

## **Oxidation - The Cycle of Aging**

Oxidation is a natural process which affects many materials including lead, when exposed to varying environmental conditions. Those conditions, rain, snow or any other weather cycle will determine the degree of severity of oxidation and the time scale over which it will occur.

Oxidation is far more likely to occur during winter conditions, with the weather attacking the shiny surface that the lead strip has, when first applied to glass. The natural colour of lead is a matt grey, so it is both normal and inevitable that discolouration will occur during that colour change over, this process although common knowledge to anyone within the industry is not always familiar with the householder.

Questions always arise about oxidation, the most common being "How long will it take my lead to oxidise and look like my neighbours?" The answer cannot be given truthfully by anyone. Only the weather conditions can determine this.

During the oxidation process it is not uncommon for different colours of bronze, blue or even gold to become visible. Once this has happened, it is a sign that the lead strip is forming its own protective barrier.

Normal cleaning of the windows with warm water and washing-up liquid will ensure that the lead is kept clean and natural oxidation can take place.

The time of year will have an affect on how the lead will react, but by no means should there be any concern about the appearance, as this quite natural process will always take place.

All lead products are susceptible to a weathering process known as oxidation. This is a natural process that forms a patina which effectively protects the lead from the elements.

The patina is made up of a layer of insoluble lead salts that give the appearance of traditional grey lead. Look at an old church window, or an old leaded light and you'll see the effect of the oxidation.

The patina is made up of normal lead sulphite, normal lead sulphate, and normal lead carbonate.

During the initial stages of oxidation the lead can display many and varied colours. The colours that you will see are partly determined by the angle of view but can include white, copper or green a blotchy appearance or even powdery deposits. This happens as the lead comes into contact with moisture and is basic lead carbonate. Householders should be aware that the appearance will settle down and that any action to remove the patina will result in the process starting over again.

The effects of oxidation will be different in different areas, but it will settle down to form the traditional patina in time. There is, however, no way of saying how long this will take. This basic lead carbonate can run off onto the glass under some circumstances and should be cleaned to avoid the likelihood of any staining. How much of a problem this oxidation becomes is governed by environmental factors, but in the longer term, the patina will form and the traditional colour will become evident.

Lead - lead oxide - basic lead carbonate - normal lead sulphite - normal lead sulphate. The final lead patina is 30% normal lead oxide, 60% normal lead sulphate and 10% normal lead carbonate. This will vary based upon time, location and airborne impurities.

## **Taming the Beast**

### ***If using Blackening Agent***

The panel should not subsequently be cleaned with solvent based or abrasive cleaners. Wipe or paint the surface of Lead with Black it until the desired colour is reached.

## **Controlling Oxidation**

### ***Control with patination oil, (oxidation will still be evident).***

Should patination oil be used, the panel should not subsequently be cleaned with solvent based or abrasive cleaners. Patination oil overcomes the problems of discolouration and basic lead carbonate release which occurs during the initial stages of oxidation. This is what causes early unsightliness.