

PASTRY LINES

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Cylinder head gaskets for engines, special coatings for pans, trays and molds for the baking sector – how does that all fit together? **Dr. Christoph Stecher**, Managing Director of acs Coating Systems, thinks “It’s a logical development.”



++ Pan clusters, cake rings and cake molds, as well as perforated trays, are also coated with DURAPEK® fully automatically

+ bbi: In the past your clients came mainly from the automobile industry, for which you developed a cylinder head gasket, but a quite different sector entered your list more than two years ago – baked products manufacturers. How did that happen?

+ Dr. Stecher: The starting point was when we were approached by an oven constructor who had problems with the non-stick effect of baking trays and roasting plates. That was three years ago. The best advertisements for our DURAPEK® coatings at that time were their robustness, durability and temperature resistance. We were slightly behind the best in relation to the non-stick effect. On the other hand, our product lasted longer. Motivated by the enquiry, we worked intensively on the non-stick effect and made considerable progress with it. We caught up and overtook. The beauty of it is that we now have a coating which achieves a good to very good non-stick effect for everything simultaneously. For sweet things, lye products, fish and meat.

+ bbi: What is requested most often?

+ Dr. Stecher: The sweet direction, e.g. for baked goods with a large proportion of sugar or with sticky, fruity fillings. Irrespective of that, we initially focused on trays for lye products, and we have solved the lye problem area. At the present moment, everything else seems to me to be easier.

+ bbi: What do you mean by that?

+ Dr. Stecher: We have developed a new lye product tray. It’s not yet a revolution, but the tray has a different appearance. It’s somewhat thicker, 2 mm thick to be precise, and

consists of aluminum with an angled edge on all four sides. This makes it very sturdy. And one very important point: the edges are NOT folded back. That’s because when lye penetrates into a folded flange, it comes into contact with aluminum. Aluminum is dissolved out and could come into contact with the baked products. That’s why we decided to coat the tray all round. Nothing must remain open. Because there’s no fold, we had to think up a special solution for the coating process. We developed matching stainless steel rivets that are attached to the tray, and we hang the tray on those for the coating stage. Now you are going to say BUT ...

+ bbi: ... the intervening space between the stainless steel rivet and the aluminum could be a weak point.

+ Dr. Stecher: One might think so, but it’s not. The aluminum tray is coated together with the stainless steel rivets, after which it passes through the oven. The coating tightly seals the intervening space. Thus the rivet grips not only mechanically but is welded in addition.

+ bbi: What’s different about the coating process?

+ Dr. Stecher: We follow a different chemical approach. Our coatings are entirely solvent-free. There are also no substances that could out-gas and decompose when they are heated. The coating layers are also thicker, in the range from 60 to 70 µm. Thus they are twice as thick as is usually customary.

+ bbi: How does the coating process take place?

+ Dr. Stecher: Whereas PTFE non-stick coatings (“Teflon”) are applied to trays and pans in liquid form by using solvents,

we employ a powder that is applied dry and electrostatically in several layers and then stoved. That's how we are able to work without solvent residues or oils. The coating takes place here on site in Wilhelmshaven, and is automated in two fully automatic pass-through plants.

+ bbi: Can you be more specific about the term "powder"?

+ Dr. Stecher: By powder I mean our coating compounds, which have a powder-like consistency comparable to flour. They consist essentially of the high-performance plastic substances PAEK (polyaryletherketone). We buy the raw polymers from the chemicals group and manufacture the coatings exclusively ourselves. We use a special plant for this, which exists only in our company. Thus we operate totally autonomously. Our coatings are covered by several patents.

+ bbi: That really doesn't sound very complicated ...

+ Dr. Stecher: It's deceptive. A coating consists of 20 different substances. An enormous amount of development effort goes into finding the right mix for an optimum result. It's a Herculean task. We have been working on our non-stick coatings for around 15 years, and the beginnings for PAEK coatings extend back for more than 20 years and were intended at that time for cylinder head gaskets. Working on the same thing for a long time seems to have become unfashionable, but if one does that one has the advantage of being one step ahead of everyone else.

