Natural Oxidisation of Leadwork

What should I expect from new leaded windows?

Like any natural product exposed to the environment, leaded windows will undergo a certain degree of atmospheric transformation. This is perfectly natural and it will eventually settle down and the lead will take on the traditional weathered lead appearance that is admired in old churches and the leaded windows of stately houses.

During this process however, especially in the early stages following installation, some people may become concerned at the changes they see occurring.

Why do the changes occur?

All of the lead used on Clayton Glass leaded units is refined, almost pure lead, which has been alloyed to improve performance. Being a purely natural material, when it is exposed to the atmosphere for the first time, it becomes subject to a process called oxidisation.

Chemists define the lead oxidisation process as: “A chemical reaction instigated by the exposure of lead to the atmosphere in which soluble lead compounds such as lead sulphate (PbSO), lead sulphide (PbS) or lead oxides are formed on the surface.

These major reaction products naturally form a compact, non-porous adherent film on the lead’s surface which halts further reaction between the metal and the atmosphere.”

Put in more simple terms, it means that when lead profile first comes into contact with the atmosphere, the surface gradually oxidises to form a natural protective film called a patina, which eventually produces the familiar grey colour.

What changes are seen?

During the initial stages of patination, the lead can appear to take on various colours such as blue, bronze, gold and green. This effect is purely visual and is usually due to the angle of the light. Gradually, however, these colours will fade away to eventually leave the final protective, grey patina.

There is another side effect of oxidation which can give rise to concern. When lead first comes into contact with moisture (rainwater or condensation) it may result in a natural, temporary discolouration, spotting and even the appearance of white powdery deposits (basic lead carbonate) which in wet weather can run onto the glass.

Again, this is perfectly natural and the temporary blemishes will eventually disappear as the patination process continues. The powder can be safely wiped off from time to time with warm soapy water, as you are doing your usual window clean, until the natural process has fully developed.

A regular exerted effort to remove the patina is not recommended as it will only expose the layers beneath, leading to the process restarting over again. We’d simply advise the lead is allowed to become accustomed to the environment in its own time, sealing the exposed lead and in doing so stabilising into the familiar dark grey colour.

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The Process of Patination

The timing to complete the cycle will vary depending on the purity of the lead, the location, the time of year, the environment, weather conditions and airborne impurities. The good news is that there is no need to treat the lead as the patination process will occur naturally.

If requested however, at the factory or even after installation the process can be pre-controlled to an extent by applying lead patination oil which will encourage the quicker formulation of the grey finish. It is important that the oil is applied as soon as possible after the lead is installed, as once the natural patination process has started and spotting has begun to occur it may be too late for the oil to take effect.

Should patination oil be used, the glass should not be subsequently cleaned with solvent based or abrasive cleaners.