

Case Story.

DGS, Carat 280.



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Structural production system for Switzerland's best in class.

The pressure on the automotive industry to reduce carbon emissions of vehicles is continuously increasing the need for highly integrated lightweight components. In this connection, structural parts are playing an ever-important part. With its new Buhler-supplied "Structural" system, supplemented with its special proprietary process expertise, the Swiss company DGS Druckguss Systeme AG possesses cutting-edge die casting technology for manufacturing structural components.

DGS Druckguss Systeme AG is a mid-size die casting company which specializes in the processing of aluminum, magnesium, and zinc. In its three factories in Switzerland, the Czech Republic, and China, some 500 employees process almost 10,000 metric tons of metal a year into high-grade die cast components.

Technology leader in the field of structural components

The company with headquarters in the corner of eastern Switzerland bordering on Austria and Germany considers its role as being a system supplier. It specializes in the development and manufacture of complex, lightweight, near-net-shape components and modules. For some time now, so-called structural components have also been included in its supply portfolio. "Within just a few years, we have evolved into the technology leader in the production of such structural parts," explains Axel Schmidt, technical manager at DGS, adding that "renowned German customers from the automotive industry confirm this fact by their intensive collaboration in developing products and processes together with us."

Demanding components

The structural components that DGS currently manufactures are all applied by the automotive industry. These parts are expected to satisfy extremely rigorous mechanical requirements – and this with very thin wall sections. They are used, for instance, in passenger cells of cars, where they are assembled as nodes or structural elements with other components in order to form a distortion-resistant and high-strength frame. For this purpose, such parts must be weldable and have a high plastic deformation capacity – that is, be highly ductile – in order to ensure that they will not rupture when overloaded.

Satisfying such rigorous requirements is a demanding undertaking in the field of die casting. In addition to important aspects such as optimal selection of the aluminum alloy to be cast, correct subsequent heat treatment, machining and surface finishing of the cast components, and some others, the casting process and the underlying casting technology are crucial. In the structural process, components are typically cast under a high vacuum, which minimizes the creation of pores and air entrapments in the cast parts. This is necessary in order to enable the components to be welded and to enhance their material characteristics by heat treatment.

Structural die casting system as a basis

The new die casting technology applied by DGS is based on the Buhler Carat machine technology in conjunction with a high-vacuum system that DGS has purpose-developed to meet the specific requirements. Other core elements include innovative die concepts and alloy formulations that have been optimized by DGS. Axel Schmidt: "In order to maintain the strong market position in the long run that we have gained over the past few years, we decided to invest in cutting-edge, high-performance die casting technology. We chose a new die casting cell manufactured by Buhler, which is equipped with a 2800 kN die casting machine of type Carat." We opted for Buhler because of the already proven qualities of its new two-platen technology. "We deliberately chose the Carat because its innovative two-platen technology convinced us," explains Axel Schmidt. "The Carat is excellently suited to the manufacture of structural parts. The high rigidity of its die closing unit increases the seal of the closed die and thus reduces the creation of flash. This helps maintain the evacuation process constant and generally supports process stability during casting. What is more, we are convinced that two-platen technology is the starting point for making additional innovative development steps in die casting technology."

With its high reproducibility, the real-time-controlled Carat shot unit ensures a consistently high quality of the components cast – from one shot to the next. The wide variety of possible settings of the shot curve make it easier to produce such demanding components. "The Carat 280 that we have selected completes our range of machines



The new Structural system operated by DGS Druckguss Systeme AG.

in the upper segment,” says Schmidt. “Moreover, the employees of DGS have been working for years with Buhler die casting systems and are thoroughly familiar with this technology.”

Buhler as a general contractor

The order that DGS Druckguss Systeme AG placed included the supply of a complete “Structural” die casting cell. The Buhler peripheral equipment integrated in the control system of the die casting cell for parts extraction, die spraying, and component labeling constitute the core of the installation. A ladling furnace, trimming press, cooling bath, and exhaust hood complete the range of supply. “We signed the contract for the complete casting cell with Buhler acting as a general contractor,” explains Axel Schmidt. “Also this decision turned out to be very sound, for we found out in the course of the project how important it is to have such projects implemented by a single source.”

Druckguss Systeme AG now possesses the specific know-how of the entire process chain within its own company. The company considers this as important proof of its capabilities and a prerequisite for generating the best possible customer value. Sub-processes such as heat treatment, subsequent machining, and surface finishing have been developed and implemented by DGS itself.

With top precision

The schedule for installation and start-up of the new die casting cell was very tight. But careful project manage-

ment enabled the specialists of Buhler to install and commission the new system on schedule. The new die casting installation has been up and running with top precision since it was commissioned in the spring of 2009. Axel Schmidt: “We are very happy with our newest Buhler system and are on track successfully putting our goals to practice. And we are proud to manufacture parts for our customers with our new installation, the most advanced and currently the largest system of its kind in Switzerland.”

(mc / bos)

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“The Carat is excellently suited for producing structural components.”

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