

Case Story.

Great Wall.



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Need for production know-how.

Two turnkey die casting cells, customized production concepts, and extensive on-site support. These are the elements with which Buhler enables the Chinese automobile manufacturer Great Wall Motors to produce its own aluminum engine blocks.

The Great Wall Motor Company Ltd (GWM) is a large international group of companies. GWM is one of the up-and-coming Chinese carmakers and was China's first private automobile producer to be listed on the Hong Kong stock exchange. In 2009, the Main Business Review listed GWM among the "500 most important companies in China" and the "30 largest automobile producers of China." The headquarters of Great Wall Motors are located in Baoding City, some 200 kilometers southwest of Beijing in Hebei Province.

Capacity increase to two million vehicles annually

The Great Wall Motor Company was set up in 1976 and has grown steadily ever since. Today, the Great Wall Motor Company incorporates more than 30 companies with a total payroll of 28,000. Its different factories are mainly located in the industrial zone of Baoding. In 2007, GWM had a manufacturing capacity of 200,000 cars a year. But its production capacities are being continuously expanded. At present, GWM is capable of manufacturing 800,000 cars annually, and by the year 2015 this figure stands to rise to 2 million.

The range of models comprises three vehicle groups: sport utility vehicles (brand: Haval), passenger cars (Voleex), and pickups (Wingle). In all, GWM offers 15 different models. About 40 % of output is exported to over 100 countries and regions.

In-house engine block production

In its efforts to reduce the weight of its cars and thus cut their carbon emissions, GWM started in 2006 to equip its vehicles with engine blocks made of aluminum. Up to then, GWM had purchased its engine blocks from vendors. Initially only incorporated in the Voleex models, the proportion of such engines increased rapidly. The fast rise in the number of these components soon gave rise to the question of building them in-house. The "Die Casting" project was thus born. Its goal was to construct the company's own factory for manufacturing engine blocks of die cast aluminum.

Turnkey systems

Buhler-supplied plant and equipment has always had a very fine reputation in China. But this reputation is not founded solely in the quality and reliability of its die casting machines. It is also due to the sound process and production know-how of Buhler's specialists. This was reason enough for the Chinese carmaker GWM to select Buhler as its partner for establishing its own in-house engine block production facility.

The first order comprised the supply of two complete turnkey production systems with project support from A to Z – from inception of the overall plant; creation of the die designs; system supply, installation, and start up; to fine-tuning of the manufacturing process. All these steps were made in close cooperation with the customer. After all, once the project had been executed, GWM was not only to have top-class systems but also the skills to manufacture engine blocks using the aluminum die casting process.

Twice 2700 tons' locking force

Great Wall Motors purpose-built a 12,000 square meter large hall for its new foundry in the industrial zone of Baoding. After the final construction stage, up to 30 casting cells of a wide variety of sizes will be in service there.

The heart of the two new die casting cells of GWM consists of one Buhler Evolution B 270 horizontal cold-chamber machine each (locking force 2700 metric tons). These machines are supplemented with peripheral equipment supplied by local vendors plus European partners. The cylinder liners are accurately positioned by a combined insertion and extraction robot. This unit at the same time extracts the cast components and handles all the parts in the casting cell. The dies are sprayed using a linear two-axis device based on leading-edge spray technology in order to ensure efficient application of the release agent and short cooling times. The thermal balance of the die is controlled by a combination of oil and water temperature control units, and a vacuum system supports pore-free production of the engine blocks. The molten metal is fed to the die casting machines by a ladling device allowing a high ladling accuracy and reducing the cycle times. A high-performance exhaust hood keeps the ambient air clean, which is highly appreciated by the operators of the cell.



One of the two new die casting cells of GWM.

Intensive training

The production of engine blocks of die cast aluminum is extremely demanding. The components are complex and their wall sections in some cases differ widely – with extremely thick sections at some points and rather thin ones at others. Controlling the thermal balance of the production die is anything but easy, and the pressure-tightness of the components requires minimum porosity. In order to rapidly achieve a stable production process, very much production-related experience is needed beside sound concepts and systems.

Buhler die casting specialists from China and Europe supported the technologists of Great Wall during the start-up phase. The knowledge was transferred by intensive user training on how to operate the systems and on the specific process technology. This enables the benefits of the Buhler concepts to be fully utilized and optimal results to be achieved. Following initial sample casting of three-cylinder engine blocks, both production systems for the new four-cylinder engines are now up and running at the Great Wall Motor Company – round the clock. (mc)



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