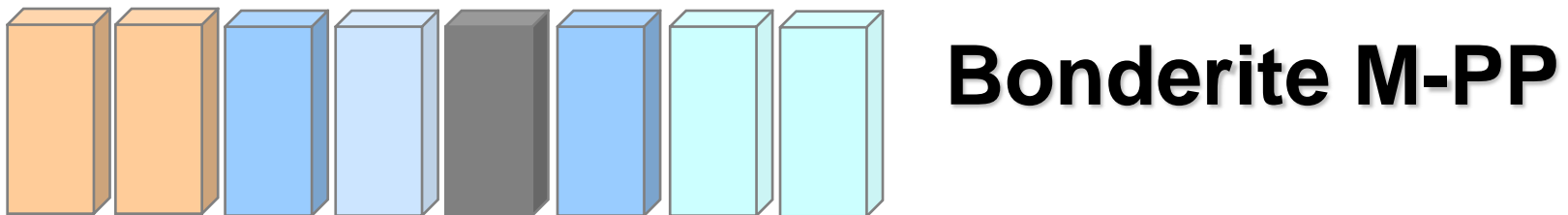
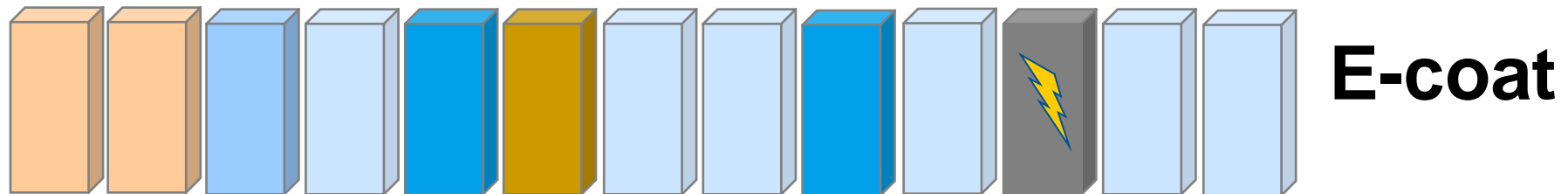


# Bonderite<sup>®</sup> M-PP 966 Coating Stages

Chemical, Not Electrical Deposition (e-coat)

Direct to Metal Application, No Pretreatment

Simpler, Fewer Stages Easier to Control and Maintain



 **Cleaning**

 **DI-Rinse**

 **ZnPh**

 **Bonderite  
M-PP 966**

 **E-coat**

 **Rinse**

 **Activation /  
Passivation**

 **Bonderite M-PT  
Seal Rinse**



# Products and Key Applications

## Interior

- seat frames
- seat tracks
- foot pedals
- door / window frames
- safety / restraint parts

## Suspension

- shock and struts
- control arms
- coil springs
- top mounts
- rubber to metal

## Chassis

- frames
- trailer hitches
- top mounts
- engine cradles
- ACE frames & structure

## Powertrain

- gear boxes
- drive shafts
- motor mounts
- battery trays
- dust covers
- break boosters
- axles

## Exterior

- low cost vehicles
- small trucks
- truck cabs
- motor cycles
- construction equipment
- office furniture

M-PP 966

**BONDERITE**

# Technology Highlight

## Bonderite M-PP 966

- Matte Black, Autodeposition corrosion resistant coating for hot and cold rolled steel.
- Oven cure < 270 F.
- Corrosion performance, Physical performance, heat and durability performance equal to Bonderite M-PP 930.

## Features and Benefits

### Mini-Emulsion

- Coat full assemblies with improved corrosion performance.

### Environmental Stewardship

- HAPS Free
- Low VOC

### Meets performance specifications

- Improved corrosion protection capabilities that meet OEM standards.

## Target Components

- seating
- suspension
- drive shafts
- rubber to metal
- shocks
- struts



# M-PP<sup>®</sup> 966 Coatings Process Advantages

## Coats Full Assemblies

- Ability to Coat Working Assemblies
- Lowers Inventory Requirements
- Eliminates Masking

