Polyaspartic/Polyurea

“A REVOUTIONARY COATING TECHNOLOGY”

Introduction

- **The name polyaspartic is becoming more recognizable among formulators, specifiers, and applicators in the coatings industry to differentiate it from polyureas and polyurethanes.**

- **Polyaspartic is a type of polyurea
(Polyaspartic aliphatic polyurea)**

- **All polyureas are a two-part system.
A resin mixed with catalyst to create the curing reaction that hardens the material.**

- **Polyaspartics are based on the reaction of an aliphatic polyisocyante and a polyaspartic ester, which is an aliphatic diamine.**

- **Polyaspartic coatings are different in both application and performance properties from plural component spray applied polyureas.**

How to Apply Polyaspartics

- Application techniques for polyaspartics include:
  - Plural component spray
  - Airless spray
  - Conventional spray
  - Brush and roll
  - Low pressure cold spray

- Polyaspartics allow a formulator to control the rate of reaction and cure, therefore the pot life or working time can vary from five (5) minutes up to two (2) hours.

Understanding Polyaspartic

- **Polyaspartic technology is similar in application and performance characteristics to 2-component aliphatic polyurethane coatings.**

Differences of Polyaspartics and Polyurethane Coatings

- Polyaspartic coatings are formulated to very high solids (70% to 100% solids)
- Polyaspartics may be applied at higher film builds (up to 15.0 mils in a single application)
- Polyaspartics are faster drying
- Polyaspartics allow a more immediate return to service

- Rapid drying (less than 2 hours)
- Applied at temperatures from 30F to 140F
- Excellent flow and leveling
- High film build (up to 15 mils in a single coat
- Applicable in high humidity
- Pot life of 5 minutes to 2 hours
- Excellent flexibility and high elongation

Differences of Polyaspartics and Polyurethane Coatings

- UV stable
- Color retentive
- High Volume Solids
- 0.0 VOC in most formulations
- High Chemical Resistance
- High Abrasion Resistance
- Low to minimal odor

Polyaspartics vs. Conventional Polyurea

Polyaspartic	**Polyurea**
Fast cure	**Very fast cure**
Aliphatic color and UV stable	**Generally not color and UV stable**
Polyaspartic Thin to moderate film build (4.0 to 15.0 mils(unlimited DFT)thickness)	**Polyurea High film build**
0.0 VOC	**0.0 VOC**
Variable speed cure	**FAST cure**
Polyaspartic	**Polyurethane**
Fast cure	**Moderate cure**
Color and UV stable stable	**Color and UV**

Polyaspartic vs. Polyurethane

Polyaspartic	Polyurethane
Thin to moderate film	Thin film build
(up to 15.0 mils DFT)	(up to 6.0 mils DFT)
0.0 VOC	Solventborne < 2.8 lbs/gal VOC
Variable cure speed	One cure speed

Polyaspartic vs. Epoxy

Polyaspartic	Epoxy
Fast cure	Slow cure
Aliphatic Color and UV stable	Not color and UV stable
0.0 VOC	0.0 to < 2.8 lbs/gal VOC

Polyaspartic	Epoxy
Application below 50F	Application greater than 50F
Full cure in 24 hours	Full cure in 5 to 7 days
Gloss retentive	Poor gloss retention

What Makes Polyaspartics Unique?

- When cured they tolerate temperatures up to 300F
- Resist stains from acids, oils, fats, foods, and other chemicals
- Installed down to 32F
- Flexibility and elongation factors are high
- High abrasion resistance
- High bond strength to concrete, steel, ceramic tile, fiberglass, and other composites
- Optical clarity in clear formulation
- May be applied vertically, horizontally and overhead
- High chemical resistance
- Rapid cure / short down time

What Makes Polyaspartics Unique?

- The elasticity, flexibility and elongation of polyaspartics allow movement of equipment and machinery
- Expansion and contraction of substrates is less of a concern
- High flexibility accommodates twisting, turning, motion or armored equipment and other small vessels and equipment and machinery

- Improved and higher elongation than epoxies and urethanes
- Elongation up to 200%
- Improved impact resistance to dropped tools
- Does not chip and crack like hard brittle epoxies and urethanes

- Improved cleanability
- Excellent graffiti resistance
- Improved release capabilities and promotes quicker off load of materials

Polyaspartic Recommended Uses

- **Designed for use as a color stable, gloss retentive, chemically resistant, abrasion resistant topcoat**
- **May be applied over zinc, epoxy, urethane, and aromatic polyurea**

