

Valirex

Metal soaps driers and additives



Driers are an essential part of all paint formulations based on auto-oxidative resins. These resins invariably contain unsaturated fatty acids, of which the oxidation causes gelation and hardening of the paint film.

The introduction of metal compounds as driers has followed the evolution of paint and varnish making. What once was an art, has now become a science.

Umicore Specialty Materials Brugge offers a wide choice of metal soaps or carboxylates as driers. Our standard driers are dissolved in aliphatic white spirit D60.

Metal soaps have many applications outside the surface coating industries. Here too USMB is active: woodpreservatives, lubricating oil additives, fuel-oil additives, often based on naphthenic acids.

More detailed information is available upon request.

Other organometal compounds

Our experience in organic compounds at laboratory and pilot plant level is not limited purely to the soaps, which we market.

We also have experience in:

- Nickel soaps...
- Basic alkaline earth soaps
- Zn, Ca, and Cu resins
- Glyceryl naphthenates
- and others.

Some of these compounds have already been manufactured on an industrial scale to meet specific demands from our clients.

Specifications and technical datasheets

Our standard specifications are mentioned hereafter, and we will be pleased to supply you technical and safety data sheets on request.

Valirex portfolio

Valirex	symbol	% metal on resin solids	Description
Barium	Ba	0.02	Barium has some of the dispersing and wetting properties of calcium and strontium, but with the lowest tendency to hydrolysis. It improves the through drying. Restriction : it is a heavy metal. Concentration of the metal up to 10 %.
Bismuth	Bi	0.20	Bismuth carboxylates, used in combination with cobalt, improve the throughdrying of the paint. They are also used as lubricating oil and grease additives for applications where high specific loads are required. They are used as well for the formation of polyurethane elastomers. In this case they are often combined with zinc carboxylates. Concentration of the metal up to 28 %.
Calcium	Ca	0.04	Calcium is the most widely used auxiliary drier. It has to be combined with cobalt or manganese. Being more a wetting agent, it is used in grinding formulations. It adjusts wet edge and gloss and can have beneficial effects on surface defects such as pinholing. Concentration of the metal 4 – 5 to 10 %.
Cobalt	Co	0.05	Cobalt is a real oxidation catalyst and will in principle promote surface drying. It is normally used in combination with other driers. It is also used as accelerator in the unsaturated polyester resins. Concentration of the metal up to 12 %.
Copper	Cu	0.15	Copper carboxylates have a certain catalytic activity in unsaturated polyester systems. They reduce the exothermic reaction and improve the storage stability. They are also used as combustion catalyst. Copper has a fungicidal preservative action as well. Concentration of the metal up to 10 %.
Cerium	Ce	0.15	Cerium soaps are polymerisation catalysts. They improve the through drying and the hardness. They are recommended for stove lacquers, overprint varnishes, white or colourless, because they give less decoloration compared to the other metals. Concentration of the metal up to 10 %.
Iron	Fe	0.10	Iron improves the through drying, especially in stoving systems. Its dark colour limits its use to primers or dark-coloured finishes. It increases the adhesion of anti rust paints on the iron support. Concentration up to 10 %.
Lithium	Li	0.02	Secondary drier, which must be accompanied by a primary drier. Increases the surface hardening of the film. It can be used in high solids coatings. It does not lose its efficiency even in cold environments. It can affect the weathering resistance of the so hardened films. Concentration of the metal up to 2%.

Manganese	Mn 0.02	Manganese is an oxidation catalyst, it improves the surface drying. It is also a polymerisation catalyst, it promotes the film hardening of the paint. Taking into account its colour, it is more used in dark paints. Its activity is inhibited by the air humidity. Concentration of the metal up to 10 %
Potassium	K 0.10	Potassium carboxylates are functioning in synergy with cobalt for the thermo set and unsaturated polyester systems. Concentration of the metal up to 15 %.
Strontium	Sr 0.20	Strontium is an auxiliary drier, having a strong surface action on pigments and fillers. It improves the throughdrying in difficult conditions, with water presence and/or high humidity and/or low temperatures. Concentration of the metal up to 10 %.
Zinc	Zn 0.15	Zinc soaps lengthen the acceleration time and improve the through drying. They limit the wrinkling formation. They also have wetting and dispersing properties. Zn in combination with Ca or Ba is a pvc stabiliser against degradation caused by the heat during the production. It is also used for slowing down the thermic degradation of lubricants and greases. Concentration of the metal up to 22 %
Zirconium	Zr 0.20	This metal is a secondary drier and must be combined with a primary drier. It improves the through drying and presents a certain synergy with cobalt and calcium. Concentration of the metal up to 18 %.

Drier combinations

We have repeatedly stressed the advantages of using combinations of driers as compared to the use of single metal driers :

- ☺ improves efficiency
- ☺ less raw materials in stock
- ☺ excellent and stable quality, with each time exact amount of metal concentrations
- ☺ reduction of production and weighing errors.

