

Newsletter



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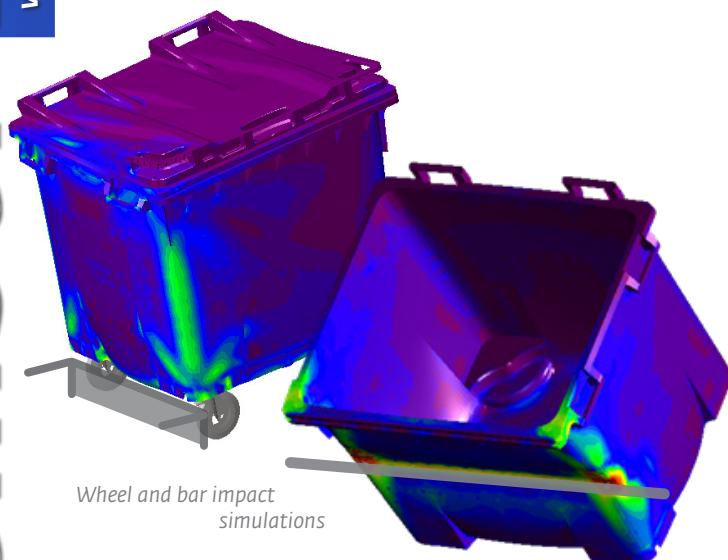
In this issue: MGBneo⁴ Garbage container series, Brabantia Nic bread bin and Plastic and the Design for Sustainability conference

Garbage container series

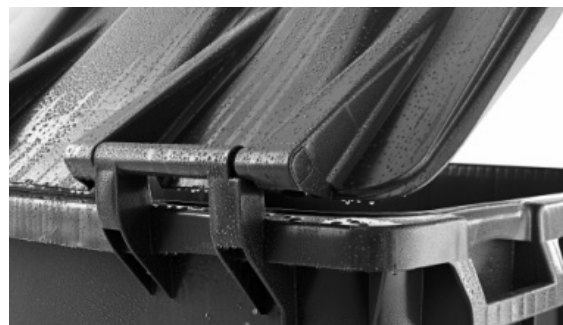
BPO developed the new MGBneo⁴ wheelie bins for Paul Craemer GmbH from the first sketch ideas to the 3D data delivery to the toolmaker of the very big and complex moulds required to produce all plastic components. The largest part is the 1100 litre body, a more than 25 kg HDPE part, being produced on Craemer's 5500 tonnes injection moulding machines. The series consists of a 660, 770 and 1100 litre version, completing the range of wheelie bins for Paul Craemer. The design of the new family members matches the design of the smaller volume Neo series.

More robust and less plastic. Like any development executed by BPO, the project was intensively supported with FEM and injection moulding simulations. This resulted in light-weight HDPE bodies and lids that can exactly be produced on the intended machines and a product that meets all standardised test (*various images of the simulations performed for this project are illustrated here*).

Innovative and clever. The containers correspond to the standards for this type of product, including all main dimensions being strictly prescribed. Within this limited design space, BPO managed to realise some innovative features. The shape of the lid is minimal in height and shaped to prevent water ingress when opening the lid, having optimal stiffness and allowing compact and stable stacking of the containers with the lids in the open position. Another robust and clever solution is the construction of the hinges, which are; contrary to other bins, assembled with one long pin in a solid base, allowing easy assembly and minimising the risk of having fracture in a typical critical area.



Wheel and bar impact simulations



Water ingress testing on open lid

Four wheel bins have handles on all sides of the body for manoeuvring and position the bin behind the garbage truck. The Ø200 mm castor wheels are heavily loaded when moving the bins with content and need to withstand impact when bumping into the kerbside. The connection area of the wheels is designed to withstand the forces that the rigid steel wheelbase applies to the plastic.

The wheelie bins can be delivered with many different optional features: lifting trunnions, noise insulation plugs, (gravity) locks, glass inserts, etc. All parts are constructed in such a way that different versions of the products can be assembled with minimal effort and be personalised by changing mould inserts.

More information can be found on the website:
<https://uk.e-catalog.craemer.com/wheelie-bins/wheelie-bins-mgbneo/mgbneo4-660-1100-plastic>



Top: Exploded view of the 770L version
Left: From large to small the 1100L, 770L en 660L containers



Simulation: During the development many different load cases were simulated. The results were used to make choices in concept development and to ensure the final design would meet the test as required in the standards. These tests included impact testing by dropping the container, tilting with heavy weight inside, kerb impact, ball drop and many more.

