Case Study

SCHROEDER goes with CELLMOULD from WITTMANN BATTENFELD for Light Weight Technology

CELLMOULD is the process of WITTMANN BATTENFELD for structural foam moldings with direct gassing. The process is based on the many years of development and experience of Wittmann Battenfeld with structural foam molding by using physical blowing agents. The nitrogen is injected into the barrel and forms foamed products with a fine and regular cell structure. All the equipment components are developed and manufactured by WITTMANN BATTENFELD.

SCHROEDER Kunststofftechnik in Kierspe, Germany, is a custom molding company, part of the privately owned German EBG Group. The company in Kierspe has about 70 employees and 33 injection molding machines within the range of 15 to 420 metric tons.

SCHROEDER has also a molding company in the Czech Republic with about 90 employees and 16 molding machines. Together with the additional companies in the group concentrating on compression and injection molding of thermo sets the total number of employees is about 250.

Dag Hagby is CEO of the companies. He points out: “Our specialty at SCHROEDER in Kierspe is the design of molds and the production of complex and extremely complex shaped injection molded products.

Fig. 1: Dag Hagby, CEO of SCHROEDER Kunststofftechnik, with complex CELLMOULD part in front of BATTENFELD 300 metric tons with CELLMOULD
SCHROEDER has already been producing structural foam moldings with physical blowing agents for quite some time. This process offers several significant advantages:

- Weight reduction
- Elimination of sink marks
- Low in-molded stresses
- Low warping
- Improved rigidity at same weight
- Low internal cavity pressures
- Improved polymer flow by means of the blowing agent
- Tight tolerances

About 70% of the business of SCHROEDER is automotive. The trend of automotive is to go for weight reduction. Weight reduction can be achieved in different ways by:

- reducing the wall thickness
- reducing the density of the parts.
- increasing the functionality

For SCHROEDER Kunststofftechnik structural foam with direct gassing is the answer to meet the targets of automotive and other fields of industry:

- Reduction of wall thickness:
The addition of the blowing agent to the polymer reduces the viscosity of the polymer. Because the better flow of the polymer cavities with wall thickness of less than 2 mm and long flow paths can be filled at lower cavity pressures.

- Reduction of density:
When adding a blowing agent to the polymer a polymer holding pressure normally is not required. The cavity is filled by the polymer completely or almost completely. The volume shrinkage is compensated by the physical blowing agent. Density reduction must be seen in relation to the mechanical properties of the products. Schroeder produce the moldings with density reductions of about 7-10%.

- Increasing functionality:
Components with rigid and soft sections are produced by means of the two-component technology. Moldings with integrated sealing sections are produced in a single-step operation. Compared to separate injection of both parts and post molding assembly two-component part can be designed lighter in weight.
SCHROEDER takes advantage of all 3 benefits of structural foam for production of light weight parts.

Most CELLMOULD products are made from PBT filled with 20% of glass and PP with 20% of mineral fillers. Many other Polymers such as PA, POM, PBT, OC, PC-ABS blends, TPE and others are used in production.

In 2011 SCHROEDER purchased 5 new injection molding machines, all from Wittmann Battenfeld. Four of them are equipped with CELLMOULD, the process for direct gassing developed and built by Wittmann Battenfeld. The CELLMOULD machines are equipped with 25 L/D screw and barrel units.

As the injection molding machines were delivered with CELLMOULD by WITTMANN BATTENFELD, service of machines and CELLMOULD are also supplied by WITTMANN BATTENFELD.

Fig. 2: CELLMOULD production at SCHROEDER

The strongest argument for SCHROEDER’s decision to proceed with WITTMANN BATTENFELD was the fact that there was only one supplier for machine and CELLMOULD technology, WITTMANN BATTENFELD, who takes care of machine and foaming technology.

In addition the advantages of CELLMOULD technology were favourable for SCHROEDER:

1. Cell structure:
   With CELLMOULD moldings are produced having a very fine and regular cell structure. The process is absolutely reliable.
2. Easy programming and control:
As all the parameter settings for CELLMOULD are made by using the machine control UNILOG B6 programming and optimizing can be made very easily. All CELLMOULD parameters are stored together with the machine parameters for the mould. Also quality control of all parameters is visualized on the same screen.

3. Gas control:
The nitrogen is injected into the barrel through a specially designed gas injection nozzle. The nitrogen for injection into the barrel is controlled by a gas controller located just at the injection unit.
So there is no need for any separate unit standing in front of the machine.

4. Low gas cost:
Nitrogen for direct gas injection is normally supplied from nitrogen bottles which are delivered from a gas company. Before gas injection the gas must be compressed.

SCHROEDER decided to also purchase a combined nitrogen and pressure generator unit from Wittmann Battenfeld and produce the nitrogen onsite by themselves. The nitrogen generator takes in environmental air, which is cleaned and dried and then separated into nitrogen and oxygen by means of a membrane system and finally compressed to 330 bars.

All 4 CELLMOULD machines are supplied with gas from the combined nitrogen and pressure generator. The same system can be used for gas-assisted injection molding Airmould as well.

SCHROEDER have 2 x 300 metric tons one-component machines with CELLMOULD and 2 x 400 metric tons two-component machines with CELLMOULD.
Fig. 4: Two component injection molding machine, 400 metric tons, with CELLMOULD, Right in front: CELLMOULD gas controller

Fig. 5: Two-component molding produced by CELLMOULD with integrated TPE seal lip.

At SCHROEDER Kunststofftechnik CELLMOULD technology and two- component injection molding are combined for production of light weight products with increased functionality.

The close partnership on technology with WITTMANN BATTENFELD eases SCHROEDER the access to applications and new processing methods.

Light weight production for SCHROEDER is one of the every day challenging processes and a key technology for the future.
WITTMANN BATTENFELD

WITTMANN BATTENFELD, a company of the WITTMANN group based in Kottingbrunn, Austria is a leading manufacturer of injection molding machines for the plastics industry. With its own sales and service companies as well as representations in about 60 countries, WITTMANN BATTENFELD provides optimal support to its customers in all matters concerning injection molding technology. Its innovative strength, highest precision and strong focus on maximum customer benefit make WITTMANN BATTENFELD a valuable partner for its customers.

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