Ticona

# Metal was yesterday!

## Vectra® LCP baking pans are the way of the future

ENGINEERING POLYMERS

# Prepare for the new baking age with Vectra® LCP!

A combination of top product quality and optimum productivity is the recipe for success in modern bakeries. The performance and serviceability of the baking pans used play an important role here. Until recently, the market was for the most part dominated by metal baking pans. But today, aluminum, stainless steel and steel sheet are by no means the only suitable materials. Plastics offer a wealth of possibilities and are more than a match for metals.

Metal replacement by plastics has been pioneered by the automotive industry. To cut costs and, above all, save weight, automotive manufacturers increasingly use the innovative power of engineering plastics to drive development. The results have been spectacularly successful. These polymer materials allow greater freedom of design, can be processed cost-efficiently by injection molding and offer significant weight advantages. Many new developments have only been possible through the use of high-performance polymers.

The baking industry, too, is benefiting from the use of plastics, particularly the special liquid crystalline plastic Vectra® LCP. With its outstanding spectrum of properties, such as its inherent non-stick effect that eliminates the need for coating, good mechanical properties, high resistance to temperature extremes and ease of coloration, Vectra® LCP offers design opportunities that were previously unimaginable and unrealisable with metal.

But the high potential of this liquid crystalline polymer does not lie just in greater freedom of design but also in increased cost efficiency. Besides being easy to process by injection molding, Vectra® LCP enables cost savings to be made during running production, e.g. through lower energy consumption and optimized process operations.

- Non-stick effect without coating
- High savings potential in baking time and temperature
- High rigidity and no warpage
- Design freedom in shapes and colors

## Non-stick effect without coating

A great advantage of Vectra® LCP for industrial and craft bakeries is its inherent non-stick effect. This eliminates the need for the usual PTFE or silicone coatings and the regular recoating previously required. And where there is no metal or coating, sub-surface migration, surface stripping and rust are no longer a problem. This in turn has a positive impact on the service life of baking pans and trays.

What's more, because of the inherent non-stick effect, the amount of fat required to grease the pans can be reduced – while the baked products still release easily from the pan.

## Impressive advantages for baking pans

Vectra® LCP has ideal properties for all types of baking pans and trays. This high-performance polymer can be used at temperatures ranging from -196 °C to +280 °C and also withstands sudden extreme temperature changes such as in shock freezing. Pans produced from this high-tech material could therefore be transferred directly from a freezer to a convection oven without any problems. Unlike metal pans, plastic pans are also suitable for microwaves.

Besides its thermal properties, Vectra® LCP also has very good mechanical properties, such as high toughness, rigidity and strength. It can withstand the severe mechanical stresses typically encountered on conveyor belts or during stacking – and yet Vectra® LCP pans weigh about 30% less than metal pans.

Vectra® LCP is free from additives such as plasticizers, complies with the required EU standards and has received food contact approval from the FDA. In addition, the plastic is food-resistant and absorbs no media that could lead to discoloration, form undesirable deposits or cause chemical surface change.

When it comes to hygiene, Vectra® LCP sets high standards. The attractive, smooth surface of the material can readily be washed in a dishwasher and is resistant to all the usual detergents.

## Vectra® LCP properties

The Vectra® LCP range for this application is currently based on the four injection molding grades E540i, E440i, S540 and S471. These differ from each other in heat resistance, rigidity, toughness and achievable surface quality. By targeted modification with fillers and reinforcing materials (mineral and glass fibers), these grades can be tailored to the requirements of different household and industrial applications.

## At a glance

- Non-stick effect without the need for coating or recoating
- Good mechanical strength: high rigidity and no warpage
- 10% energy saving in baking time and temperature
- Approximately 30% lighter than metal
- Noise reduction in stacking and handling
- Suitable for use in ovens, microwaves and freezers (shock freezing) over a temperature range from -196 °C to +280 °C
- Design freedom and color versatility
- Dishwasher safe and detergent resistant
- Cost-efficient production by injection molding
- EU and FDA food contact approval

