Paladin
Paints & Chemicals Pvt. Ltd.

Product Catalogue

THE PIONEERS

IN CNSL TECHNOLOGY

ABOUT US

Founded in 1985 under the name Vanaprabha and renamed to Paladin Paints & Chemicals Pvt. Ltd. in 2000, has built a stature for its innovative products, operational excellence and dedication to safety of human & environment. Our aim is to develop lasting relationships with our customers based on human qualities: by understanding their needs, doing business with ethics and demonstrating a passion for exceeding expectations of our clients.

With sales operations in over 30 countries, we serve coatings manufacturers in Marine,Protective ,Industrial, Flooring, Automotive and Electronics segments. We supply a unique range of products for protection and durability of our customer assets. We are striving hard to be one of the world leaders in developing, manufacturing, and promoting products using natural and renewable cashew nutshell liquid technology. Our team is driven with a work force which delivers perfection to meet client requirements. Our technical division is headed by experts with more than 100 years of combined experience in polymer chemistry & CNSL technology. We are the **PIONEERS of CNSL Technology in India** and are proud to be so. It was our first major step towards the safety of the environment and our people.

Paladin Paints & Chemicals Pvt. Ltd. manufactures all products at its production plant at Khalapur (India), which is **ISO 9001:2015** certified. The entire staff of Paladin Paints & Chemicals Pvt. Ltd. adheres strictly to best practices to ensure health, safety, environmental and security standards. Paladin Paints & Chemicals Pvt. Ltd. continuously invests heavily in R&D Laboratory, Manufacturing Equipments & Technical Support.

Our Research facility located at the manufacturing site, mainly focuses on development of innovative CNSL based products which can perform for end use oriented market requirements and satisfy customers. It is our main objective to exploit renewable natural raw materials for development high quality products which can also helps in ecological protection. With well skilled and experienced team we are working in direction of developing new paths for future market requirements.

Headquartered in Mumbai, the economic capital of the country, is led by a management team with a combined experience of over 60 years of manufacturing in Epoxy Resins. We have over 90 employees who consistently follow best practices to deliver quality, reliability, consistency and performance.

Index

OUR PRODUCT RANGE

EPOXY CURING AGENTS

- Phenalkamines
- Phenalkamides
- Phenalkamine Adducts
- Phenalkamide Adducts

EPOXY RESINS & MODIFIERS

- Cardanol Modified Epoxy Resins
- Diluents
- Catalysts

ALKYDS

- Acrylated Alkyds

MARKETS WE SERVE

COATINGS

- Marine & Protective
- Industrial
- Flooring
- Food application

ADHESIVES

- Construction Chemicals
- Sealants
- Electronics
- Molding
- Transportation

COMPOSITES

- Pre-preg
- Resin transfer molding
- Hand lay up
- Wind mill
- Cylinders



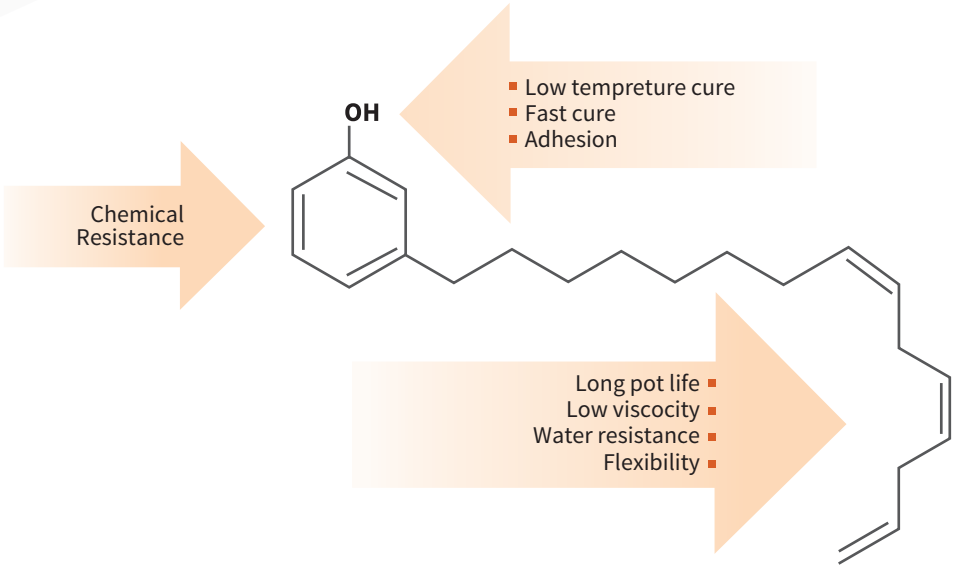


CARDANOL TECHNOLOGY

In the search for cost effective modern materials, CNSL and its products play a significant role. Being renewable, it offers much advantage over synthetic raw materials. Its versatility stems from its innumerable applications in many areas.

CARDANOL, a natural phenol with a side chain has been found to have interesting chemical structural features which enable a range of chemical modifications. One can create a wide spectrum of bio-based monomers capitalizing on the chemically versatile structure, containing aromatic ring, the hydroxyl group and the double bonds in the C15H27 alkyl chain.

Cardanol - an Effective Substitute for the Petroleum-based Phenol



Cashew nut shell liquid (CNSL) or cashew shell oil is a natural chemical with a yellowish sheen found in the honeycomb structure of the cashew nut shell and is a byproduct of processing cashew nuts.

