



KEIM Mineral Paints – Technical Digest

KEIM Soldalit-ME, Photocatalytic Reduction of Nitrogen Oxides & Air Pollution

1. The Issue - UK Air Quality

Air pollution has negative impacts on human health and the natural environment. Whilst levels in the UK have been declining, there are more measures which need to be taken, specifically with regard to Nitrogen Oxides. Nitrogen Oxides are produced by industrial and traffic pollution and are irritants which can affect the human respiratory system. In the presence of VOC (Volatile Organic Compounds), Nitrogen Oxides can react and create ozone, which is a highly reactive form of oxygen and a significant health risk even at low concentrations.

- Even at low concentrations Nitrogen Dioxides are harmful to health
- Harmful to respiratory tract and irritating to the mucous membranes of the respiratory system
- Increases the sensitivity to infectious diseases
- Despite reduction measures that have been introduced often the limits set are still exceeded in many places

Recently the World Health Organisation has re-categorised exhaust fumes from diesel engines as carcinogenic and stated that exposure to the mixture of chemicals from diesel engines should be reduced.

In terms of the paint industry, the effects on air pollution should be considered from the manufacture of the materials through to the resultant effects of material application i.e. the release of VOCs.

2. The Solution – Keim Soldalit-ME

Keim Soldalit-ME is a photocatalytic mineral paint which uses light energy to neutralise pollution. Titanium dioxide is the catalyst which is added to the paint to enable the photocatalytic reaction. The catalyst is not used up in the reaction and will continue to react for the life of the paint.

The reaction converts Nitrogen Oxides and other harmful pollutants into harmless nitrates.

The photocatalytic reaction also helps to breakdown organic material and contaminants, keeping surfaces cleaner. This means that when Titanium dioxide is used in conventional paints it can breakdown the organic paint itself, reducing the lifespan of such paints. Keim Soldalit-ME is a mineral paint which means that there is no compromise between high levels of the catalyst and effective photocatalytic performance and durability.

Photocatalytic mineral paints provide long-life environmentally friendly, highly light reflective and pollution reducing paint finishes.

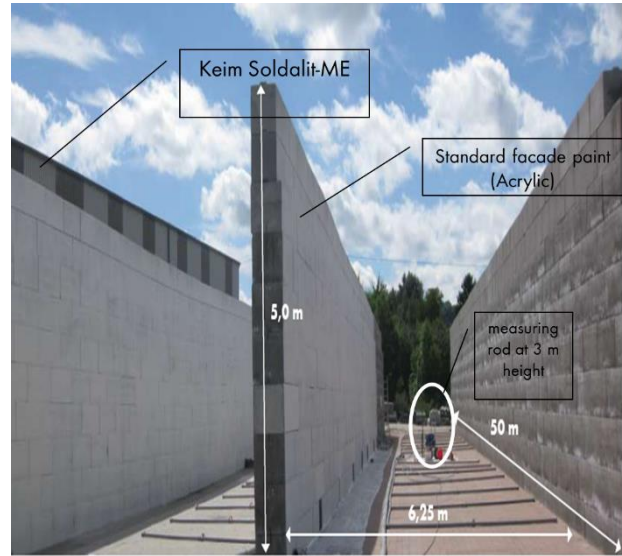
3. Under Practical Conditions - Street Canyon Test

Keim Soldalit-ME was tested outdoors in direct comparison with other standard facade paints in a street canyon test. The canyon was continuously exposed to nitrogen oxides and the pollutant gas concentration in both canyons was measured over a period of time.

The degradation rates in practice are strongly influenced by wind strength and wind direction as well as by solar radiation. In the defined period, Keim Soldalit-ME led to NO₂ reduction rates from 10 - 50 % in the street canyon.

Keim Soldalit-ME has been proven in these outdoor tests to reduce Nitrogen Oxides (NO₂) concentrations by up to 45%.





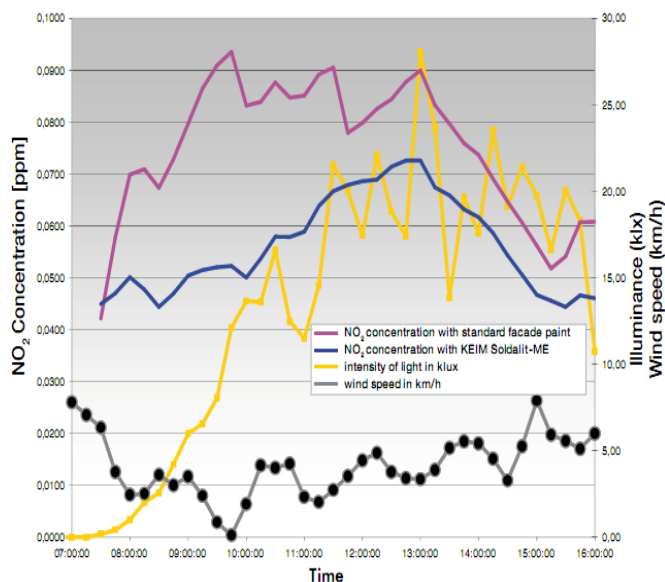
In Amsterdam, on the A10 Autobahn (Motorway) Keim Soldalit-ME was used onto the noise reduction barriers and demonstrated an average reduction of 4.4g NO₂ per square metre on a smooth surface per year. For a textured surface this effect significantly increases.

- If an average family car/small van emits approximately 5600g NO₂ per year
- Approximately 32 million cars in the UK, this would equate to 179m kg of NO₂ being emitted into the environment every year
- Just 1272 square metres of surface painted with Keim Soldalit-ME could offset the NO₂ emissions of each vehicle every year.

When tackling Nitrogen Oxide pollution in the UK, any technique which significantly reduces this type of pollution should be considered to ensure improvement to the natural environment and public health.

Whilst photocatalytic mineral paints cannot, on their own, cure the problem, they are a significant step in the right direction, both in terms of air quality and protection of the environment, as well as changing our reliance on conventional, potentially damaging paint materials.

4. The Results – NO₂ Reduction Test





5. The Mineral Difference

Keim Mineral paints are different, because they are manufactured using natural earth oxide pigments and potassium silicate. They do not contain any harmful ingredients such as solvents or petrochemicals and have no detrimental effect on either the substrate, environment or air quality.

When applied to mineral substrates, Keim Mineral paints penetrate into the surface creating a microcrystalline structure which provides an integral protective and decorative finish. This crystalline structure allows free passage of moisture vapour, eliminating blistering and flaking of paint. Mineral paints also protect the surface from the ingress of moisture.

For further information regarding Keim Soldalit-ME and the features and benefits of Keim Mineral Paints please contact our sales office - sales@keimpaints.co.uk or 01952 231250.