Rubber Bushings  
do not coat



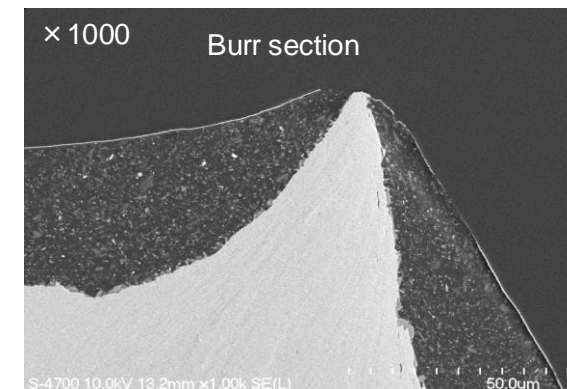
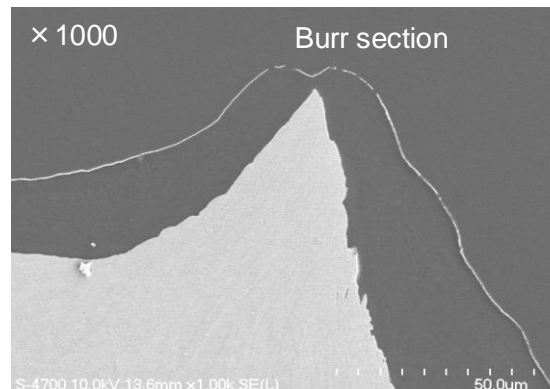
## Throw Power, Inside Coverage

- Virtually Unlimited Throw-power
- Coverage Prevents “Inside-Out” Corrosion



## Edge Coverage

- Uniform Coating Around Edges



# Process Value Proposition

- **Reduced capital investment (40% savings compared to Ecoat)**
- **Time to market: <26 weeks to build new line**
- **Reduced energy demand/ consumption**
- **Process flexibility:**
  - Small foot print
  - Less ancillary equipment
  - High rack density, increase productivity
  - Reduced operation labor; fewer chemical stages to QC and maintain
- **Total Cost/Sq. ft. savings 10-15% less than Ecoat**
- **Environmental sustainability**
- **Excellent Henkel technical support**

# The Simple Coating Solution Summary

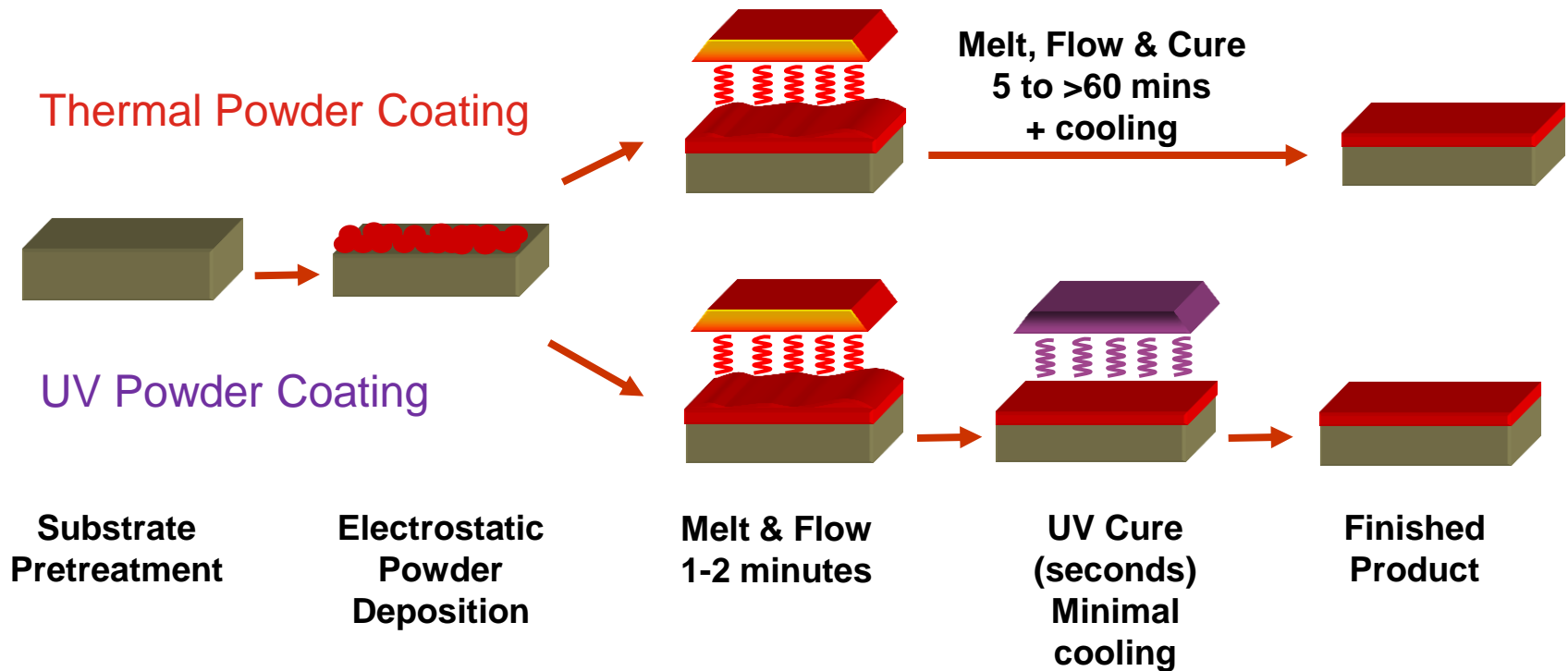
- **Recent GM 15-Year Corrosion Approval (GM 14872 Exposure E)**
- **Replaces galvanized metal, zinc phosphate and electrocoat in a single process**
- **Direct to metal application (no rectifiers needed)**
- **Coating is environmentally friendly (green chemistry)**
- **Excellent corrosion performance**
- **Superior edge coverage / interior protection**
- **Reduced overall process costs**