GREEN TECHNOLOGY

Paladin specialty products are based on renewable resources from nature. We are committed to implement Green Technology approach for our products development. Cashew nut shell liquid is a natural, non food chain, renewable, non-petroleum material. CNSL have genetically inbuilt performance properties with low cost and availability which makes it ideal candidate for commercial market. The product range we offer can provide formulator freedom to build up high solids and solvent free systems for protection of applicator and environment. Paladin is motivated in direction to exploit diversity of natural resources for development and replacement of traditional petroleum based products. Paladin is making progress on path where industrial development and ecology balance move hand in hand.

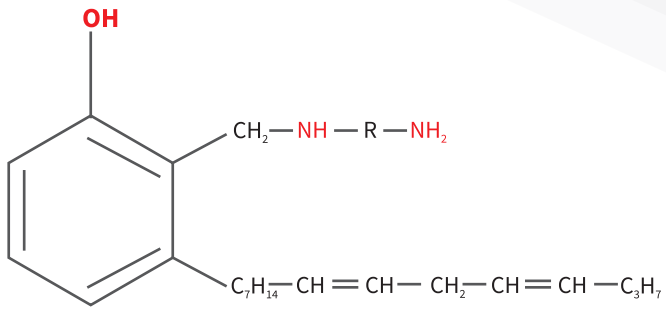
PRODUCTS

PHENALKAMINES

The phenalkamines are basically defined as mannich reaction product of cardanol, formaldehyde and polyamine. These products compose of advantages of Mannich base such as fast cure even at low temperatures, good chemical resistance, moisture tolerance, non blushing properties and good surface appearance. Also presence of aliphatic side chain of cardanol gives good pot life, good flexibility and surface tolerance.

The presence of hydrophobicity due to side chain brings excellent water and sea water resistance with many other advantages for formulator. Adhesion of phenalkamine to poorly prepared and/or wet surface is good due to presence of aliphatic side chain which does not allow water to interfere between resin and surface bonding.

Also hydrophilic nature of phenolic hydroxyl group which gives water sensitivity is suppressed which enhance corrosion protection.



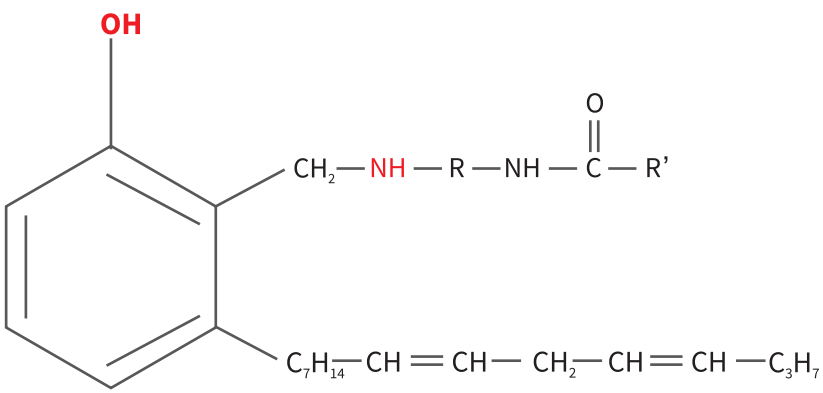
Phenalkamines are being widely used in marine, industrial maintenance and civil engineering applications.

PHENALKAMINES BASED COATINGS FORMULATIONS OFFER

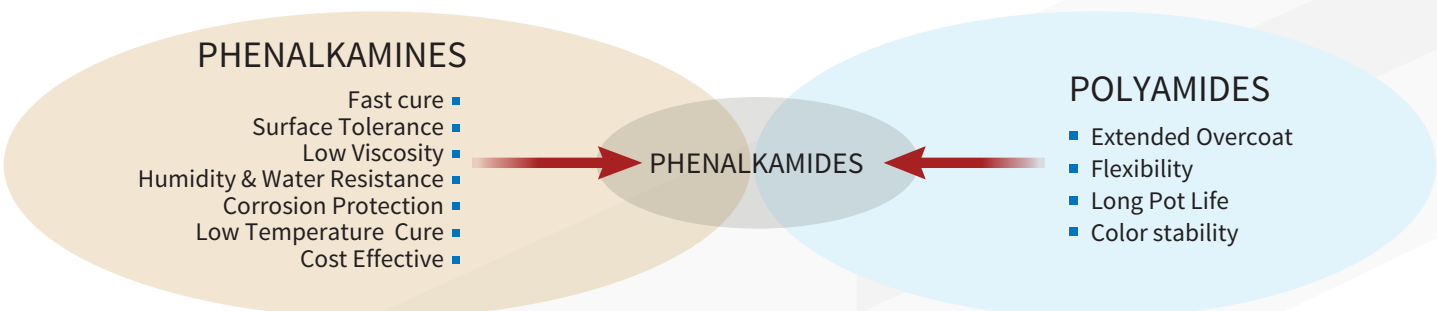
- Low temperature cure (as low as 35°F/0°C)
- Non critical mixing ratios
- Excellent water and chemical resistance
- Good humidity & corrosion resistance
- Good compatibility with different types of epoxy resins
- Good adhesion to poorly prepared surfaces

PHENALKAMIDES

A novel class of epoxy curing agents called phenalkamides have been developed to brigde the gap between polyamide and phenalkamine chemistries. By chemically combining these technologies, phenalkamides offer the benefits of both while reducing their limitations.



