

DURA produces a wide variety of metallic carboxylates, which are reaction products of metals and organic acids. Our extensive range of driers is based on a large variety of metals, acids and hydrocarbons. In some cases neat solventless liquid metal soaps are also available. The behavior of a metal soap or its solutions is governed solely by the chemical function of the metal while the organic acid merely helps convert the metal into a soluble or solvent compatible form.

### **Metallic carboxylates - Driers for oxidative coating:**

Drier metals are traditionally divided into two groups: active (or primary) and auxiliary (or secondary) though it is an arbitrary classification. Driers that promote oxygen absorption followed by peroxide formation and decomposition are termed active; auxiliary driers, while exhibiting no catalytic action on their own, appear to synergistically enhance the functioning of the active drier metals. It has been postulated that secondary driers function by forming complexes with primary drier metals.

Active (Primary) Driers: cobalt, zirconium, lead, cerium, iron etc.

Auxiliary (secondary) Driers: calcium, manganese, barium, zinc, lithium, etc.

### **Cobalt**

Cobalt is "the drier" metal and is most extensively used. It is a powerful oxidation catalyst; and as a result, in coatings containing cobalt alone, the surface dries preferentially causing surface wrinkling and poor through dry in the extreme. It is therefore combined with other metals such as lead, manganese, calcium, zirconium, etc. traditionally (i.e. in conventional solids coatings) or with aluminum or lithium in modern high solids coatings. Cobalt has a red-violet purple color : however the yellow color of oils and resins counter this and resultant coatings have increased whiteness. Cobalt therefore is invariably preferred in white coatings.

The wrinkling effect produced by high cobalt levels is taken advantage of when producing alkyd based wrinklingenamels.

### **Zirconium**

Zirconium is the most widely accepted substitute for lead drier. It functions mainly by its catalytic activity on drier metals such as cobalt and manganese. The impetus for increased use of zirconium is environmental regulations restricting use of lead. Zirconium is effective in both air dry and bake coating systems. It improves gloss, hardness and through dry without any adverse effect on other coating properties.

### **Manganese**

Manganese promotes both 'surface dry' and 'through dry', although it is less efficient than cobalt and lead in air drying finishes. In baking finishes manganese is superior to cobalt as it does not cause imbrutement. Manganese also gives better result than cobalt in low temperature drying performance and does not suffer from wrinkling under high humidity conditions. However, manganese is rarely used along but added as a modifier, with cobalt being use as a primary drier. Manganese generally imparts a pink/yellow color to white enamels and hence is best avoided in such finishes. In some systems such as urethane oils, use of manganese in preference to cobalt results in reduced 'skinning' problems.

