Not the same old acrylate!

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Abstract

Hair fixative polymers have undergone a continuous series of transformations. Whilst most came about as improvements to the technology, some were a response to changing regulatory requirements. This article will talk about some aspects of hair spray formulations, both aerosols and pumps, characterized by high levels of water (55% VOC and lower). The choice or the requirement to include water in an aerosol or pump spray formulation, has a direct impact on the chemistry/polymers that can be used; choosing the appropriate product makes the difference between a wet, coarse spray and a fine, fast-drying one.

Usually, the target is to obtain a fine, fast-drying and soft-delivery spray; in practice the final product is often the result of compromises such as coarser spray pattern for higher setting ability, or soft hold for low tack. The property of the polymer that enables it to spray well in formulations that have a high amount of water is referred to, in this article, as water-compatibility. This is important in aerosols, but even more in pump sprays, where the VOC level dictates the amount of water that is used, with very few alternatives.

In the context of the available hair fixatives offered by our company, I would like to present a new polymer designed for hair spray application (water containing systems): Polyacrylate-22 (trade name Luviset Shape), which has, in my opinion, reached performance levels that enable better formulas to be created without any big compromise. Polyacrylate-22 is the newest addition to our product line; not only does it work well with water, but take the formulations to new level of performance and water compatibility. Not just for 55% VOC, but lower-yet if necessary. This polymer will be described in more detail in the following section.

Introduction

As mentioned above this is a new product that was developed for the toughest water challenges. Among its features are strong crunchy hold, fast-drying spray, with low tack and ability to produce a fine spray even in high water-containing formulas (low and very low VOC formulas). The chemical composition of the polymer has a portion of acrylate chemistry and one of polyurethane, the former drives the hold properties, the latter allows for the improved sprayability and the extremely low tack during and after drying. In more detail, Polyacrylate-22 is a copolymer of methyl methacrylate, methacrylic acid, acrylic acid and urethane acrylate component, it is supplied in a solution form, where the solvent is a mixture of water and ethanol.

Although this product has not been tested for skin care applications, an initial qualitative evaluation reveals a very nice skin feel given by the polymer, characterised by the absence of tack and tightening effects, and the ability to form a water resistant film. The polymer film formed by the product as it is supplied, 60% neutralized pH 7, it is not water soluble.

Technical profile - product features

When compared to other polymers on the market, Polyacrylate-22 showed overall winning features, as shown in the spider chart that summarizes the product's properties (Figure 1).

This new product has outstanding water compatibility, which can be described by laboratory tests in terms of particle size of the spray (spray-ability), lack of foaming (visual test), clarity of the formulation (again a visual assessment or it can also be performed instrumentally). Other properties of the polymer have also been benchmarked against relevant competitors' products; all tests were performed in a laboratory setting. Noticeable are the properties of the polymer relative to lack of tack and hold; the former distinguishing this product from many others, the latter is more of a core property of hair fixatives and it is common among the most popular polymers