It would, however be a huge, if not an impossible task to recommend drier combinations for each type of paint. Nevertheless we can make certain

suggestions and offer a range of combinations which are particularly suitable for specific binders. These guidelines can serve as a basis from which other combinations for more specific applications can be derived.

A number of combinations have appeared for a variety of reasons, including

- * Improved drying action in cold damp conditions
- * Toxicological reasons (absence of Pb)
- * Economical reasons

These combinations include Co-Zr-Ca, Co-Ba-Zr, Co-Ba-Zn, Co-Li-Ca, Co-Sr-Ca

and many others, for example Valirex SIL 413 d60.

These combinations have replaced lead in all paints and varnishes. So far no good alternative for cobalt has been found and will most probably never be found. For more information or a presentation on Co-toxicology, please do not hesitate to contact us.

We will gladly advise you on any enquiries you should have and supply any combination you require.

Valirex driers and additives

Product	%	Tolerance % +-	Colour Gardner max	Viscosity St/25°C max.	Solids min %	Specific weight max	Use
Valirex Cobalt							
Co 6 d60	6	0.2	blue	0.2	25	880-920	drier, fuel additive, oxidation catalyst
Co 8 d60	8	0.2	blue	0.2	36	920-960	drier, fuel additive, oxidation catalyst
Co 10 d60	10	0.2	blue	3	40	980-1020	drier, fuel additive, oxidation catalyst
Co 12 d60	12	0.3	blue	5	55	1020-1060	drier, fuel additive, oxidation catalyst
Co 12 ester	12	0.3	blue	4			drier, fuel additive, oxidation catalyst
Valirex Calcium							
Ca 4 d60	4	0.2	3	0.2	20	830-870	drier
Ca 5 d60	5	0.2	4	0.2	25	850-890	drier
Ca 10 d60	10	0.2	7	2	48	970-1020	drier
Ca 4 N d60	4	0.2	5	0.5	40	870-910	drier, wetting agent, additive drier
Ca 5 N d60	5	0.2	8	5	49	910-950	drier, wetting agent, additive drier
Ca 5 N ester	5	0.2					
Valirex Manganese							
Mn 6 d60	6	0.2	reddish brown	0.3	34	890-930	drier, fuel additive
Mn 8 d60	8	0.2	reddish brown	1	45	940-990	drier, fuel additive
Mn 10 d60	10	0.2	reddish brown	6	55	1010-1060	drier, fuel additive
Mn 8 ester	8	0.2	reddish brown	4		990-1030	drier
Valirex Zinc							
Zn 8 d60	8	0.2	4	0.5	36	870-920	drier, additive
Zn 10 d60	10	0.2	4	0.5	45	920-960	drier, wood preservative
Zn 12 d60	12	0.3	4	0.5	53	950-990	drier, wood preservative
Zn 8 ep	8	0.2	16	10		960-1000	oil additive
Zn 10 ep	10	0.2	16	20		980-1020	additive for lubricants
Zn 15 versatate	15	0.3	3	5	72	1000-1050	drier, wood preservative
Zn 22	22	0.4	4	350		1130-1180	additive
Valirex Copper							
Cu 8 low leach	8	0.2	dark green	20	-	1000-1040	pvc compounding -not to be used as biocide within the European Union
Cu 8 d60	8	0.2	dark green	5	50	940-1000	additive for unsaturated polyester - not to be used as biocide within the European Union
Valirex Zirconium							
Zr 6 d60	6	0.2	3	0.2	18	850-880	drier
Zr 12 d60	12	0.3	5	0.2	40	950-1010	drier
Zr 18 d60	18	0.3	4	2	62	1100-1150	drier
Zr 18 ester	18	0.3		4		1040-1180	drier
Valirex Cerium							
Ce 6 d60	6	0.2	yellow green	1	23	850-890	drier for lead free systems
Ce 10 D60	10	0.2	yellow green	5	45	930-970	drier for lead free systems
Valirex miscellania							
Ba 12.5 d60	12.5	0.3	5	0.5	52	970-1000	drier
Sr 10 d60	10	0.2	4	5	45	940-980	drier
Li 2 d60	2	0.2	6			890-930	drier, catalyst
Fe 6 hf	6	0.2	dark brown	0.5	36	900-940	drier, fuel additive, woodstainer
Fe 10 hf	10	0.2	dark brown	3	60	980-1040	drier, fuel additive, woodstainer
K 15	15	0.3	3	100		1050-1150	fuel additive, polymerisation catalyst
Valirex aqua							
Ca 4 aqua	4	0.2	8	1	40	900-940	drier for aqueous oxidative drying systems
Co 9 aqua	9	0.2	blue	5	45	960-1000	drier for aqueous oxidative drying systems
Zr 12 aqua	12	0.3	4	1	45	1020-1060	drier for aqueous oxidative drying systems