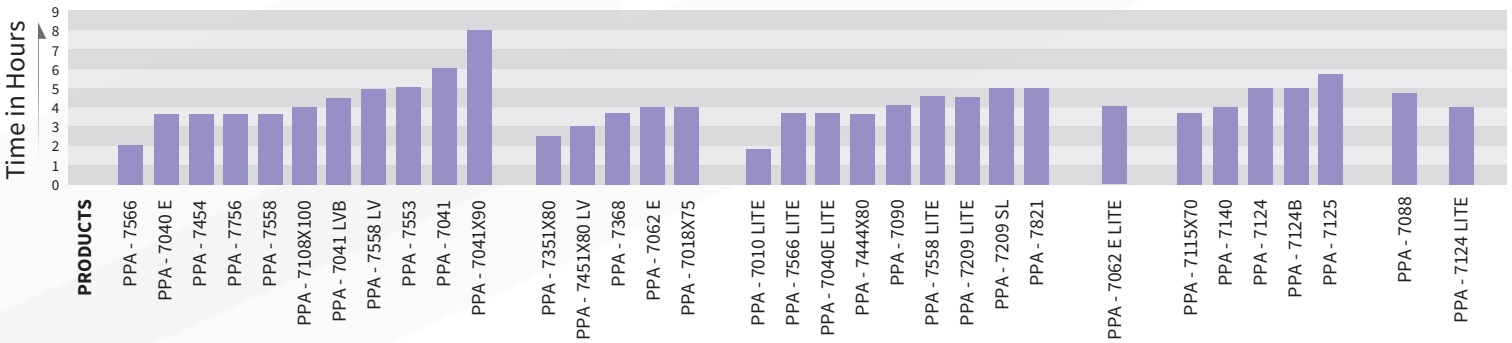
PHENALKAMIDES BASED COATINGS FORMULATIONS



Phenalkamides allow formulators to use the same formula around the year, all weather(less stock)to have quick return to service (cost savings), and to have long-lasting performance coatings (durability). All of that with a renewable solution.

Thin Film Dry Hard Time Comparison

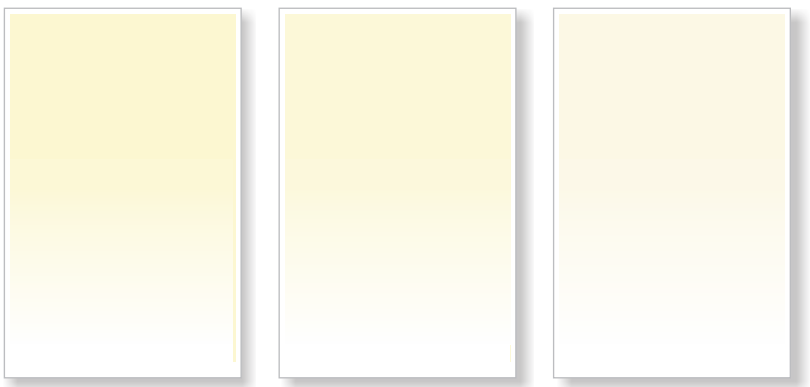
Drying @ 25°C, DFT 200micron
with Liquid Epoxy (EEW 190)



PRODUCT RANGE

Trend in COLOUR STABILITY after 72hours QUVB

(2 hours condensation @45°C/8 hrs Light @50°C)

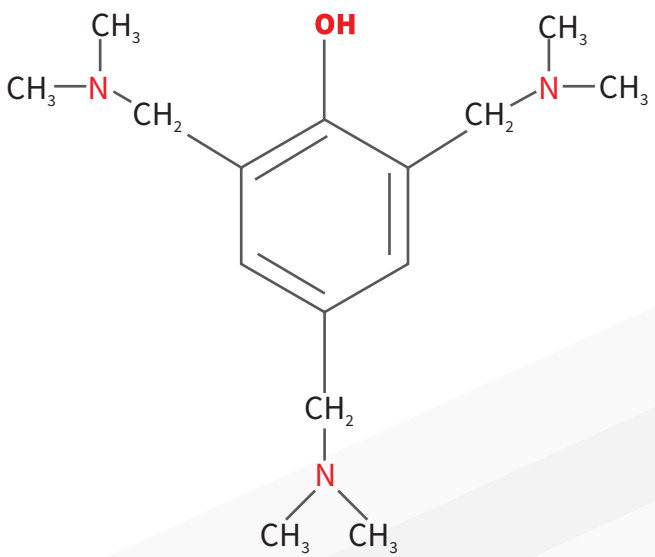


Phenalkamine | Phenalkamine Adduct | Phenalkamide

CATALYST

Paladin paints & chemicals offers catalyst for epoxy formulators. It is a Lewis base catalyst for curing of epoxy resins. It is used both as a curing agent (Adhesive applications) and as an activator for other curing agents including amidoamines, amine adducts and polyamides (coatings, castings, flooring, concrete and adhesive applications). It is also a preferred catalyst for blends of liquid epoxy resins and liquid polysulfides for body solder, sealant and concrete adhesive applications. Also, it is a highly efficient catalyst for epoxy resins cured with polycarboxylic acids and anhydrides (casting and laminate applications), as well as for the isocyanate / polyol and isocyanate trimerization reactions (isocyanurate foam applications)

PCAT-1030 is low colour, low viscosity accelerator can be used in combination of other curing agents for epoxy resins. It is chemically denoted as 2 4 6-tris dimethylaminomethyl phenol which is mannich base reaction product of dimethyl amine and phenol. As indicated in figure catalyst comprises of tertiary amine group which enhances the rate of cross linking.