Polyaspartic Applications

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Ideal applications include:
Military Equipment and Vehicles
Bridge coatings
Deck coatings
Cold storage / low temperature application
Processing area floors and walls
Rail Cars
Pipelines
Wind Turbines
Airports and Airport Equipment
Amusement Parks and Water Parks
Pharmaceutical
Power
Industrial equipment
Industrial floors
Marine
Chemical plants
Off-Shore Oil Platforms
Fertilizer Plants
Water & Wastewater
Pulp & Paper
Food & Beverage
Healthcare
Universities and Schools
Power
Mass Transit
Garage floors
Retail floors
Stadiums
Automotive
OEM
Zoos
Veterinary Clinics
Aquariums
Tunnels

Polyaspartic Benefits

- **Polyaspartics will help control coatings costs by significantly decreasing the cure process and adding durability.**
- **Polyaspartics will lengthen the service life in a variety of applications and varying environmental conditions.**
- **The faster dry times and higher film builds achieved in horizontal, vertical and overhead applications by brush, roll or spray translates into rapid return to service and improvements in overall productivity.**
- **Higher flexibility in applications and compatible with a wide variety of generic coatings.**

Surface Preparation Techniques

- **Always consult with the manufacturer for specific guidelines for surface preparation standards and instructions.**

- **Surface preparation methods or combination of methods may include:**
- **High pressure hydroblasting**
- **Water jetting**
- **Abrasive blasting**
- **Shot blasting**
- **Scarifying**

- **Detergent water cleaning**
- **Power tool cleaning**
- **Hand tool cleaning**
- **Solvent wiping**

- **Remember, whichever method(s) are used for surface preparation a sound, clean, neutralized and profiled surface suitable for the specified product must be achieved.**

Product Application Equipment

- **Brush –Nylon/Polyester Natural Bristle**
- **Roller –3/8” to ½” woven, shed resistant high quality short to medium nap roller cover with a phenolic core**
- **Airless Spray - When airless equipment is used:**

Pump capable of 3,000 psi (207 bars)
.019 to .023 spray tip
Minimum 3/8” ID fluid hose
50’ to 100’ of spray hose
10’ whip hose

- **Conventional Spray – When conventional equipment is used:**

Gun should be Binks 95 or equal
Cap Tip 68 PB/68
Atomization pressure –80 psi
Fluid Pressure –30 psi

Mixing and Pot Life of Polyaspartics

- **Always follow manufacturer’s written instructions as indicated on Product Data Sheet.**
- **Mix in appropriate size pails.**
- **Use a mechanical mixer before use to assure a homogenous blend.**

- **Caution –Do not agitate in air or moisture**
- **Check with manufacturer for pot life or working times. Pot life will vary from minutes to hours dependent on manufacturer**
- **Pot life will be affected by temperature and relative humidity. Small batches may also have shorter pot life.**

Reducer and Solvents for Polyaspartics

- Always consult with manufacturer for recommendations regarding reduction solvent. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and applications conditions.

- Commonly used solvents for reduction and clean up may include but are not limited to the following:
- MEK
- Acetone
- Xylene

Recoat Intervals of Polyaspartics

- **Dry time will be influenced by temperature, humidity, air movement, and film thickness. Minimum recoat time shall be identified when the film is not deformed by firm thumb pressure and no coating is visible on thumb.**

- **Maximum recoat shall be identified and determined when the thumb nail test no longer makes a permanent indention in the coating with ones thumb nail.**

- **Always consult with manufacturer for proprietary minimum and maximum recoat intervals of polyaspartics.**

Shelf Life and Storage of Polyaspartics

- **Most polyaspartics will have a shelf life of six (6) months in properly sealed and unopened containers.**
- **Storage temperatures shall be between 50F and 100F. Keep away from extreme heat, freezing temperatures and moisture.**

Polyaspartics and Industrial Hygiene

- With proper ventilation used in conjunction with standard safety equipment –including air purifying respirators and eye and skin protection –result in very low exposure to measured levels of airborne isocyanates and polyaspartic esters.

Conclusion

- **Polyaspartics are proving to be a valuable alternative to standard epoxies, polyuretahnes and conventional polyureas.**
- **With increased speed of cure and user friendly attributes, polyaspartics provide productivity enhancements to painting operations.**
- **From an application perspective, polyaspartics simplify the spray equipment issues associated with fast cure coatings. The polyapsartics are not "so fast" that they require the use of impingement mixing plural component spray equipment.**
- **Less expensive and less complicated spray equipment as well and brush and roll application can be used in most polyaspartic applications.**
- **The advantages of polyaspartic technology, compounded with the proven performance and health safety of these materials, makes polyaspartic coatings and excellent option for a revolutionary coatings application.**