# UV-Curable Powder Coatings



# UV-Cured Powder Coating

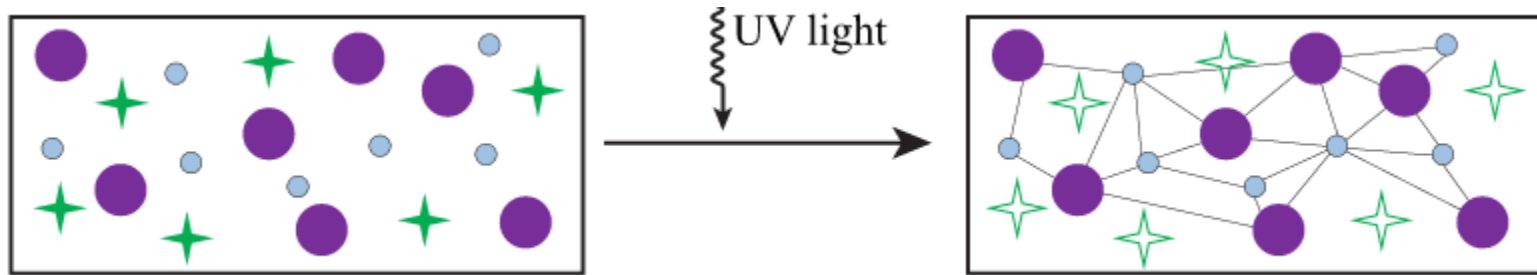
The differentiating characteristic of UV-curable powder coating is the separation of melt & flow from cure