SR.NO.	PRODUCTS	SOLID CONTENT (NVM %)	COLOR GARDNER (MAX)	Viscosity @ 25°C in cps	Amine Value	Key Properties
CATALYST						
1	P CAT- 1030	Solvent free	6	100 to 300	570-625	Low color, low viscosity accelerator

Note: All Products are having shelf-life of 12 MONTHS when stored at 25°C

Sr. No.	Products	Solid Content (NVM %)	Color Gardner (MAX)	Viscosity @ 25°C in cps	Amine Value	AHEW	Curing at 25°C (in Hrs)	Curing at 5°C (in Hrs)	Key Properties	Marine	Transportation	Protective & Industrial Coatings	Solvent Free & Flooring	Top Coat	FDA 175.300
PHENALKAMINES															
1	PPA - 7040 E	Solvent free	16	2000	510	81	3 - 4	8 - 12	Low viscosity, solvent less, surface tolerant, good chemical & corrosion resistance.		●	●	●		
2	PPA - 7041	Solvent free	16	25000	300	130	5 - 7	17 - 19	Excellent anticorrosion, low temperature cure, solvent less hardener.	●●	●	●	●		●
3	PPA - 7041 LVB	Solvent free	16	2000	330	125	4 - 5	17 - 20	Low viscosity hardener for solvent less & high solid.		●	●	●●		
4	PPA - 7041 X 90	90 ± 2	16	4000	290	144	7 - 9	17 - 19	Solution form of PPA-7041 for ease of handling at low temperatures.	●●		●			●
5	PPA - 7558 LV	Solvent free	12	800	340	95	4 - 6	17 - 19	Lower viscosity, good adhesion, safe for potable water, flooring & masonry.			●	●●		
6	PPA - 7108 X 100	Min. 90	16	5000	345	125	3 - 5	16 - 18	Very good for wet surface adhesion.	●	●	●	●		●
7	PPA - 7454	Solvent free	14	2000	285	133	3 - 4	10 - 11	Excellent film for fast curing at low temp. solvent less, very good adhesion.	●		●	●		
8	PPA - 7553	Solvent free	14	600	380	95	4 - 6	18 - 20	Low viscosity, Fast cure, excellent adhesion & solvent free.	●	●	●	●		
9	PPA - 7756	68 ± 2	16	650	185	255	3 - 4	9 - 11	Fast cure, excellent adhesion & Workable pot life.	●	●	●			
10	PPA - 7558	Solvent free	16	1500	340	95	3 - 4	17 - 20	Low viscosity, excellent adhesion, safe for portable water, flooring & masonry			●	●		●
11	PPA - 7566	Solvent free	16	2000	365	95	1.5 - 2.5	8 - 12	Very Low viscosity, very Fast cure at low Tempature excellent adhesion & solvent free.		●	●	●		●
PHENALKAMINE ADDUCTS															
12	PPA - 7062 E	65 ± 2	16	700	180	180	3 - 5	8 - 12	Epoxy adduct, good blush resistance & adhesion. Fast drying, recovery & good recoating flexibility	●	●●	●●			
13	PPA - 7368	63 ± 1.5	16	1100	180	190	3 - 4	8 - 10	Adduct suitable for Ballast Tank Coatings.	●●	●	●			
14	PPA - 7351 X 80	80 ± 2	16	20000	215	255	2 - 3	5 - 7	Very Good chemical resistance, film properties, fast cure & good adhesion to galvanized surfaces.	●	●	●			
15	PPA - 7451 X 80 LV	80 ± 2	16	2000	185	255	2 - 4	6 - 9	Low viscosity, good chemical & solvent resistance, good flexibility & good adhesion to galvanized surfaces.	●	●	●			
16	PPA - 7018X75	75 ± 2	14	2000	225	151	3 - 5	18 - 20	Fast cure, low viscosity, longer pot life.	●●	●	●			
LITE PHENALKAMINES															
17	PPA - 7010 LITE	Solvent free	10	500	675	57	1.5 - 2	3 - 4	Low viscosity, Light color, fast cure, excellent adhesion, solvent free & workable at -10°C	●	●	●	●		
18	PPA - 7558 LITE	Solvent free	10	1500	340	95	4 - 5	17 - 19	Low viscosity, Excellent, adhesion, safe for potable water, damp surfaces, flooring & masonry.			●	●●		
19	PPA - 7566 LITE	Solvent free	10	2000	365	95	3 - 4	8 - 12	Fast cure, low viscosity		●	●	●		
20	PPA - 7209 SL	Solvent Free	3	600	285	95	4 - 6	18 - 20	Low viscosity. Very light colored for top coat applications.			●	●	●	
21	PPA - 7821	Solvent free	10	400	315	123	4 - 6	18 - 22	Useful in mastic, longer pot life, fast cure.	●	●	●			
22	PPA-7090	Solvent free	10	100000	260	190	3 - 5	18 - 20	Fast curing hardener for pipes, tanks & also useful for adhesives.			●			
23	PPA - 7444 X 80	80 ± 2	8	4000	220	190	3 - 4	8 - 12	Fast hardness development, good flexibility & high solids.	●	●●	●			
24	PPA - 7209 LITE	Solvent free	10	600	330	95	4 - 5	16 - 18	Low viscosity, rapid cure at low temp. , Excellent addhesion on wet surface.	●	●	●	●●		
25	PPA - 7040 E LITE	Solvent free	10	1500	430	81	3 - 4	16 - 18	Low viscosity, solvent less, surface tolerant, good chemical & corrosion resistance.		●	●	●		
LITE PHENALKAMINE ADDUCTS															
26	PPA - 7062 E LITE	65 ± 2	10	500	180	180	3 - 5	8 - 12	Epoxy adduct, good blush resistance & adhesion. Fast drying, recovery & recoating flexibility.	●	●●	●●			
PHENALKAMIDES															
27	PPA - 7124	Solvent free	16	70000	250	160	4 - 6	16 - 18	Low cost, good potlife, solvent free	●	●	●			
28	PPA - 7124B	Solvent free	16	70000	250	160	4 - 6	14 - 16	Fast cure, potable water application, food application	●	●	●			●
29	PPA - 7125	Solvent Free	11	75000	255	160	5 - 6	18 - 20	Curing during wet and damp surfaces, useful for adhesives. Superior corrosion resistance	●	●	●	●		
30	PPA - 7140	Solvent free	10	18000	375	97	3 - 5	16 - 18	Curing during wet and damp surfaces, useful for adhesives. Superior corrosion resistance	●	●	●			
31	PPA - 7115X70	70±2	10	350	160	314	3 - 4	15 - 20	Curing during wet and damp surfaces, useful for adhesives. Superior corrosion resistance.	●	●	●			
PHENALAKAMIDE ADDUCTS															
32	PPA - 7088	65 ± 2	16	1000	150	462	3 - 6	18 - 20	Fast cure, good wet surface adhesion, good corrosion resistance	●	●	●			●
LITE PHENALKAMIDES															
33	PPA - 7124 LITE	Solvent free	10	25000	265	160	3 - 5	8 - 12	Low color, solvent free.	●	●	●		●	

