

PROTO DIE – A new method for diecast prototypes

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G.W.P. has developed a new die casting method for prototypes in which complex die cast parts can be economically cast under series-like conditions. Genuine diecast prototypes in aluminum, zinc or magnesium can now be economically and quickly manufactured using the PROTO DIE method.

This is a new approach for producing die casting dies that makes the die casting procedure economical for prototypes and pilot series for the first time. "We worked long and hard on our new die concept. The crisis in the automotive industry also increased cost pressure on development. We now have sufficient demand for our method from this industry to allow us to actively market it," notes Rocco Weyers, one of the two managing directors of G.W.P. Manufacturing Services AG. The key feature of this method is a die that is optimized for the significantly fewer cycles associated with prototypes. "We developed a highly simplified design that significantly lowers costs and shortens the die production process without sacrificing the quality of the molded parts," continues Weyers.

The great frustration of engineers

Developers are familiar with the problem: Previously, prototypes for subsequent die cast components were milled from solid metal or were created using metal laser sintering (MLS) or as an investment casting. Every type of production has a significant disadvantage in regard to genuine functional prototypes: The alloy, joints, and tolerances are not equivalent to later die cast series due to production-related issues. Frequently, the reliability of the process for the future series and fit with mating components can only be estimated. Since the properties of the prototypes always only approximate those of future series parts, a great deal of development time is lost through necessary extensive test series and adaptations. In addition to additional costs, this can significantly delay the launch of a product.

Advantages of PROTO DIE

With the new PROTO DIE prototype method, pilot series and small series up to 3,000 pieces (maximum tool life) can be cast depending on the size of the molded parts and geometry of the components. The maximum component dimensions for a body diagonal ($R=\sqrt{(a^2+b^2+c^2)}$) is 300 mm, and the maximum clamping force of the employed machines is 500 tons. Undercuts can be created with slides and mold cores as in normal series dies. All conventional series alloys in aluminum, zinc, magnesium and brass can be used for the PROTO DIE die casting method. Rocco Weyers: "Up to now, we have produced most prototypes out of aluminum. However, we see a great deal of developmental potential with magnesium. Magnesium requires special experience and expertise to finish, however, which we have accumulated in our own production center in Zhongshan."

The delivery time for diecast prototypes is a minimum of 22 workdays since solid steel dies need to be created for the PROTO DIE procedure. In comparison to rapid prototyping models, the delivery of parts is comparatively long. However, the overall development time is significantly shorter with the PROTO DIE procedure since significantly fewer test series are required. The dies for the prototypes can be changed very quickly and economically thanks

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to the modular design. With just a few alterations, the dies can also be used for the pilot series.

PROTO DIE is especially suitable for cast prototypes

- Whenever high-quality, thin-wall metal prototypes are required,
- When properties are needed that approximate those of series production (tests),
- When economical pilot series and small series are planned,
- When a subsequent die cast series is planned (cost advantages).

Better prototypes

As with mass-produced cast parts, thin-wall cast parts can be manufactured with the PROTO DIE method. The tolerances (according to GTA14), physical properties and fine surfaces are identical and not just similar to diecast parts. This fact distinguishes PROTO DIE from a series of developments by other manufacturers. Greater precision and more exact fits can be achieved with subsequent machining. The cast prototypes can be painted, powder coated or galvanized.

"In recent years, we have made a great deal of effort to further refine the PROTO DIE method. The results are something to be proud of. I think that our approach of using genuine diecast prototypes has enormous potential for manufacturers, especially in the automobile and machine manufacturing industry," notes Rocco Weyers. As a manufacturing service provider, G.W.P. sees itself as a partner in development and has significantly expanded its product line of engineering services. Technological consultation, CAD construction, industrial design, reverse engineering, simulations and materials analyses are some of the services that are offered to accompany customers ideas all the way to ready-to-install products.

Attractive to a variety of sectors

PROTO DIE is attractive to all branches of industry that use thin-wall, precise cast metal components. Particularly sectors with numerous highly-demanding mechanical components such as the automotive sector, machine building, rail car manufacturing or the aeronautics industry can significantly profit from this new procedure. Manufacturers of lighting systems, medical or electronic equipment that regularly develop new housings significantly save time and money with this new method. Expense generally increases when corrections are made later in the development process.

For more information, go to: www.gwp-ag.com/r_404

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Brief profile of the G.W.P. Group

The G.W.P. Group comprises G.W.P. Manufacturing Services AG headquartered in Berlin (central office and sales), Fuwei Hardware Company Ltd. (production) in Zhongshan (China), and G.W.P. Manufacturing Services Ltd. in Hong Kong (Legal Representative).

As a manufacturing services provider for several different manufacturing processes, G.W.P. AG provides mechanical components according to the drawing made of metal and plastic. With its very broad production palette, G.W.P. offers industrial companies a wide range of components and assemblies from a single source. It focuses on tool-intensive production processes such as the die casting and injection molding of small and medium-sized series.

With an extensive line of engineering and development services such as technological consultation, CAD construction, industrial design, reverse engineering, feasibility tests, method adaptations, 3-D measurements and materials analysis, we accompany customers from the idea to the finished series.