# UV-Curing – Free Radical Cross Linked Coating

Resin Photopolymer

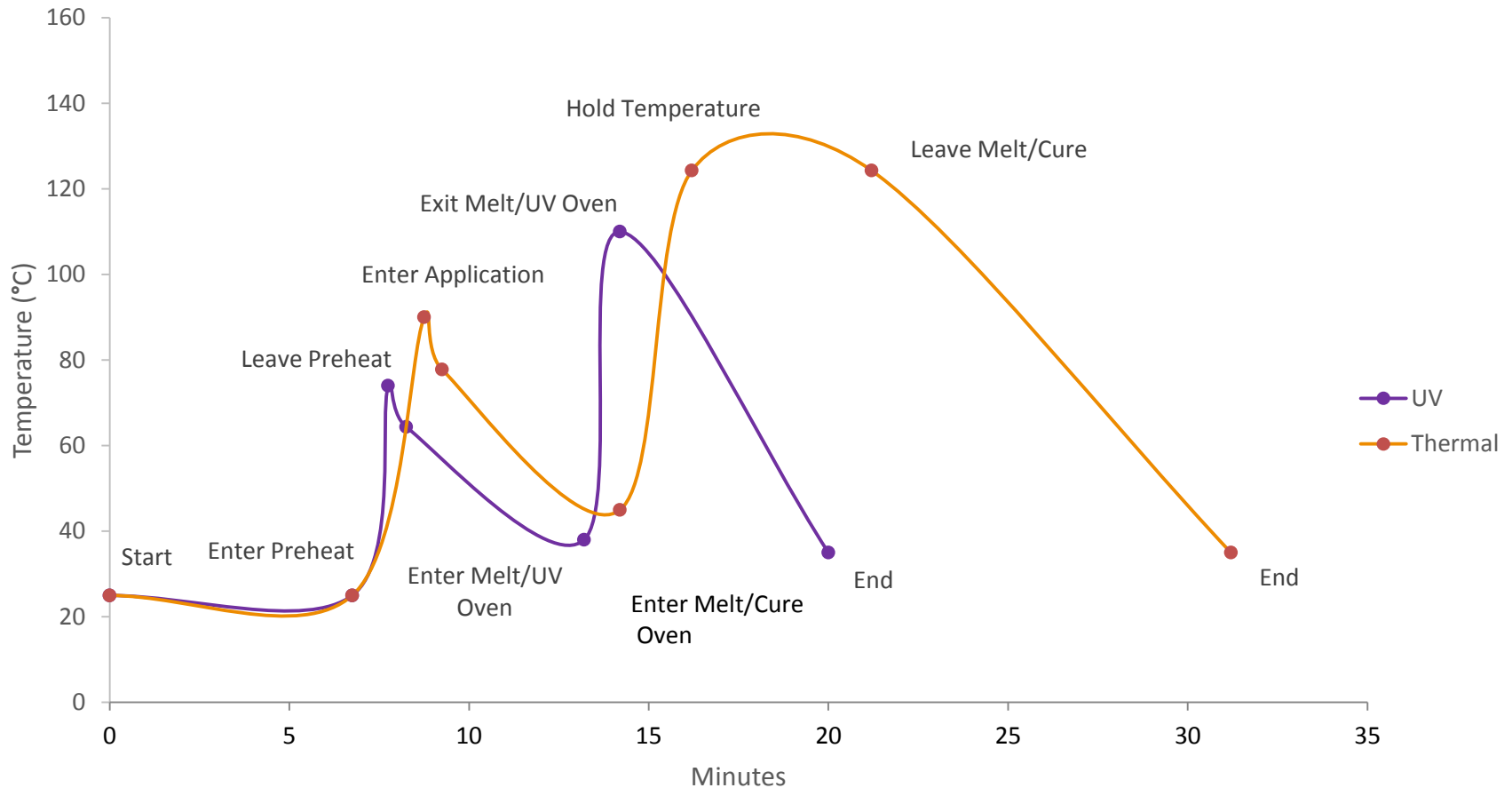
Induced polymerization by light



 Photoinitiator

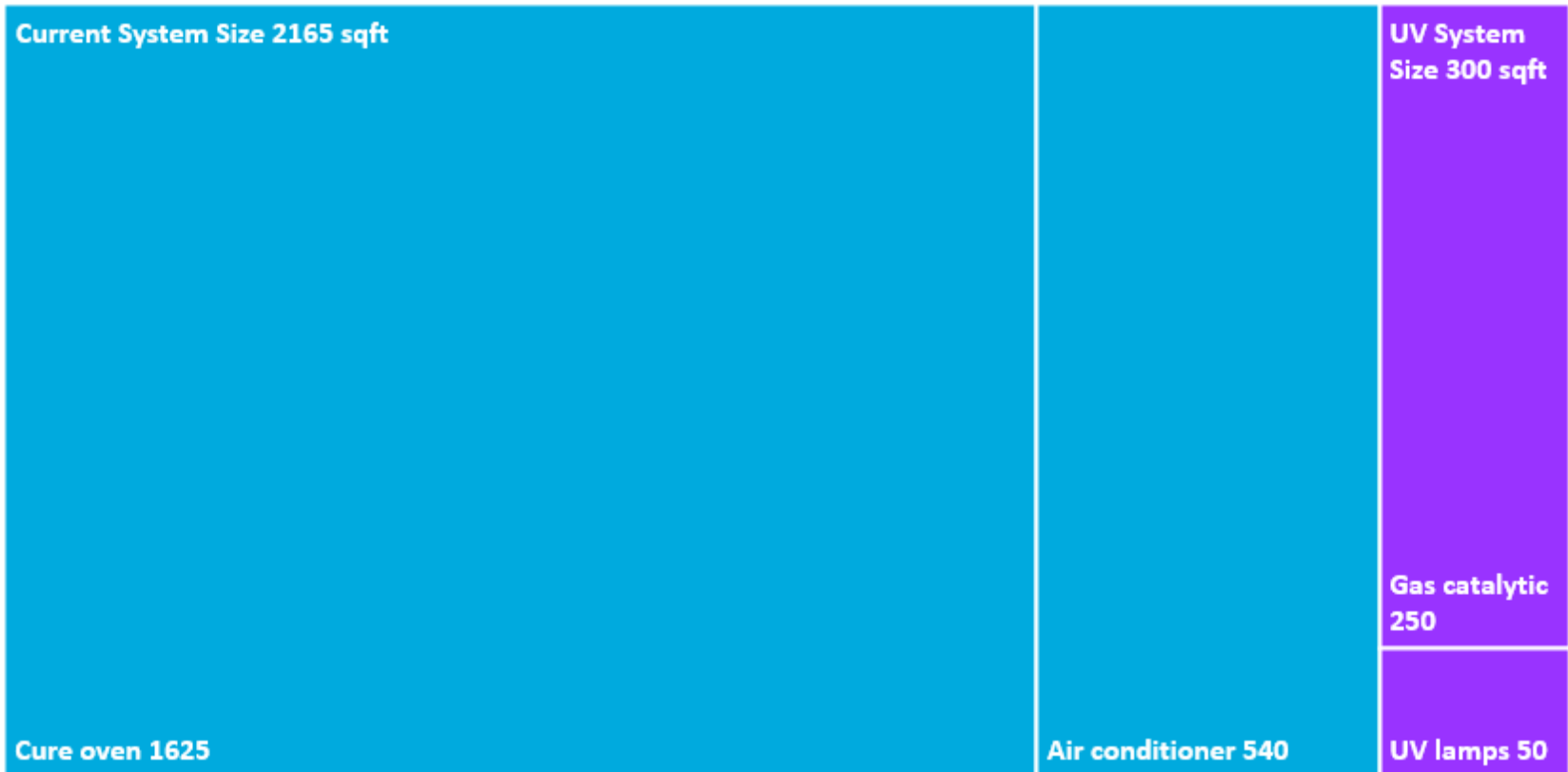


# Time and Temperature Process Efficiency



# Plant Utilization Efficiency

## Sqft Comparison Between Current System and UV System



# UV-Cured Powder Coating Thermal Profile

Melting powder not heating part

1 second  
65° C

47 seconds  
78° C

96 seconds  
104° C



Total time in front of IR panel 120 seconds  
Total dwell time in front of IR panel 96 seconds  
Surface temperature end of cure – 85° C

# Examples of Parts Bonded with M-PP 996 and UV Cure Powder



pneumatic closure



shock absorber



oil filter



head gasket cover



CV joint

# Benefits of Bonderite M-PP 996 Combined with a UV-Cured Powder System



**SAVES ENERGY**



**LOWERS COST OF QUALITY**



**REDUCES PLANT FOOTPRINT**



**PRODUCES HIGHER PROFITS PER HOUR**



**INCREASES MANUFACTURING FLEXIBILITY AND PRODUCTION CAPACITY**



No solvents



No water



Less energy



Less time

# Bonderite M-PP 996 with UV-Cured Powder Performance

## Bonderite M-PP 966 + UV Cured Powder meets or exceeds OEM requirements

- GM 15-year corrosion requirement