** 200 Microns with Liquid Epoxy (EEW= 190)*

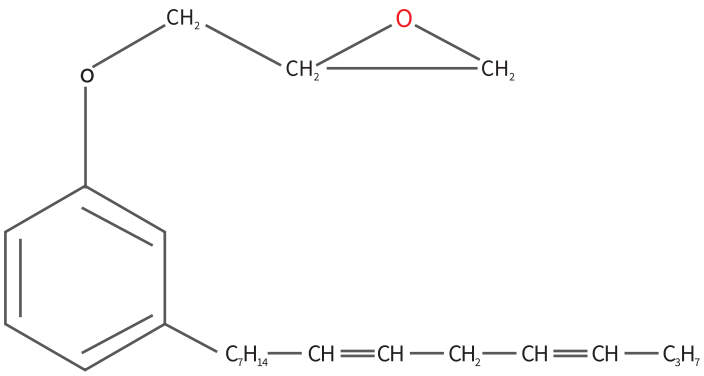
Note: All Products are having shelf-life of 12 MONTHS when stored at 25°C

Viscosity & Amine Value are indicative & detailed on TDS

● Recommended ●● Highly Recommended

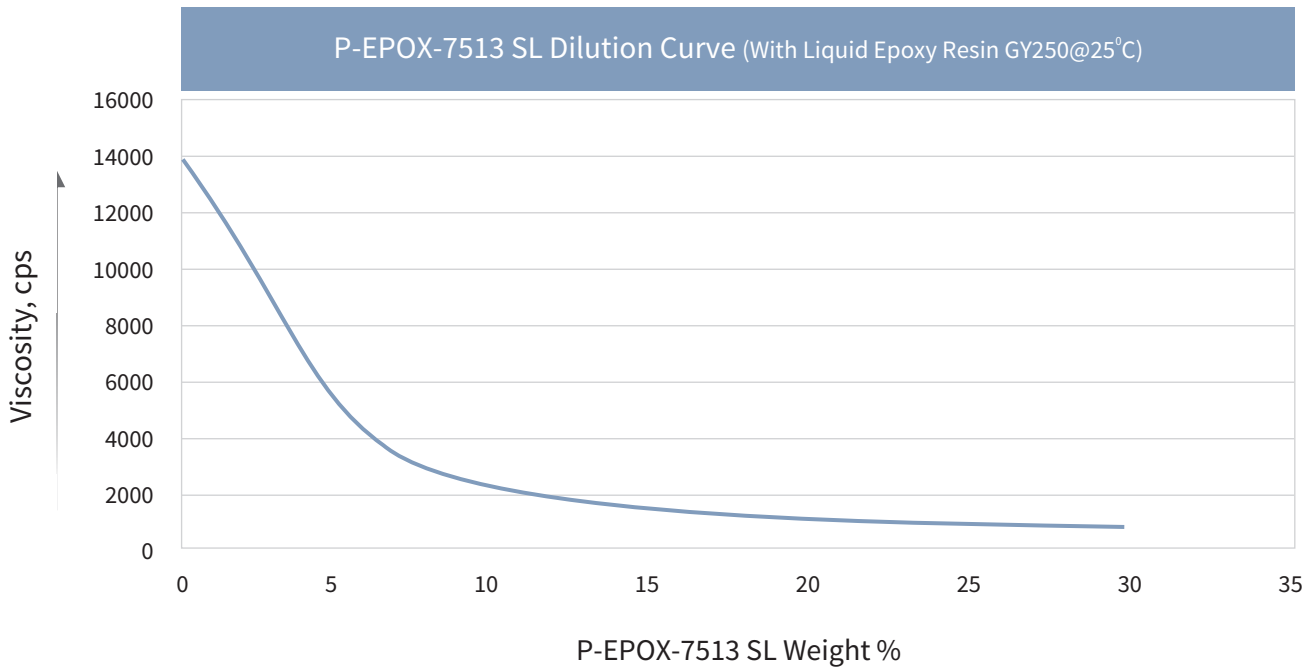
EPOXY DILUENTS

Reactive Diluents are epoxy group-containing functional products which are low viscosity glycidyl ethers that can react with the curing agents to become the part of the cross-linked epoxy system. Preferably, the diluent should react with the curing agent at approximately the same rate as that of the resin, and contribute substantially to viscosity reduction at low concentrations, and be non-reactive with the resin under normal storage conditions.



Paladin PEPOX-7513 series products are low viscosity, monofunctional epoxy reactive diluents that can be used to increase flexibility, impact resistance, and water resistance. These reactive diluents are basically glycidyl ethers derived from cardanol molecule.

PEPOX-7513 LITE and PEPOX-7513 SL are low viscosity, higher purity, and lighter color version of this series. Both grades have a similar chemical structure and ideal for formulating low emission, low odor, high solid, solvent free coatings.



Why use Epoxy Diluents ?

- Highly useful for improving solids of the coating
- Cheaper formulations
- Reduce the possible development of heat and shrinkage upon cure
- Good electrical properties
- Can be also used to optimize performance properties such as impact strength, adhesion, flexibility, filler-loading and solvent resistance of the epoxy system.

SR.NO.	PRODUCTS	SOLID CONTENT (NVM %)	COLOR GARDNER (MAX)	Viscosity @ 25°C in cps	Epoxy Equivalent Weight (EEWT)	PHR with Liquid epoxy Resin EEW=190*	Key Properties
DILUENTS							
1	P-EPOX - 7513	Solvent free	13	40 - 70	425 - 575	2 - 20	Reactive epoxy diluents
2	P-EPOX - 7513 LITE	Solvent free	10	40 - 70	425 - 575	2 - 20	Low viscosity, low color reactive epoxy diluents
3	P-EPOX - 7513 SL	Solvent free	6	40 – 55	385 – 450	2 - 20	Very low color, low epoxy equivalent reactive epoxy diluents

Note: All Products are having shelf-life of 12 MONTHS when stored at 25°C

ONE PACK EPOXY ETHER SYSTEM (Cardanol Modified Epoxy Resins)

