

HEADLINE

Small component, great effect: High performance sealing membrane for AdBlue® fuel tank cap

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TEASER

The day will come when the drivers of almost all modern diesel vehicles of the lowest emission class will have to fill up their tanks with AdBlue®. And when they do, they will have a rather unremarkable looking blue screw cap in their hands to which there is actually much more than meets the eye: Because the AdBlue® tank caps of numerous renowned car manufacturers are equipped with a special high-tech sealing membrane made of one of the most interesting plastics of all – Permeaflon®.

TEXT

When people hear the word Teflon™, they usually think immediately of frying pans. That's a shame: Because polytetrafluorethylene (PTFE), the technically correct name for the material which is marketed under the brand name Teflon™, can do a whole lot more than merely prevent food from sticking. Apart from the fact that PTFE is extremely anti-adhesive, it is distinguished above all by its immense chemical and thermal resistance.

For more than 50 years, Berghof Fluoroplastics has been dealing almost exclusively with this material. And they are constantly finding new, exciting areas of application in which PTFE convinces in customized solutions.

AdBlue® tank caps are an excellent example. Similar to fuel tanks, the tanks for AdBlue® also require an effective system for aeration and venting to compensate the internal pressure fluctuations caused by changes in temperature, filling level or position. This job is taken over by a venting element in the tank cap.

And a real all-rounder is required for this purpose because urea, the basic substance of AdBlue® has a strong crystallization tendency. Evaporation of water forms white crystals which can clog the venting membrane. So, ideally, the membrane should be designed in such a way that the urea solution drips off without residue to prevent crystals from adhering to it. In addition, the membrane must be extremely gas-permeable on the one hand and may not let through any liquids on the other hand.

There is a material which ideally unites exactly these properties: Permeaflon® from Berghof. Therefore, one of the leading manufacturers for sealing technology for the numerous AdBlue® tank cap variants of their well-known customers has subjected this high-tech plastic – the expert calls it symmetrically porous, sintered PTFE – to a real acid test. The experts exposed membranes made of Permeaflon® again and again to AdBlue® for several weeks in a so-called swash test – and they were delighted with the results: From the beginning to the end of the test, the substance dripped off without residue and crystals did not penetrate the robust pore structure. This successful test therefore proved that Permeaflon® is the ideal material for the breathable sealing membranes.

However, Berghof Fluoroplastics stands not only for unique alliances of material properties but also for unique alliances with its customers. The AdBlue® tank caps are also a very good example of this.

Because the sealing technology specialist produces these caps in very large quantities (several millions per year). The obvious question is: How can they be manufactured smoothly and economically? A good thing that the experts at Berghof have always understood the cooperation with their customers as a real partnership.

The experts at Berghof Fluoroplastics have brought their customers together with their partner Herrmann Ultraschalltechnik for example. In close cooperation, a production process has emerged based on an ultrasonic welding machine developed by Herrmann which is simpler and more efficient, reduces process steps and saves on assembly auxiliaries.

Step 1: The machine punches the membrane contour out of a material band.
Step 2: The so-called sonotrode, a special ultrasonic sealing tool with vacuum suction, transports the punched Permeaflon® membrane to the plastic part.
Step 3: The machine joins the membrane and plastic part by ultrasonic welding. Finished!

This smart system has several advantages for the customer: He now works with a less expensive (because not pre-fabricated) membrane material band which Berghof supplies ready for processing. The new process also saves material and time (cycle time: less than two seconds per welding cycle). The previously necessary optical quality check is also superfluous because the system itself checks reliably by a vacuum query whether the membrane is punched and positioned correctly.

“Only” a tank cap? The cap of the AdBlue® auxiliary tank may look unremarkable but technically it has a whole lot to offer.

PHOTOS

<p>Complex task: Similar to fuel tanks, the tanks for AdBlue® also require an effective system for aeration and venting to compensate the internal pressure fluctuations caused by changes in temperature, filling level or position. This job is taken over by a venting element in the tank cap.</p>	
<p>True all-rounder: Permeaflon® of Berghof Fluoroplastics is not only extremely anti-adhesive, it is characterized above all through its enormous chemical and thermal resistance.</p>	

Punching and sealing in one working operation: This very special ultrasonic welding machine from the company ensures in combination with a less expensive (because not prefabricated) membrane material band, which Berghof supplies ready for processing, not only material, but also time.



About Berghof Fluoroplastics:

For most people, Polytetrafluorethylen (PTFE) is more familiar under its trade name Teflon™. The material is characterized by a series of positive properties. It is, for example, extremely insensible against low and high temperatures and has an enormous chemical resistance. PTFE also has a low friction coefficient and is extremely anti-adhesive. Using the latest production technologies, Berghof Fluoroplastics permanently works on the continuous optimisation of PTFE to utilize the great potential of the material in full. The company, which has more than 50 years of expertise in this area, accompanies its customers on all steps to the finished product: from consulting and material selection, to research and development, to material production and integration of the products in the respective application.

Find out more on www.berghof-fluoroplastics.com

Berghof in brief:

As a family-run technology company focussing on long-term goals, the Berghof Group, which is based in Enigen unter Achalm (Reutlingen), is a partner for the development and production of innovative services. Our aim is to improve the competitiveness of our customers and partners in their markets. As a versatile team of around 320 experts and specialists in eight product areas, we are dedicated to this task with enthusiasm and passion. Our values are **fairness**, **versatility** and **high-quality** and these form the basis for an intense partnership built on trust.

More information can be found at www.berghof.com