

# Using additives to enhance coating application performance

Additives are an essential part of coating applications as they can enable additional functionality that many alternative coating technologies cannot match in terms of manufacturing capabilities or the specific performance properties of the finished product. Additives for coating applications may include:

- Solvents
- Catalysts
- Extenders
- Thickening agents
- Levelling agents

## Solvents

Solvents are used in coatings to disperse the various components of a formulation (e.g., pigments, binders) before the product is applied. Solvents also control the viscosity of the coating for the required substrate and application method. If a coating is applied to a substrate, the solvent evaporates, thereby leaving the resin and pigments to form a film that has a consistent appearance and quality.

Due to their release of volatile organic compounds, the aim is to reduce the amount of solvents in coating applications. However, their rapid drying times, durability, and ability to withstand harsh environments and temperature extremes make solvent-based coating applications the most workable option for many products and manufacturing processes.

## Catalysts

Catalysts are added to coating formulations to: (i) influence their reaction rates during polymerisation; (ii) provide beneficial properties to coating applications. A typical example is faster reaction rates enabling quicker drying times at lower temperatures while providing enhanced mechanical properties and durability. These actions permit productive and cost-effective coating applications, higher-quality coatings and, therefore, better-quality finished products.

## Extenders

Extenders are used in coatings to enhance performance before, during and after application. Magnesium silicate ('talc') is a good example. Talc is added to formulations to increase viscosity and create the appropriate levels of coverage and dispersion upon application. After application, the talc in the coating creates a barrier against moisture and chemicals due to its hydrophobic properties. This feature protects against corrosion, peeling and cracking of the coated surface. The longer pot life enabled by extenders by maintaining the

coating at the correct application viscosity can also reduce costs and waste.

## Thickening agents

Thickening agents (also termed 'rheology modifiers') are added to coating formulations to provide the requisite flow properties. These can be pseudoplastic or thixotropic. The former is characterised by increased viscosity as force is applied, and the latter is characterised by reduced viscosity. These factors are crucial to the chosen application method and outcome of the finished product. For example, the correct viscosity upon application can prevent excess dripping/spattering if a brush or roller is used, and can promote a consistent and durable finish. Thickening agents can also be employed to promote the correct rheology characteristics required of a coating formulation throughout manufacturing, storage and transportation.

## Levelling agents

If aesthetics are important levelling agents can be employed to optimise the finished appearance of a coated surface by controlling the surface tension of a coating (i.e., its ability to wet and spread adequately over a given substrate). If the surface tension of a coating is too high, defects which may not have been visible upon application may appear once the coating has dried. These can include pinholes, scratches, craters, "floating" and "flooding". Levelling agents are added to coating formulations to help eliminate these surface defects and provide a superior looking and smoother appearance.

## In conclusion...

Additives comprise only a small proportion of all the components in a coating formulation. However, the performance characteristics they enable are very important for manufacturing, storage, application and/or end-use stages. Hence, consideration of the most appropriate additives is crucial. This can be in relation to an additive's compatibility with the coating formulation, including the base polymer, solvents, pigments and other additives. With over 120 years formulation and manufacturing experience in the performance coatings sector, ITAC can help.

*Further information on ITAC's technical solutions and application expertise can be found online at <https://itacadhesives.co.uk> or by calling 01204 573736 or emailing [info@itac.uk.com](mailto:info@itac.uk.com)*