Epoxy resins are a vast class of prepolymers and polymers containing more than one epoxy group, also often referred to as glycidyl or oxirane groups. They can be either low-molecular honey-like liquids or high-molecular solid substances. Their molecular weight often determines their potential uses and applications. **Cardanol Modified Epoxy Resins** are quite stable at room temperatures and gain their ultimate performance when get cured by oxidative mechanism.

The most important property we can achieve is anti-corrosive systems which protects metallic assets from natural degrading agents such as water, oxygen, carbon dioxide, UV etc.

We can offer one pack "Epoxy Ether" systems which are reaction products of alkyl phenol & Bis-phenol A epoxy resin. Instead of film formation from cross linking with Hardener & epoxy, these **Cardanol Modified Epoxy Resins** get cross linked through air oxidation mechanism.

Paladin provides series of one pack epoxy systems to meet specific end use applications. PEPOX- 2325 X 65 and PEPOX- 2092 X 65 are modified versions of PEPOX- 2800 X 65 with improved performance properties and exterior durability.

PEPOX- 2727 X 65 is new members of this class developed to extend over coating time interval. This product gives freedom to applicator by escalating time interval for second coat application.

SR.NO.	PRODUCTS	SOLID CONTENT (NVM %)	COLOR GARDNER (MAX)	Viscosity @ 30° C in FC B4 Cup in Sec	Hydroxyl Equivalent Weight	Key Properties
CARDANOL MODIFIED EPOXY RESINS						
1	P-EPOX - 2800 X 65	65 + 2	12	40 - 60	720	Good corrosion resistance in 1k applications close to 2k epoxy coating
2	P-EPOX - 2325 X 65	65 + 2	12	30 - 50	1000	Good corrosion resistance and exterior durability
3	P-EPOX - 2092 X 65	65 + 2	16	40 - 60	650	Fast drying and Superior corrosion resistance
4	P-EPOX - 2727 X 65	65 + 2	12	40 - 60	390	Extended over coating with 2k-PU & 2k-epoxy

Note: All Products are having shelf-life of 12 MONTHS when stored at 25°C

ACRYLATED ALKYD RESINS

In situ graft acrylic-alkyd hybrid resins were formed by polymerizing acrylic and acrylic-mixed monomers in the presence of alkyds by introduction of a free radical initiator to promote graft formation.