Valirex Combination driers

Product composition	Tolerance % +-	Colour Gardner max	Viscosity St/25°C max.	Solids min %	Specific weight max	Use
Valirex Sil 413 d60 Co 1- Zr 1.7 - Ca 3.9	0.2	blue	2		920-960	multipurpose universal drier
Valirex Co6Zr9 d60 Co6 - Zr 9	0.2	violet	2	60	1050-1100	drier
Valirex Mix 7 d60 Co 1.2 - Ba 7.2 - Zn 3.2	0.2	blue	0.5		950-990	drier
Valirex mix 9 d60 Co 1.2 - Ba 7.2 - Zr 3.2	0.2	blue	0.5		960-1000	drier
Valirex mix 20 d60 Co 1.2- Zr 3.2 - Ca 4.0		0.2	blue	2		940-980 drier
valirex mix 26 d60 Co 1.2- Zr 6.0 - Ca 3.0		0.2	violet	1		960-1000 drier
Valirex mix 38 neutral d60 Co 0.9 - Sr 5.4 - Ca 1.8	0.2	blue	5		920-970	drier
valirex mix 53 d60 Co 1.2 - Ca 4 - Li 0.6	0.2	violet	5		910-950	drier
Valirex 88A d60 Co 1.1 - Ca 2.2 - Sr 4.4	0.2	blue	5		920-970	drier
Valirex mix 145 d60 Co 1.5 - Zr 10.6 - Ca 1.5 - Zn 0.85	0.2	blue	2	57	1040-1080	drier
Valirex mix 222 d60 Co 0.6 - Ca 2.0 - Zn 3.1	0.2	blue	2		880-920	drier
Valirex mix 259 d60 Co 1.8 - Zr 3.0 - Mn 2.4	0.2	violet	1		890-930	drier
Valirex 835 d60 Co 0.8 - Ca 3 - Zr 5	0.2	violet	1		940-990	low temperature, high humidity drier
Valirex 1055 d60 Co 1.0 - Zr 5.0 - Ca 5.0	0.2	blue	2		970- 1000	drier

The above list is a limited list of the mixtures which are readily available. Of course, we will gladly advise you in finding the right drier mix for your specific needs.

Special Valirex driers for ink products

Product	%	Tolerance % +/-	Colour Gardner max	Viscosity St/25°C max.	Specific weight max	Use
Valirex Cerium						
Ce 10 ink oil	10	0.2	yellow green	3	980-1020	drier for ink applications
Valirex Cobalt						
Co 5 hv	5	0.2	blue	5	920-960	drier for ink applications
Co 8 ester	8	0.2	blue	4	970-1010	drier for ink applications
Co 10 xylene	10	0.2	blue	0.5	990-1030	accelerator, general oxidation catalyst
Co 12 xylene	12	0.3	blue	5	1030-1070	accelerator, general oxidation catalyst
Co 6.5 ink oil	6.5	0.2	blue	1	920-960	drier for ink applications
Co 8 ink oil	8	0.2	blue	2	950-990	drier for ink applications
Co 10 ink oil	10	0.2	blue			drier for ink applications
Co 12 ink oil	12	0.3	blue	15	1020-1060	drier for ink applications
Valirex Manganese						
Mn 6 ink oil	6	0.2	reddish brown	2	920-950	drier for ink applications
Mn 8 ink oil	8	0.2	reddish brown	5	960-1000	drier for ink applications
Mn 6 ester	6	0.2	reddish brown	1	950-980	drier for ink applications
Mn 8 ester	8	0.2	reddish brown	4	990-1030	drier for ink applications
Valirex Noval						
noval 50 % ink oil			max 2	0.1	850-880	anti skinning agent
noval 50 % d60						
noval			max 1	0.2	910-930	anti skinning agent
Valirex mixes						
Co2Mn6 d60			violet	3	930-970	drier for ink applications
Co2Mn6 ink oil			violet	3	960-1000	drier for ink applications
Co2Mn6 ester			violet	1	980-1020	drier for ink applications
Co2Mn6.5 d60			violet	3	980-1020	drier for ink applications

Liability disclaimer

This information is accurate to the best of our knowledge, but without any guarantee. You should check the suitability of our products for your purposes. If necessary, you can consult our technical service staff.

Trouble shooting

Problem with the paint	Description
too slow drying action	increase the amount of the driers
shows a loss of drying action	increase the amount of neutral calcium (through pigment absorption) increase the amount of overbased calcium (through drier precipitation)
shows slow drying at lower temperatures	replace Ca by Ba, Sr or Li
shows slow surface drying	increase the amount of Co and add Ca
shows poor through drying	increase the amount of Zr, Sr or Ca
shows poor drying in high humidity	replace Ca by Ba
is too tacky	increase the amount of Co or Mn and add Ce
shows an after tack	increase the amount of Zr or Sr
shows a low gloss	add Zn or replace Ca by Ba
is too soft	add Ce or Li
shows poor water resistance	replace Ca by Ba or Sr
is yellowing	increase the amount of Co, while reducing the amount of Ce or Mn
is wrinkling	increase the amount of Ca or decrease the amount of Co or add Zn and replace Co by Mn
is too fragile	increase the amount of Zr and reduce the amount of Co or replace Co by Mn
attracts dust	increase the amount of Co