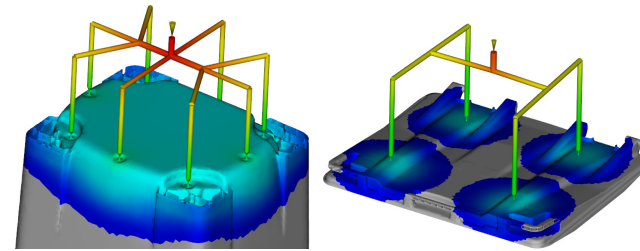
Moldflow: For the lids and bodies, injection moulding simulations were used to analyse and optimise the injection locations. In close cooperation with Craemer and the toolmaker, the locations and hotrunner diameters were fine-tuned in detail. The warpage of the parts was also simulated and geometrical precautions were taken to ensure straight parts after injection moulding.

Brabantia Nic bread bin

For over 100 years now Brabantia is making all efforts to design household products that are durable, convenient and well made. In cooperation with Brabantia BPO developed a new bread bin. The lid of the bin can be used as a serving tray, very practical and multifunctional. But of course, as a consumer you also just want a bread bin that can be closed tightly so your bread stays fresh. With this idea BPO went to work.

For a successful design the lid and bin have to fit on top of each other very well. The bread bin has a rectangular design with high sidewalls. Brabantia wanted to make the bread bin using injection moulding, with the injection point in the centre of the bottom. Similar plastic products are known to be sensitive to warping (shape distortion due to unequal shrinking of the plastic) because of the injection moulding process. Especially the long side walls of a design are susceptible to unwanted deformations. This gives the risk that the lid may not fit correctly on the bin. Brabantia was aware of this risk and contacted BPO, as experts in the field of injection moulding, to be one step ahead of potential problems. A Moldflow simulation was conducted, with an emphasis on warpage. As expected, the first simulations showed the long side wall to bend inwards approximately 2 millimeters. The design was adjusted based on these results: Brabantia gave the long wall a bit more curvature and the fitment of the lid was changed.

Without these simulation tools, thorough cooperation with Craemer's R&D department and BPO's experience in development of heavy loaded products like garbage containers, it would have been impossible to accomplish these new, innovative designs as they are being produced by Craemer and can be seen in the streets of the first communities around Europe.

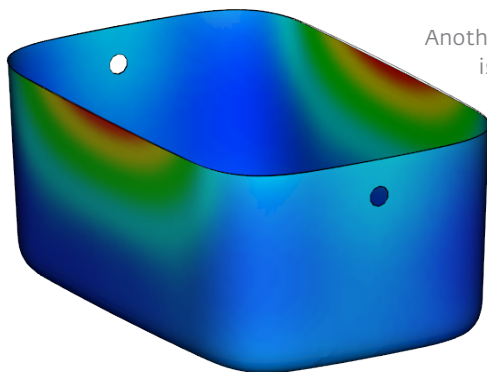


Moldflow simulations with injection system

The actual product showed very similar results as the simulations. In these Moldflow simulations for the bread bin BPO was focused on the warpage effect. But at the same time as the Moldflow simulations, filling pattern, filling pressure, required clamp force, cooling time, weld lines and air traps are analysed. All these variables were found to be in order for this skillfully designed bread bin. The result is really something to behold: a fine product with a lid that fits perfectly!

Brabantia has started the production of the multifunctional Nic bread bin and the product is available through various retailers.

For more information, check; www.brabantia.com



Warpage simulation of the bread bin

Another potential risk with injection moulding is the deformation of the middle of the bottom. The bin has a standing rim, but if the deformation of the bottom exceeds the height of this rim, the bread bin may 'spin' around if placed on a flat surface. This possible effect was also judged in the Moldflow simulation. The bottom deforms approximately 1 millimeter upwards, which is a good result.



The bread bin and the lid that can be used as a serving tray in use



*On behalf of the BPO team;
Happy Holidays and best wishes for*

2020!

Plastic, Design for Sustainability:

This autumn, BPO (Mr Brocades Zaalberg) will be keynote speaker at the "Design for Sustainability" conference. We cordially invite you to attend the conference.

(10 - 11 December 2019, Berlin, Germany).

**Plastic: Design
for Sustainability**