



## PLASTINUM<sup>®</sup> Gas Injection Molding with CO<sub>2</sub> Koller builds on cutting-edge gas injection molding technology from Linde for new plastics line

### Highlights

- State-of-the-art, patented and reliable GIM process
- Greater process stability
- Quality gains with less warpage
- Ideal platform for global business expansion

### Customer

The Koller Group is a global technology company headquartered in Dietfurt in the heart of Bavaria, Germany. The company specializes in the development and manufacture of plastic tools, PUR honeycomb sandwich boards, lightweight systems, ready-to-install components and injection-molded parts in small and large series, primarily for the automotive industry. Group member Koller Kunststofftechnik GmbH was founded in 1997 to focus specifically on automotive plastics parts. It serves leading automotive OEMs in Europe.

Covering the entire value chain from vision through development to industrialization and series production at its certified sites, the Group is an early adopter of state-of-the-art technologies capable of meeting demands for lighter, more robust parts among car makers.

One of Koller's key accounts, a leading producer of premium cars, approached the company with a request for a new rear frame. Koller realized that gas injection molding (GIM) – otherwise known as gas-assisted molding (GAM) – would be the best way to meet the customer's lightweight and strength specifications for the new frame. The Group thus decided to entrust the new part to Koller Kunststofftechnik given its expertise in automotive plastics manufacturing.

### Challenge

Koller contacted Linde to assist with early trials exploring the various injection molding options. The company was keen to overcome the downsides of water as the pressure fluid due to the need for a drying cycle coupled with process stability issues. Similarly, it was not convinced that the conventional choice of nitrogen (N<sub>2</sub>) as the injection gas was the best fit for its quality and process stability targets. Linde advised Koller to try a novel path using carbon dioxide (CO<sub>2</sub>) instead of nitrogen. As the only company to offer this technology, Linde's broad reference customer base indicates that early adopters of GIM technology with CO<sub>2</sub> are already benefiting from significant gains in process stability and part quality.

# KOLLER

## Solution

Following Linde's advice, Koller decided to skip the N<sub>2</sub> trials and move forward with a state-of-the-art solution based on CO<sub>2</sub>. Working closely with its long-standing partner Maximator, leading provider of high-pressure gas equipment, Linde thus helped Koller to set up trials for the new GIM line based on its innovative, patented PLASTINUM® Gas Injection Molding with CO<sub>2</sub> solution. The supply scheme was based on CO<sub>2</sub> cylinder bundles with a dedicated CO<sub>2</sub> switchover manifold to ensure continuity of supply.

The tests quickly confirmed that PLASTINUM Gas Injection Molding with CO<sub>2</sub> was ideally equipped to meet Koller's ambitious quality targets by reducing warpage and increasing process stability overall. "Because this facility was a new build, we had a valuable opportunity to get everything right from the ground up – and thus get ahead of the innovation curve. Linde's PLASTINUM Gas Injection Molding with CO<sub>2</sub> solution gives us precisely the quality and process stability advantages we need in the highly competitive automotive market," says Robert Kekesi, Production Manager at Koller Kunststofftechnik GmbH.



Linde PRESUS® C high pressure equipment

## Benefits

Liquid carbon dioxide instead of nitrogen for GIM applications gives Koller the process stability it was looking for. Through reduced warpage, the company is able to maintain a consistently high quality level. The option of a turnkey offering also resonated strongly with management at Koller. Linde and Maximator covered all steps in the process flow from the gas supply scheme and piping through the pressure boosting equipment and injectors to the gas control units. "With their proven deployment experience, Linde and its partner Maximator meant we had a single source of accountability for all our gas supply, pressure boosting and injection needs. A turnkey offering makes life a lot easier for us," continues Kekesi.

In addition, the cleaning effect of carbon dioxide on the injectors stabilizes production processes in the long term. And the rapid cooling properties of CO<sub>2</sub> make it an effective and inexpensive way to improve temperature control in injection molding.

## Looking ahead

As part of its commitment to continually optimize supply and ease of maintenance, Linde has suggested that Koller switch from the current gas cylinder bundles to a bulk tank for liquid CO<sub>2</sub> combined with a PRESUS® pressure booster system. Once the changeover is complete, this new bulk system will further simplify maintenance and reduce handling effort.

Looking ahead, the company is confident that PLASTINUM Gas Injection Molding with CO<sub>2</sub> will attract new business from other automotive OEMs around the world who are keen to leverage the quality, process efficiency and other benefits of CO<sub>2</sub> as the injection gas in GIM



Rear frame made using PLASTINUM® GIM C technology

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