Baycusan® C 1008: A New Film-Forming Polyurethane Polymer for Hair Styling Formulation

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Abstract

The purpose of this project was to investigate attributes of a new polyurethane dispersion, Baycusan® C 1008, as a film-forming polymer for hair styling applications and compare it with conventional hair styling polymers. Key measurements, such as high-humidity curl retention, cantilever 3-point bending or omega loop, were conducted to evaluate the performance of this new polyurethane dispersion.

Baycusan® C 1008 offers a new solution for use in hair styling formulations. In addition to excellent high-humidity curl retention and a medium-durable hold, the unique feature of this polyurethane dispersion is its highly flexible hold. Furthermore, the new polyurethane dispersion is easy to incorporate into the formulation. No high energy input is required, it is suitable for a cold/cold production process, no neutralisation is required and it offers high formulation versatility.

Introduction

Numerous hair styling products are available on the market in response to consumer expectations, as well as different climatic conditions, regulations and trends. A wide range of hair styling polymers is available to meet these different requirements. Conventional hair styling polymers are based on vinyl pyrrolidone, vinyl acetate and acrylic resins. For example, copolymers known by the following INCI names: Octylacrylamide/Acrylates/Butylaminoethyl Methacrylate Copolymer, Acrylates/t-Butylacrylamide Copolymer and Acrylate Copolymers are currently used in hair styling products. These acrylic resins are known to contribute good hold to hairstyles. Nevertheless, they cannot be used to develop products that hold the hairstyle effectively and over long periods, while at the same time giving the hair a natural finish and allowing it to move. The films formed by these film-forming agents have mechanical properties that are difficult to control. Vinyl acetate-based polymers and in particular VA/Crotonates/Vinyl Neodecanoate Copolymer are also widely used. Compared to acrylic resins, they have a moderate resistance to humidity but impart a silky feel to the hair.

Baycusan® C 1008, a Styling Film-Forming Agent that Provides a Natural Finish

Consumers are looking for increasingly effective hair styling products, for example in terms of hold and durability, although with no compromise in terms of the cosmetic aspects of the product. The product must offer a strong, long-lasting hold and excellent resistance to humidity but must also leave the hair silky, shining and natural looking.

Our company is introducing a new polyurethane based film-forming agent, Baycusan® C 1008, to meet these consumer expectations (Table 1). Baycusan® C 1008 is also unique in that it contains neither preservatives nor co-solvents such as ethanol or N-methyl-2-pyrrolidone (NMP).

Baycusan® C 1008	
INCI name	Polyurethane-48
Chemical description	Waterborne polyurethane dispersion (PUD) based on adipic acid, 1-6 hexandiol, neopentyl glycol, isophorone diisocyanate, isophorone diamine, N-(2-aminoethyl)-3-aminoethanesulphonic acid, sodium salt
Solids (wt.%)	30 ± 2
pH	7.0 ± 1.5
Glass transition temperature (°C)	< 45.5

Table 1. Properties of Baycusan® C 1008

The Chemistry of Polyurethanes

Baycusan® C 1008 is a high molecular weight polyurethane dispersion in water. The stability of the polymer dispersion is achieved by using an internal emulsifier incorporated into the polymer chain. Polyurethanes are formed from the reaction of