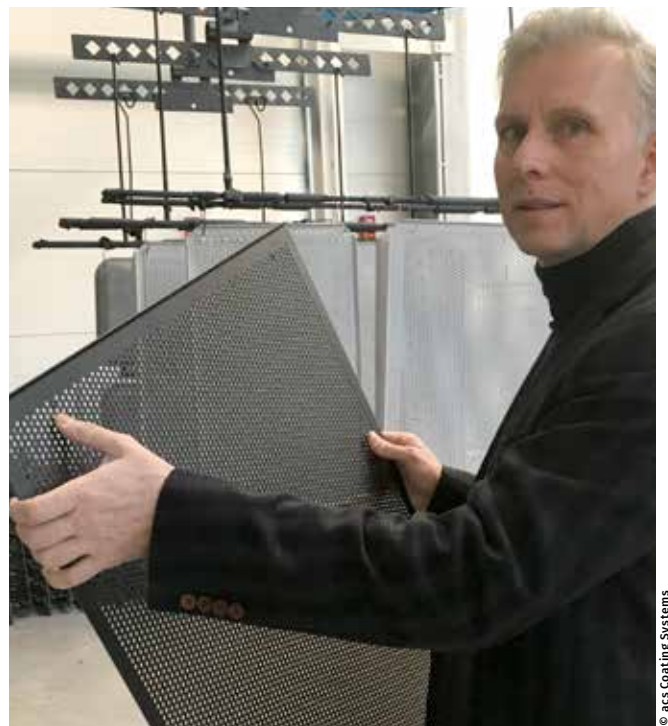
+ bbi: Why PAEK?

+ Dr. Stecher: We wanted thermoplastics because they have the property of turning into a liquid at a certain temperature. That's why an oven is sufficient, instead of working with solvents, which are often even carcinogenic. The abrasive wear properties and long-term durability are also very good. There is no embrittlement. We use PAEK because this high-performance plastic has high chemical resistance while being hard at the same time. There's no out-gassing, even at high temperatures, and we have had that tested as well. There is a small drawback: they are more expensive and not so easy to process. But coping with that has been our business for 20 years. Of course, because the raw materials are already in the upper price bracket, we cannot manufacture cheaply-priced coatings. But anyone who does the calculation to the finish will recognize that our baking trays ultimately save money.

+ bbi: You would need to explain that.

+ Dr. Stecher: Firstly, our trays have a longer lifetime. The coating lasts longer. Secondly, bakeries save energy and baking time, and also need no baking paper. More time means more pieces per unit time, lower personnel costs etc. We presented an example calculation from the viewpoint of a baker with an annual turnover of approx. EUR 1m. This revealed that the additional costs due to DURAPEK® baking trays are recouped within three months. From then on it saves money, because less energy is consumed, a lower oven temperature is needed, baking time is saved and no baking paper is needed. Thus the supposedly more expensive product is actually less costly and more sustainable. The retail trade is increasingly demanding sustainability.

+ bbi: What are the possible time and temperature savings?



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++ Dr. Christoph Stecher says: "Working on the same thing for a long time seems to have become unfashionable, but if one does that one has the advantage of being one step ahead of everyone else."

+ Dr. Stecher: Our customers report time savings of 10%. They were able to reduce the temperature by 10 to 20°C to achieve the same baking result.

+ bbi: Is there a warranty guaranteeing how long the trays will last?

+ Dr. Stecher: I can't give that yet, because applications differ very greatly. But I do have an example. One customer required 20,000 baking cycles. As things stand today, cycle 177,000 has been reached.

+ bbi: Some tray manufacturers say the abrasive wear of aluminum trays occurs mainly due to pushing them into and out of a rack trolley or into the rails of an in-store oven. Do you see any problem in that respect?

+ Dr. Stecher: We always coat this area, even on simple baking trays. The coating is the same in principle as on the exhaust flange of a BMW. That has to last for ten years and withstand temperatures of up to 300°C, and the components slide on top of one another. Or as in the case of a cylinder head gasket, which must also last ten years and must withstand arduous thermal movements under a large load. Our roasting plates for the catering trade are also pushed into the oven, and they last for ages. I don't see any problem, provided there is a smooth sliding surface and appropriate utilization.

+ bbi: How do you reconcile your five mainstays – the automobile industry, the baking sector, catering, household goods and industrial coatings?

+ Dr. Stecher: The industries are entirely different, and so are the applications. But the solution strategies are similar. There are different compositions for the coatings and different programs, but the machinery equipment and work processes are the same.

+ bbi: Dr. Stecher, many thanks for the interview. +++