The Company

A manufacturer of high performance waterborne coatings for application to PVC extrusions used in both internal and external environments.

The Problem

The company wanted the ability to produce a range of coloured PVC for use in their product range which includes window frames, garage doors, guttering and cladding.

When considering the different options available to achieve the desired outcome, the company looked at pigmentation of the PVC using masterbatch. However, the use of pigments can cause a breakdown of the PVC over time, particularly when exposed to sunlight. This gradual breakdown will reduce the exterior durability.

A second option was to use a solvent based coating. Again this was a problem in that solvent based coatings also have an effect on the PVC by softening it. Furthermore, solvent based products are not an environmentally friendly option.

Ideally, the company needed a waterbased solution.

The Solution

By working closely with Incorez, the company was able to develop a formulation that includes a blend of waterborne aliphatic polyurethane/acrylic hybrid dispersions. These hybrid dispersions combine the excellent physical resistance properties of polyurethanes with the binding and wetting properties of acrylic emulsions. Upon application, film formation takes place by evaporation of water to yield tough, resilient films.

The relative cost of the coating is more than the solvent based and pigmented PVC options. In addition, the company needed to invest in extra drying equipment. However, these costs were more than offset by the fact that the company could charge a premium price for the colour coated frames which include a range of wood effects.

The Benefits

As well as the economic benefits of using waterborne coatings, the environmental benefits are significant too. The company has seen cost reductions enabled by the low volatile organic compound (VOC) content and elimination of toxic substances. The cost of maintaining environmental permits and the costs associated with processing, handling and disposal of hazardous waste have been eliminated.

The combination of polyurethane/acrylic dispersions used in the final formulation results in a range of waterborne coatings with the following benefits:

- adhesion to the PVC without softening it
- good combination of surface hardness and flexibility
- heat reflectance
- excellent colour/gloss retention
- aliphatic base gives exterior durability
- ease of colour variation