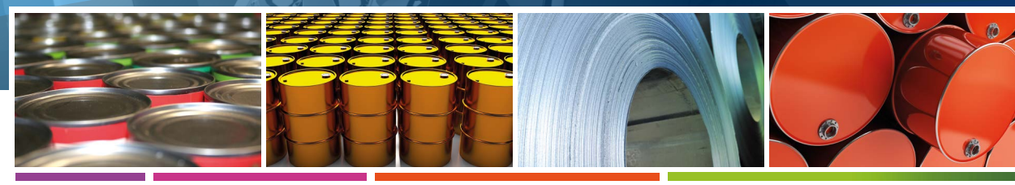
CATALYSTS FOR INDUSTRIAL COATINGS

CYCAT® Catalysts



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Catalysts for Industrial Coatings

About allnex
allnex is a global specialty chemicals company and leading supplier of resins and additives for architectural, industrial, protective, automotive and special purpose coatings and inks. We are recognized as a specialty chemicals pioneer offering the broadest portfolio of high quality products.

Our product range entails innovative liquid resins and additives, radiation cured and powder coating resins and additives and crosslinkers for use on wood, metal, plastic and other surfaces.

Supported by 33 manufacturing and 23 research and technology support facilities throughout the world, we provide responsive and local support to our customers, helping them to rapidly bring advanced coating solutions to the market.

CYCAT® Catalysts
allnex supplies acid catalysts for accelerating the cure response of amino crosslinking agents. Each catalyst is designed to fulfill a specific applications requirement, and in most cases, one catalyst will be preferable over another depending on formula composition and curing conditions.

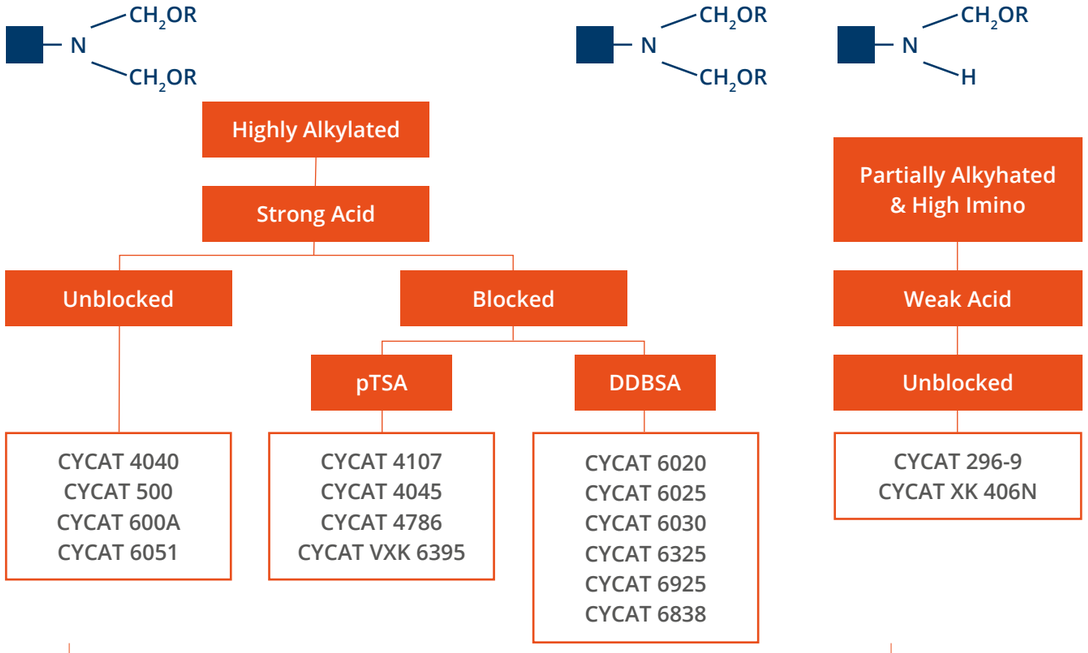
Catalyst Selection Criteria
The reaction of amino resins and polyols is complex and often requires acidic catalysts. The relative efficiency of catalysts correlates to the acidity, and the overall reaction rate is directly proportional to the concentration of the catalyst. Frequently used catalysts are p-toluenesulfonic acid (PTSA), dodecylbenzenesulfonic acid (DDBSA), dinonylnaphthalenesulfonic acid (DNNSA), dinonylnaphthalenedisulfonic acid (DNNDSA) and organic phosphoric acid esters.

