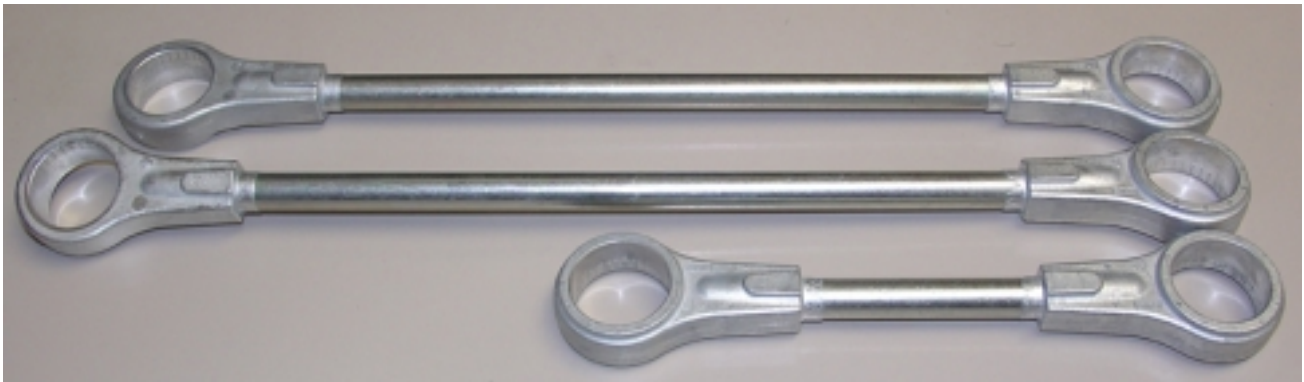


# Assembly Solutions

From FisherTech, division of FisherCast Global Corporation

## Higher capacity die casting system improves production and cuts assembly costs



With FisherTech's Injected Metal Assembly process, zinc alloy rings are cast directly onto the ends of rods in a completely automated assembly process, replacing a time-consuming and costly welding operation. The new AM51 IMA system can now accommodate much larger applications: up to 18 inches (450 mm) in the largest diameter, with a zinc alloy shot capacity up to 4 cubic inches (500 grams).

A different way of looking at assembly increased production rates and reduced costs of a stabilizer link used in the suspension system of passenger cars and minivans for ZF Lemforder Corporation, the Brewer, Maine manufacturer of suspension components for the automotive industry.

The original assembly consisted of two stamped steel rings resistance welded to a specially tipped rod, which was then sent out for plating before final fabrication of the stabilizer link components. The rings and rod themselves were costly. To obtain the needed precision, the stamped rings required secondary machining to tight tolerances, and the length and the tip diameters of the rod had to be held to specific dimensional requirements after welding. The plating and shipping charges also increased the piece price.

ZF Lemforder's manufacturing engineers evaluated several alternative methods to reduce the cost of the stabilizer link, including FisherTech's AM51 Injected Metal Assembly (IMA™) system. A major benefit is the ability to integrate the fully automated system into ZF Lemforder's existing production line. The equipment's method of die casting the rings directly on the rods also eliminates critical component preparation, secondary machining and plating of the completed assembly.

With the IMA process, the rod length is not critical which reduces component cost, as does the knurling operation in place of precision tipping of the welded rods. The tolerance control lies within the precision die casting tool that forms the zinc alloy ring directly onto the knurled ends. The ring is cast



*The original stabilizer link assembly required pre-manufactured stamped steel rings, secondary machining, a specially tipped rod and post-plating. Production time and costs are cut by eliminating the stamped rings and processing operations. FisherTech's IMA system simply casts tight tolerance zinc alloy rings directly onto the rod.*

to  $\pm .03$  mm, but the overall length tolerance of the rod is  $\pm 1$  mm. This loose tolerance is immaterial because the rod is held in a precise position in the tool in relation to the outside diameter of the ring, with the molten alloy flowing around the end and compensating for any inconsistency. Being able to use a pre-plated rod improves productivity as the assembly doesn't have to be shipped for post-assembly plating, allowing same-day production of the stabilizer link.

"Before we had to wait days for parts to return from plating," says John Belding, Senior Manufacturing Engineer, at ZF Lemforder's Brewer, Maine facility. "We also save on the amount of plating being applied as it is

The zinc alloy die cast rings exhibit very favorable strength, dimensional stability and load bearing characteristics, as the alloy has mechanical properties similar to low carbon steel. The assembly passed a series of complex tests, meeting all fatigue performance requirements.

FisherTech custom-designed the AM 51 IMA machine and tooling to ZF Lemforder's specifications, which includes full robotic automation. An integrated vision system checks rod dimension and presence of the knurl before the robotic arm places a rod in each of the two ring-shaped cavities in the die casting tool. As the zinc alloy solidifies, it locks securely onto the knurls. The assembly is removed, the runner trimmed from the ring, and



*In a single step, the automated Injected Metal Assembly system die casts the zinc alloy rings onto the rod. It is immediately transferred to the final assembly equipment for insertion of internal components. A cast detail inside the bore simplifies the assembly operation.*

only required on the rods, because zinc alloy is inherently not prone to corrosion. The zinc material is also less expensive than the stamped steel ring, and the cost of casting is equivalent to the welding operation. The tool design ensures the very tight tolerances required for the rings, and FisherTech's hot chamber die casting process consistently maintains these tolerances from part-to-part with no secondary finishing."

"The tool design also incorporates a detail inside the bore for ease of assembly and retention of inserted components, and provides for changing the date stamping of the die cast rings on a weekly basis."

the second end introduced to the tool cavity for die casting. The operation is programmed with a ShotScope® real-time shot control system verifying casting quality. The stabilizer link configuration is immediately transferred to the final assembly station for completion.

Application of FisherTech's IMA system is highly flexible as it is not designed exclusively for a single assembly function and is easily adaptable to changes in the die cast configuration and rod length. Inserts are used in the existing tool to cast different ring sizes.

"IMA technology gives us a competitive edge and will enable us to enter new market areas," says Belding.



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