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Technical Report

WITTMANN BATTENFELD Airmould internal gas pressure technology

Sustainability and conservation of resources by using Airmould internal gas pressure technology

Airmould is a process by which nitrogen is injected into a mold cavity partly or completely filled with melt to form an internal cavity structure. In this way, light-weight components can be produced within a short cycle time and simultaneously with high-quality surfaces, while saving resources as well. All components required for this process have been developed and are produced in-house by WITTMANN BATTENFELD.

With the further development of this technology – brought to market as Airmould 4.0 – a system has been created which meets the industry's demand for easy operation and compactness and offers its users a number of advantages. Airmould 4.0 is an internal gas pressure system which no longer requires a large control cabinet, thus saving customers valuable space on the production floor. The necessary pressure control modules have also been further downsized and thus become very compact. As a result, they can now be mounted and used flexibly on any injection molding machine. For easier operation, Airmould 4.0 can be fully integrated in the Unilog B8 or B8X control system of WITTMANN BATTENFELD machines. For use on machines of other brands, user-friendly operation is also ensured via the WITTMANN Group's standardized manual control terminal.

In times when CO_2 footprint and conservation of resources are buzzwords, the Airmould technology has become more and more significant for users. This process saves resources in more than one way. Firstly, the use of this technology saves plastic material. Secondly, these material savings lead to a reduction in part weight, which is of great benefit especially for the automotive and mobility sectors by reducing, in turn, the required energy input. Since nitrogen gas is injected exclusively into the interior of the cavity in internal gas pressure injection molding, there are no limitations whatsoever to the quality of the parts' surface finish compared to compact injection molding. On the contrary: with Airmould, the gas assumes the function of the holding pressure and counteracts component shrinkage from the inside. As a

result, it reduces the formation of sink marks and warpage. This aspect is of major significance primarily for thick-walled parts.

Typical applications for Airmould technology are bar-shaped parts. These include all kinds of handles, levers, brackets and hangers for weight reduction, such as door handles for the automotive sector. Additional examples are components for white goods or home and garden tools, where material savings have a substantial effect on costs. Some further common applications are media lines and tubes for the automotive sector and parts for the furniture industry, such as components for tables and chairs.

Apart from bar-shaped geometries, Airmould can also be used for flat parts with ribs, such as panels and covers, or beverage crates and tabletops. Here, the nitrogen is injected precisely into the rib structures, in order to prevent sink marks on the surface of the opposite side. Moreover, this process is also suitable for flat parts with local bulges. Typical examples here are car outside mirrors, housings or reusable boxes.

Fig. 1: WITTMANN BATTENFELD Airmould compressor unit

Fig. 2: Airmould 4.0 pressure control modules, central unit and manual control terminal

Fig. 3a: Automotive door handle – produced with Airmould technology for weight reduction

Fig. 3b: Airmould channel inside door handle

Fig. 4: Airmould channel on gas pedal

Fig. 5: Clothes pegs – material savings by using Airmould

The WITTMANN Group

The WITTMANN Group is a globally leading manufacturer of injection molding machines, robots and auxiliary equipment for processing a great variety of plasticizable materials – both plastic and non-plastic. The group of companies has its headquarters in Vienna, Austria and consists of two main divisions: WITTMANN BATTENFELD and WITTMANN. Following the principles of environmental protection, conservation of resources and circular economy, the WITTMANN Group engages in state-of-the-art process technology for maximum energy efficiency in injection molding, and in processing standard materials and materials with a high content of recyclates and renewable raw materials. The products of the WITTMANN Group are designed for horizontal and vertical integration into a Smart Factory and can be interlinked to form an intelligent production cell.

The companies of the group jointly operate ten production plants in six countries, and the additional sales companies at their 36 different locations are present in all major industrial markets around the world.

WITTMANN BATTENFELD pursues the continued strengthening of its market position as a manufacturer of injection molding machines and supplier of comprehensive modern machine technology in modular design. The product range of WITTMANN includes robots and automation systems, material handling systems, dryers, gravimetric and volumetric blenders, granulators, temperature controllers and chillers. The combination of the individual areas under the umbrella of the WITTMANN Group enables perfect integration – to the advantage of injection molding processors with an increasing demand for seamless interlocking of processing machines, automation and auxiliaries.

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