

LANXESS extends use of composite material to extrusion blow molding

- **One-step process with short cycle times**
- **Excellent adhesion**
- **Focus on hollow sections and locally reinforced hollow parts**
- **Good recycling properties**

Cologne, September 3, 2020 – LANXESS is expanding the range of applications of extrusion blow molding: Continuous fiber-reinforced thermoplastic composites of the Tepex brand can also be integrated in the production process. In a feasibility study, experts at the specialty chemicals company demonstrated that components made of polyamide 6 can be manufactured with blow molding technology while receiving local reinforcement with Tepex at points subject to heavy loads. The investigations were performed on a state-of-the-art and close-to-production blow molding machine at the technical center of the High Performance Materials business unit (HPM) in Dormagen. “The components show an outstanding adhesion, which allows utilization of Tepex’s tremendous strength and rigidity,” explains Arthur Rieb, blow molding specialist at HPM.

The process can be used to locally boost the mechanical performance of blow-molded components, for instance in areas that are subject to high mechanical stress due to impact loads or high pressure. “In addition, it is suitable for the manufacture of blow-molded structural components, for example hollow sections for car body reinforcement. Extensive use of Tepex can be a key factor in reducing weight and material use because the basic wall thickness of the component can be decreased,” Rieb explains. Based purely on thermoplastic systems, the hollow parts are easy to recycle, thus making it easier to establish closed-loop material cycles.

LANXESS AG

Contact:
Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

Blow molding step determines cycle time

When manufacturing such hollow parts, a tubular parison is extruded first of all. At the same time, a heated and plasticized Tepex insert is placed in the blow molding tool. The parison is then inflated in the tool, thus also forming the Tepex section. This results in a component with a defined shape and local Tepex reinforcement. "The forming of Tepex is integrated in the blow molding process. Therefore, the result is a one-step overall process with short, economically efficient cycle times that are typical of blow molding," adds Rieb.

Simplified process

Previously, manufacturing components of this kind involved the subsequent welding of a two- or three-dimensional Tepex insert onto the blow-molded hollow part. The overall process in the first case has two stages, while that in the second case has three due to the preceding Tepex forming. "Therefore, our process makes things much simpler," says Tilmann Sontag, expert in lightweight design at HPM's Tepex Automotive Group. "In addition, the fabric reinforcement makes the plasticized Tepex material much easier to handle than tapes that are unidirectionally reinforced with continuous fibers. This enables a stable and safe production process."

Fully consolidated material bond

The continuous fibers in Tepex are fully pre-impregnated with plastic. Consequently, the pressure during blow molding is sufficient to consolidate the material so that no air pockets are formed. "The result is a material bond with excellent adhesion between the blow molding material and Tepex. Even low blow molding pressures are enough to form Tepex into critical 3D geometries such as hemispheres with tight radii," says Sontag.

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Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
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Germany

Phone: +49 221 8885-5041
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Wide range of blow moldable polyamides

HPM has developed a wide product range of high-viscosity compounds based on polyamide 6 and 66 with and without glass-fiber reinforcement. These materials can also be used for the new process/material combination. For instance, the range includes very soft, impact-resistant product variants such as the unreinforced polyamide 6 compounds Durethan BC700HTS DUSXBL and Durethan BC550Z DUSXBL. Materials of this kind are extremely suitable for Tepex-reinforced tanks or other hollow parts where the application also requires high impact resistance and flexibility, for example. By contrast, the glass fiber-reinforced product types tend to be the material of choice for lightweight structural components.

With Tepex, too, a wide range of product types are available for the process – for instance material variants that are reinforced with continuous-fiber fabrics or laminates made of glass, aramid, or carbon fibers. The matrix of composites is also capable of variation. In addition to polyamide 6 or 66, for instance, it can also consist of polyolefins such as polypropylene or polyethylene.

HiAnt – comprehensive customer service

LANXESS HPM business unit has combined its expertise in material, application, procedural and technological development under the brand HiAnt so that it can support customers at all stages of component development. The service encompasses everything from concept design, material optimization and the calculation of component characteristics by means of simulation tools right through to processing, component testing and the start of series production.

More information about LANXESS products and developments, technologies and services for blow molding and Tepex can be found at blow-molding.lanxess.com and bond-laminates.com.

LANXESS AG

Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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News Release

LANXESS is a leading specialty chemicals company with sales of EUR 6.8 billion in 2019. The company currently has about 14,300 employees in 33 countries. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, additives, specialty chemicals and plastics. LANXESS is listed in the leading sustainability indices Dow Jones Sustainability Index (DJSI World and Europe) and FTSE4Good.

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LANXESS AG

Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

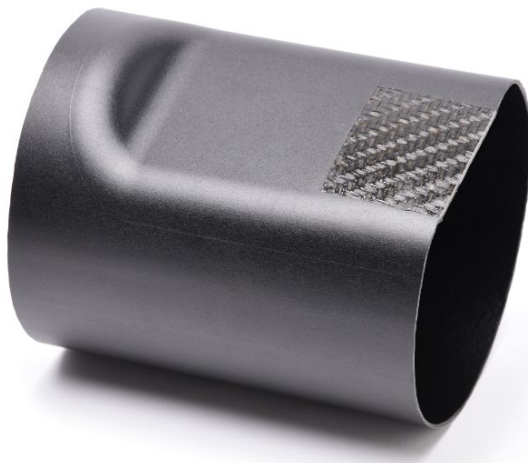
Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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Images



Engineering plastics experts Tilmann Sontag (left), Loreen Winkelhake and Arthur Rieb evaluate the quality of a hollow part reinforced with Tepex during blow molding at the Dormagen Technical Center of LANXESS's High Performance Materials business unit. Photo: LANXESS AG



Thanks to the good adhesion between the blow molding material and Tepex, a material bond is created in which Tepex can fully exploit its strengths in terms of strength and stiffness. Photo: LANXESS AG

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Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

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