



PATCHAM

***Patcham Driers...
Individual and Combination***



PATCHAM DRIERS

Function	To accelerate the drying of various forms of paint, printing inks, and varnishes.
Components of Driers	
Metal	The most important component of a drier. "We sell the metal and the function of that metal".
Acid	Makes the metal compatible with the paint media, allows it to react, has no other function in the drying process.
Carrier	Makes the metal compatible with the paint media, allows it to react, has no other function in the drying process.

Individual Metal Driers

A range of metals of Octoates and naphthenates including rare earths

Primary Driers	% metal (± 0.2)	Features and Benefits
Cobalt	6%	By far the most important and widely used active drier. Strongly promoting surface drying. Intensive red-violet colour, but low effect on color on the dry paint film. Used in combination with other metal driers. Tendency to cause surface wrinkling and poor dry through
	8%	
	10%	
	12%	
Manganese	6%	Lower drying catalyses than cobalt. Low risk of wrinkling. Brownish or pink-yellow colour of the paint film develops at high Mn dosages
	10%	
Iron	%	Dark colour, Catalytic effect only from baking temperatures over 130 °C
	10%	
Cerium/ Rare Earth	10%	Used in white varnishes and overprint varnishes, Also in baking enamels
	12%	
Lead	18%	Promoting polymerization, increased hardness, trough drying. Activity as sole drier is very low. Lead improves flexibility and durability of the film. Eco-toxic...
	20%	
	24%	

Auxiliary Drier	% metal (± 0.2)	Features and Benefits
Zirconium	12%	Most widely accepted replacements for lead, Shows best color, lowest yellowing tendency, used in combination with cobalt (and calcium)
	18%	
	24%	
Barium	12.5%	Substitute for lead, Improves through-drying, Good pigment wetting characteristics. Toxicity concerns...
Calcium	5%	Stabilizes active driers. Promotes drying under adverse weather conditions. Reduces loss of dry issues. Promotes pigment wetting
	10%	
Zinc	12	similar drying performance and thus lower risk of film discoloration
	16	
	23	
Potassium	10	Activates cobalt, thus may enable reduced Co levels for similar drying performance and thus lower risk of film discoloration
	12	
	15	
Lithium	2%	Best results if used in combination with cobalt Reduces wrinkling tendency in high solids coatings. Tends to increase risk of discoloration of the liquid paint during storage.

Addition Rate Calculation of Drier Requirement

Weight of drier required is calculated using the following equation:

$$\text{Weight of drier} = \frac{(\% \text{ resin solids}) \times \% \text{ metal required} \times \text{batch weight}}{\% \text{ Metal of drier in Solution}}$$

For example: binder resin was long oil alkyd

15 kg. of 70% alkyd resin solids, requiring 0.06% Cobalt metal on resin solids will require 5.25 kg of Co 12%

$$\begin{aligned} &= \frac{(15 \text{ kg}) \times (70\%) \times (0.06\%)}{12} \\ &= 0.0525 \text{ kg of Co 12\%} \end{aligned}$$

same computation goes with Zr or Pb and or Ca or Zinc depending on the metal requirement

For combination Drier, Using Patcom 3 with 1% Co metal

$$\begin{aligned} &= \frac{(15 \text{ kg})(70\%) \times (0.05\%)}{1} \\ &= 0.525 \text{ kg} \end{aligned}$$

In combination drier, Cobalt content was considered for dosaging as this metal is very critical. If added more than what is suggested as stated below table. Problem of wrinkling will likely occur.

**Typical Application Concentrations of Drier metals
(metal content based on binder's solid content)**

<i>Drier metal</i>	<i>Typical concentration</i>	<i>Normal max. Conc.</i>
<i>Co</i>	<i>0.06</i>	<i>0.2</i>
<i>Mn</i>	<i>0.02</i>	<i>0.1</i>
<i>Pb</i>	<i>0.5</i>	<i>1.0</i>
<i>Zr</i>	<i>0.3</i>	<i>0.4</i>
<i>Ce</i>	<i>0.2</i>	<i>0.6</i>
<i>Ca</i>	<i>0.2</i>	<i>0.4</i>
<i>Ba</i>	<i>0.2</i>	<i>0.4</i>
<i>V</i>	<i>0.03</i>	<i>0.05</i>
<i>Bi</i>	<i>0.3</i>	<i>0.5</i>
<i>Zn</i>	<i>0.2</i>	<i>0.4</i>
<i>Sr</i>	<i>0.4</i>	<i>0.6</i>
<i>K</i>	<i>0.03</i>	<i>0.08</i>
<i>Li</i>	<i>0.03</i>	<i>0.05</i>

**Recommended formulation of combination for different types of binder
(% metal based on binder's solid)**

<i>Resin Types</i>	<i>Active Drier</i>	<i>Auxiliary Drier</i>
Drying oils	0.03 Co or Mn	0.2 Zr, 0.1Ca
Medium Oil Alkyd	0.04 Co	0.2 Zr, 0.1Ca
Long Oil Alkyd	0.05 Co	0.3 Zr, 0.2Ca

Driers in Green solvent

Individual metal combinations in green solvent for ink and UPR industries.

Complex combination driers

A range of lead free combination driers are available. Tailor made blends are also possible.

Combination Grade	Co content	Total Metals
Patcom 1	6%	15%
Patcom 21	1.2%	11.6%
Patcom 24	1.2%	10.2%
Patcom 45	0.8%	8.8%
Patcom 46	2.5%	10.7%
Patcom 47	0.9%	9.9%

Lead Replacement - Patcom 9

- **Complex combination that can replace lead on a 1:1 basis**
- **Excellent drying performance**
- **No adverse effects on whiteness and film hardness**

Cobalt free drier

Patcom 2515 and **Patcom 2516** are special metal complexes that function as cobalt free active driers. These are recommended in urethane alkyds and in air drying paints where the toxicity of cobalt is an issue.

Driers for Alkyd Emulsions

Patox WB driers are water dispersible drying catalysts for use in waterborne, air-drying paints.

Patox WB driers are based on metal carboxylates, thus offering catalytic properties similar to effect of traditionally used driers in solvent borne air-drying paints; however, the products excel in waterborne paints in offering superior compatibility, workability and performance properties.

Primary Driers	Physical State	Colour	% Non-volatile	% metal (± 0.2)	Specific Gravity
Patox WB 103	Liquid	Violet	46 – 54	3.00(Co)	1.000
Patox Co 10	Liquid	Violet	69-77	10.0	1.025
Patox Co 6	Liquid	violet	41-48	6.0	0.915
Patox Mn 6	Liquid	Reddish Brown	60-68	6.0	1.000
Auxiliary Drier					
Patox Zr 12	Liquid	G3	44-52	12.0	1.005
Patox Ca 05	Liquid	G3	65-72	5.0	0.940