Ionic or covalently blocked sulfonic acid catalysts are used in amino resin-based stoving systems. The deactivation of the sulfonic acid is a very important tool to achieve the desired balance of storage stability of a catalyzed system followed by rapid cure when the coating reaches the desired temperature.

Acid Types
Strong acids are most effective for highly alkylated melamine, benzoguanamine and all urea-formaldehyde resins.
Weak acids are most effective for both the crosslinking and self-condensation reactions of resins which are subject to general acid catalysis. Thus, high NH containing resins and partially alkylated melamine-formaldehyde resins and all conventional butylated resins benefit most by the use of weak acids as catalysts. In these systems, weak acids are actually much more efficient catalysts than are strong acids. However, for high temperature bake OEM auto clear coats, dodecylbenzenesulfonic acid (DDBSA) catalysts, are also very effective. Weak acids include mono and alkyl phosphates, phosphoric acid, carboxylic acids, and pyrophosphates such as CYCAT® 296-9 catalyst. CYCAT XK 406N catalyst is especially designed for phenolic resins.

Catalyst Selection

Highly alkylated



Partially alkylated & High Imino

Product Name	Acid Type Volatile	% Active	Acid #	Density g/ml	Gardner Color	Minimum Cure	Attributes / Uses	Applications
CYCAT® Acid Catalysts								
CYCAT 296-9	DMAP Isobutanol	50	155 - 165	1,06	1	110°C	Weak acid for high NH/polymeric melamine and phenolic crosslinkers.	GI
CYCAT XK 406N	Phosphate Xylene/Butanol	9.1	100 - 112	0,90	2	80°C	Complies with FDA 21 CFR, Sec. 175.300 (b) (3) xiii (a&b), mainly for phenolic resins.	Packaging
CYCAT 500	DNNDSA Isobutanol	40	80 - 90	0,93	12 max.	RT	General purpose catalyst. Excellent water, detergent and salt spray resistance.	GI, Coil
CYCAT 600A	DDBSA Isobutanol	70	130 - 140	0,96	4	RT	General purpose catalyst. Excellent water, detergent and salt spray resistance. Excellent solubility characteristics, complies with FDA 21 CFR, Sec. 175.300 (b) (3) xiii (a&b).	Auto, Packaging
CYCAT 4040	p-TSA Isobutanol	40	130 - 140	0,98	1	RT	Most versatile and polular catalyst.	GI
CYCAT 6051	DNNSA Butanol	50	60 - 65	0,95	<18	125°C	Best water and corrosion resistance for high temperature applications on metal.	GI, Coil
CYCAT Blocked p-TSA Catalysts								
CYCAT 4045	p-TSA Ethylene glycol	20		1,16	1	100°C	Excellent formulated package stability and flow properties., Coil, G.I.	GI, Coil
CYCAT 4107	p-TSA Isopropanol	25		0,90	1	90°C	Good metal mark resistance. GI, Coil.	GI, Coil
CYCAT 4786	p-TSA n-Butanol	30		0,98	1	80°C	Low temperature cure. Excellent stability. Coil, G.I.	GI, Coil
CYCAT VXK 6395	p-TSA Isopropanol	25		0,95	1	80°C	Low temperature cure. Excellent stability.	GI, Coil
CYCAT Blocked DDBSA Catalysts								
CYCAT 6020	DDBSA Isopropanol	40		0,90	2	120°C	Best appearance, excellent color automotive clear coat.	Automotive, GI
CYCAT 6025	DDBSA Isopropanol	25		0,85	2	120°C	Balanced performance for auto top coat, general industrial.	Automotive, GI
CYCAT 6030	DDBSA Isopropanol	30		0,90	2	120°C	Faster cure response than CYCAT® 6020 and 6025. Automotive clear coat	Automotive, GI
CYCAT 6325	DDBSA Isopropanol	25		0,90	2	120°C	Broad solubility. Excellent color stability., automotive clear coat, G.I.	Automotive, GI
CYCAT 6838	DDBSA Xylene	25		0,95	5	120°C	Very low conductivity, corrosive resistance, good adhesion, and great film appearance	Automotive, GI, Coil
CYCAT 6925	DDBSA Isopropanol	25		0,90	2	120°C	Complies with FDA 21 CFR, Sec. 175.300 (b) (3) xiii (a&b), Packaging.	Automotive, GI, Packaging