Acrylated alkyd has drawn a lot of attentions as acrylics, as they have superior properties of both the systems. Developed for fast drying interior / exterior durable air drying coatings, they can be used as hydroxyl functional base in two pack urethane systems.

Acrylated Alkyd features:

- Excellent binder for exterior durable coating
- Cost effective versatile resin
- Highly compatible with chlorinated rubber resins & Polyurethane resins
- Quick drying with very good acid & alkali resistance coatings
- Can be used by paint formulators to develop excellent coatings for ship side paints
- Container coatings, low bake primers & top coat for chasis
- Quick drying touch-up coatings

Both members of acrylated alkyd series comprise different level of modifications which make then useful for specific end application. Formulator can utilize PAL - 6103 X 60 to make system cost effective with higher degree of performance, while PAL - 6108 X 60 has higher level of acrylation which offer superior UV stability.

SR.NO.	PRODUCTS	SOLID CONTENT (NVM %)	COLOR GARDNER (MAX)	Viscosity @ 30° C in FC B4 Cup in Sec	Hydroxyl Equivalent Weight	Key Properties
ACRYLATED ALKYDS						
1	PAL-6103 X 60	65 + 2	10	20 - 30	2100	Cost effective, good acid & alkali resistance
2	PAL-6108 X 60	65 + 2	10	25 - 45	2100	Good UV stability, fast drying

Note: All Products are having shelf-life of 12 MONTHS when stored at 25°C

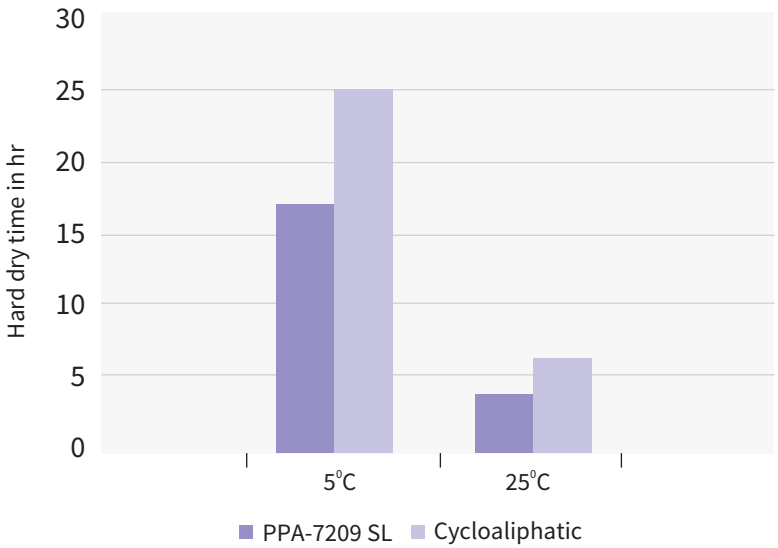
PHENALKAMINE PPA-7209SL FOR TOP COATS

Paladin offers PPA-7209 SL which is specially designed phenalkamine that exhibits fast and low temperature cure in combination with good pot life in comparison with other amine curing agents. Another advantage of theses product are blush free glossy film at lower temperature with high humidity level. This product shows excellent UV stability and low value of yellowing when exposed to sunlight. All These harmonizing performance properties of this product, allow their wider application in floor coating and fast return to service.

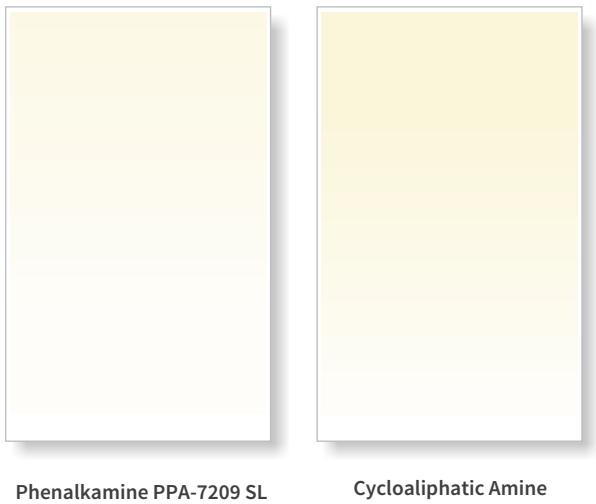
Furthermore as with other phenalkamines, these products exhibit fast crosslinking speed, good impact resistance and non-critical mix ratio which reduces risk of failure with change in environmental conditions after application. Their excellent water and chemical resistance ensure the top coat durability in industrial environments. The essential condition for topcoat fulfilled by this product is to have very good adhesion to primer or concrete.

PPA-7209 SL has combination of both, fast reactivity at a broad temperature range and hydrophobicity, results in very good early water resistance in coatings formulated with phenalkamines. This gives benefit in case of rain or a spill shortly after the application of the top coat.