- Passes ASTM B117 1000 hour salt spray

Pretreatment	966 Full Cure	930/E2 Co-Cure
Film Build Range (mils)	1.7 - 2.3 mils	1.7 - 2.3 mils
60° Gloss	75-83	78-83
Pencil Hardness	3H	3H
50 MEK Test*	9	9
Crosshatch Adhesion		
@ 1.6 mils	4B+	4B+
@ 1.8 mils	5B-	4B+
@ 2.0 mils	5B-	4B+
@ 2.2 mils	5B-	4B+
@ 2.4 mils	5B-	5B-
@ 2.6 mils	5B	5B
@ 2.8 mils	5B	5B
@ 3.0 mils	5B	5B
@ 3.2 mils	5B	5B

\*Internal measurement where 0 is worst and 10 is best

# Questions

**Presenter**

**Todd Coggins**

**Henkel Corporation**

**Business Development Manager – Surface Treatment**

**Automotive & Transportation – NA**

**32100 Stephenson Highway**

**Madison Heights, MI 48071**

**248-583-9300 ext. 2457**

**todd.coggins@henkel.com**

**[www.henkel-adhesives.com/automotive](http://www.henkel-adhesives.com/automotive)**

**Co-Presenter**

**Michael Knoblauch**

**Keyland Polymer Material Sciences, LLC**

**Keyland Polymer UV Powder, LLC**

**4641 Hinckley Industrial Parkway**

**Cleveland, OH 44109**

**216-741-7191**

**[mfk@keylandpolymer.com](mailto:mfk@keylandpolymer.com)**

**[www.keylandpolymer.com](http://www.keylandpolymer.com)**