## High savings potential

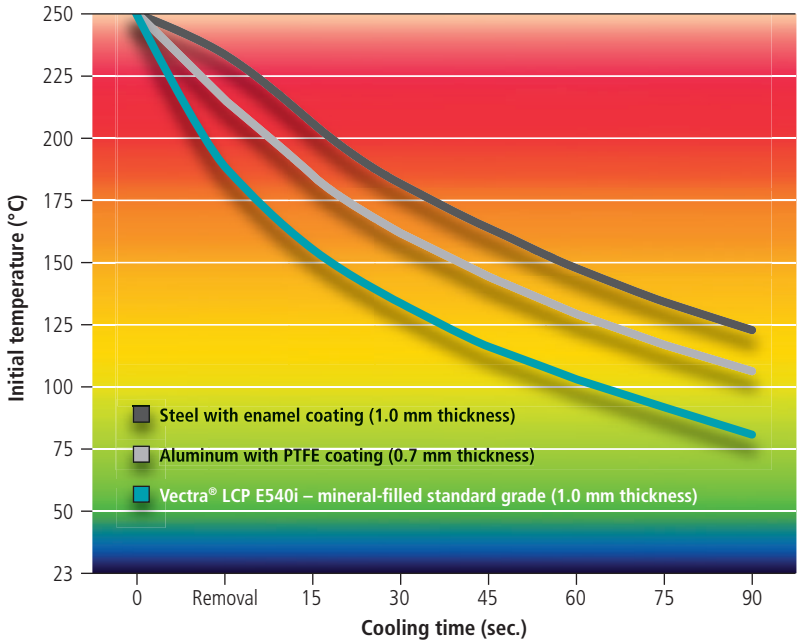
To increase their profitability, bakeries need to cut costs, save energy and reduce baking time, while also optimizing process operations. This is exactly what Vectra® LCP achieves in a number of different ways.

As a result of the polymer's inherent non-stick effect, coating and recoating are unnecessary. This saves high costs in terms of freight charges and downtime.

Additional savings potential lies in the good heat transfer properties of Vectra® LCP. This plastic absorbs the oven's heat more quickly than metal and transfers it directly to the product being baked. This allows shorter baking times and about 10% lower baking temperatures.

After removal from the oven, the lightweight plastic pans also cool far more quickly than their metal counterparts. This provides better pan utilization, since the pans can be emptied, refilled and reused within a very short space of time.

**Comparison of cooling behavior**




Standard test plaques were heated at 250 °C and their cooling behavior documented with a thermal imaging camera. Vectra® LCP cools much more quickly than conventionally used materials.

Low mold temperatures and very fast cycles make it possible to produce large quantities per unit of time and so ensure optimum machine utilization.

## Advantages for processors

Besides design flexibility, the main advantages of producing baking pans and trays from plastics lie in processing. In comparison with other high-performance plastics, Vectra® LCP permits easy, cost-efficient mass production by injection molding.

Other advantages of Vectra® LCP for production include:

- Wide processing window
- Very low melt viscosity
- Flash-free injection molding

## Design freedom offers shape and color flexibility

In the development of new products, ease of processing, freedom of design and color versatility play a key role.

Even a combination of different materials and functions is possible. For example, the silicone rim of a new springform pan is held clamped in a stable base produced from Vectra® LCP. Because of its attractive surface finish, the base can also be used as a serving plate.

Vectra® LCP is easy to color. A large range of colors is available for the four Vectra® LCP grades. In addition, special colored formulations can be supplied to customer specifications.

This design flexibility is particularly appreciated by household goods manufacturers, whose products have increasingly short lifecycles. With Vectra® LCP, it is easy to respond rapidly to changing shape and color trends and to produce promotional articles.

Vectra® LCP is supplied as natural pellets approx. 3 mm in size. Color masterbatches are available in a range of different colors.

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# Plastics know-how at first hand

Ticona, the technical polymers business of Celanese Corporation, is a leading manufacturer of engineering polymers. As the world's largest LCP producer, Ticona can give customers the benefit of more than 20 years' market and product experience with this liquid crystalline polymer.

But Ticona is more than just a raw material supplier. As a polymer manufacturer, Ticona provides comprehensive technical service support for its customers. This ranges from in-depth consulting on projects to material selection, assistance with part and mold design, CAE calculations and optimization of production processes.


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