Curing Time with Liquid Epoxy Resin (EEW 190)

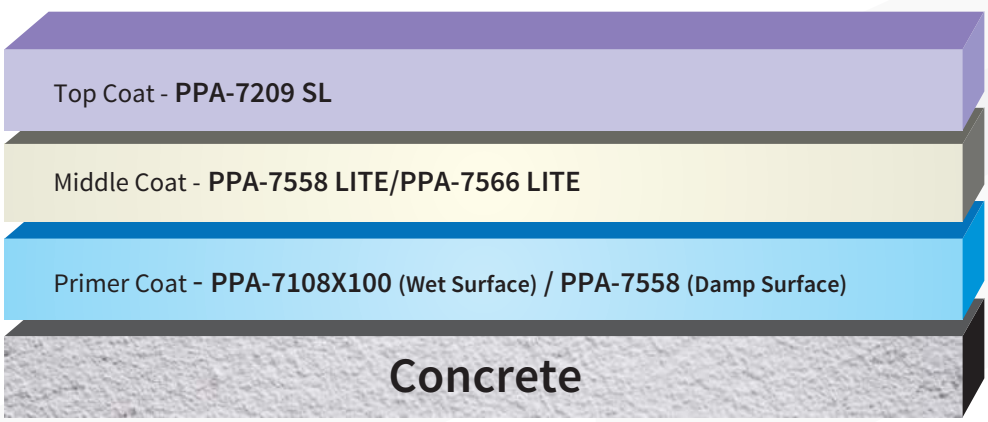


UV light Color Stability

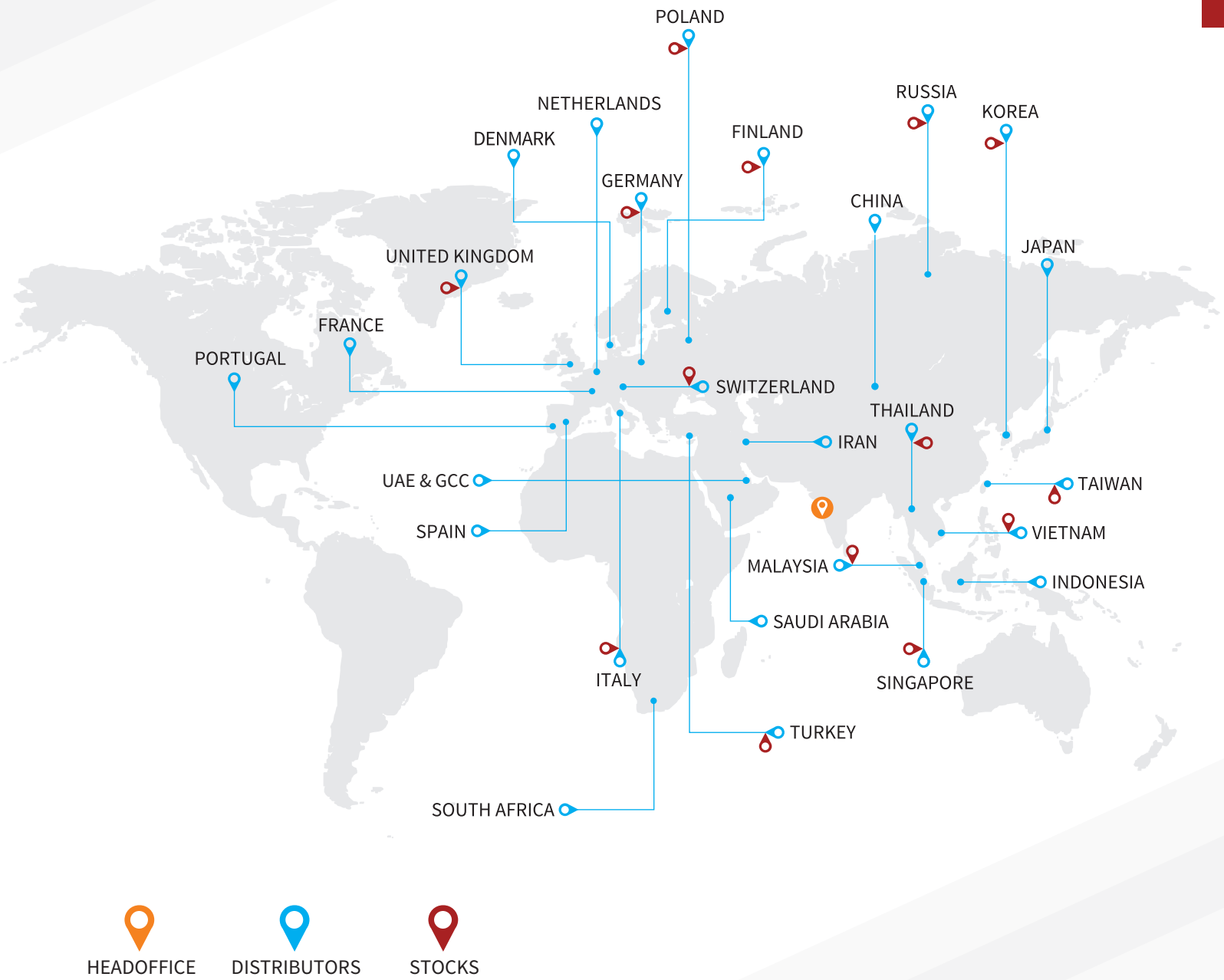


Comprehensive System for Concrete

We offer phenalkamines for all concrete coating layers. Our hardeners recommended are selected on basis of parameters to be fulfilled for each specific coat application. The phenalkamines suggested for primers offer excellent adhesion to the substrate while hardeners for top coats provide excellent UV resistance. These products have good self-leveling properties with fast cure, and non critical mix ratios for easy application. The products indicated in the figure are the preferred choices.



GLOBAL PRESENCE



ISO 9001:2015 Certified

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