

DYNAPOL®

Competency: Functional Polymer Design

Keep the pack stainless! – New DYNAPOL® polyesters for interior Can Coating solutions with excellent protective properties

DYNAPOL® polyester resins serve versatile coating solutions for metal packaging containers. Evonik is driving the extension of the DYNAPOL® series for food contact applications. Two new high molecular weight polyesters – DYNAPOL® L 907 and L 914 – are leading to coatings with excellent media resistance. Sterilization tests with respectively coated metal cups were carried out in the presence of spicy and colored foodstuff. These harsh test conditions simulated the retort process in food can filling lines. The test metal cups were perfectly protected.

DYNAPOL® polyester resins are well established high quality paint binders for pre-coating flat metal sheet or strip which is subsequently formed and finally used in diverse end applications – one of them being metal packaging containers or simply “cans”. The DYNAPOL® product portfolio offers a versatile range of saturated, middle and high molecular weight polyester resins suitable for can coatings matching the technical needs of the market. Additionally, many DYNAPOL® grades are in compliance with common regulatory frameworks for food contact applications. This is important because when it comes to protective interior coatings for food cans such health & safety aspects influence the acceptance and approval by authorities and throughout the whole value chain. Given this fact, paint manufacturers and raw material suppliers place ever increased emphasis to food safety aspects and related legal frameworks, when steering future business orientation.

The high ponderousness of legal requirements is shown not last by the recent step the French government took by prohibition of the substance bisphenol-A (BPA) in food contact coatings [1]. BPA is the main ingredient for epoxy based coatings used in the majority of food cans and is under suspicion to cause health concerns.



With two new high molecular weight polyesters – DYNAPOL® L 907 and L 914 – Evonik is presenting appropriate alternatives to the paint manufacturing industry. Both products are main binder resins and designed for interior, high performance BPA-non intent (BPA-NI) can coatings. DYNAPOL® L 907 has a high glass transition temperature of 75°C while offering a high degree of coating film flexibility at the same time. During the can manufacturing process perfect film flexibility is inalienable necessary due to deep-drawing and bending processes of the pre-coated metal sheets. In addition, coatings derived from L 907 convince by high resistance towards sterilization conditions as required in real food can filling lines.

During the development of DYNAPOL® L 914 focus was on further improvement of sterilization resistance. By increasing the glass transition temperature to 100°C, more durable coating films are achievable. Despite this high glass transition temperature there is hardly any trade-off in flexibility. Some experiments and results based on the two new products are described in the following.

To simulate the sterilization process taking place in a real can filling line in a laboratory, the coated cans were sterilized in presence of food-types which are commonly packed in metal cans. Tomato paste and hot peppers were chosen as sterilization media, representing strongly colored, salted and spicy aggressive filling goods.

Gold and white colored DYNAPOL® L 907 and L 914 based coatings are challenged by these media and compared to an epoxy based gold-lacquer for reference.

The pictures attached illustrate the pre-coated and formed test cans after the sterilization process.

In more detail, Picture 1 shows the specimen after sterilizing at 129°C for 30 minutes in "Chiles Jalapenos", a type of hot peppers. It can clearly be seen that both test cans remain untouched after the sterilization process. The coatings maintained their initial gloss, did not absorb the food colorants and did furthermore not indicate any adhesion loss; not even at the intensely bent edges and corners.

When comparing these findings with the test results received from a standard epoxy-gold lacquer (Picture 2), it can be clearly seen that this epoxy coating suffers from limited film flexibility and adhesion to the metal substrate. For that reason the coating film peels-off the can. In consequence, the foodstuff would no longer be protected from the metal substrate of the can and vice versa.

Usually white pigmented coatings are more sensitive for discoloration by natural food colorants when compared to above mentioned gold lacquers. Picture 3 shows the formed test cans after the sterilization process in sieved tomato paste for 30 minutes at 129°C. Tomato paste is a very aggressive foodstuff because of its strong red color and acidic pH value. Obviously both coating films have passed the sterilization process without changing their whitish sheen or absorbing the red dyes. Besides that, the coatings are completely undamaged and do not show any indication of adhesion loss.

The test results speak for themselves and confirm the strong performance of the new DYNAPOL® grades. In the crucial points, film flexibility, adhesion and resistance towards sterilization conditions, DYNAPOL® L 907 and L 914 are outstanding.

¹⁾ www.eurofins.de/de-de/news/news/news-2015/bisphenol-a-anwendungsverbot-in-frankreich.aspx

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(april 2008)

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