

Technical Article

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## USING THE FULL POTENTIAL - AMORPHOUS METALS FOR HIGH PERFORMANCE GRIPPERS



Grippers are used in various industries and applications where picking up, manipulation and precise handling of objects or materials is required. Whether in robotics, food processing, pharmaceutical and medical technology or aerospace - grippers have a wide range of applications. Depending on the field of application, the material used must meet specific mechanical, environmental and operational requirements in order to always ensure a reliable and efficient gripping function.

Amorphous metals, also known as metallic glasses, have high strength and hardness, making them the ideal choice for use under intensive loads. Thanks to their excellent wear and corrosion resistance - even under harsh operating conditions such as humidity, chemicals - amorphous metal grippers maintain their structural integrity over long periods of time.

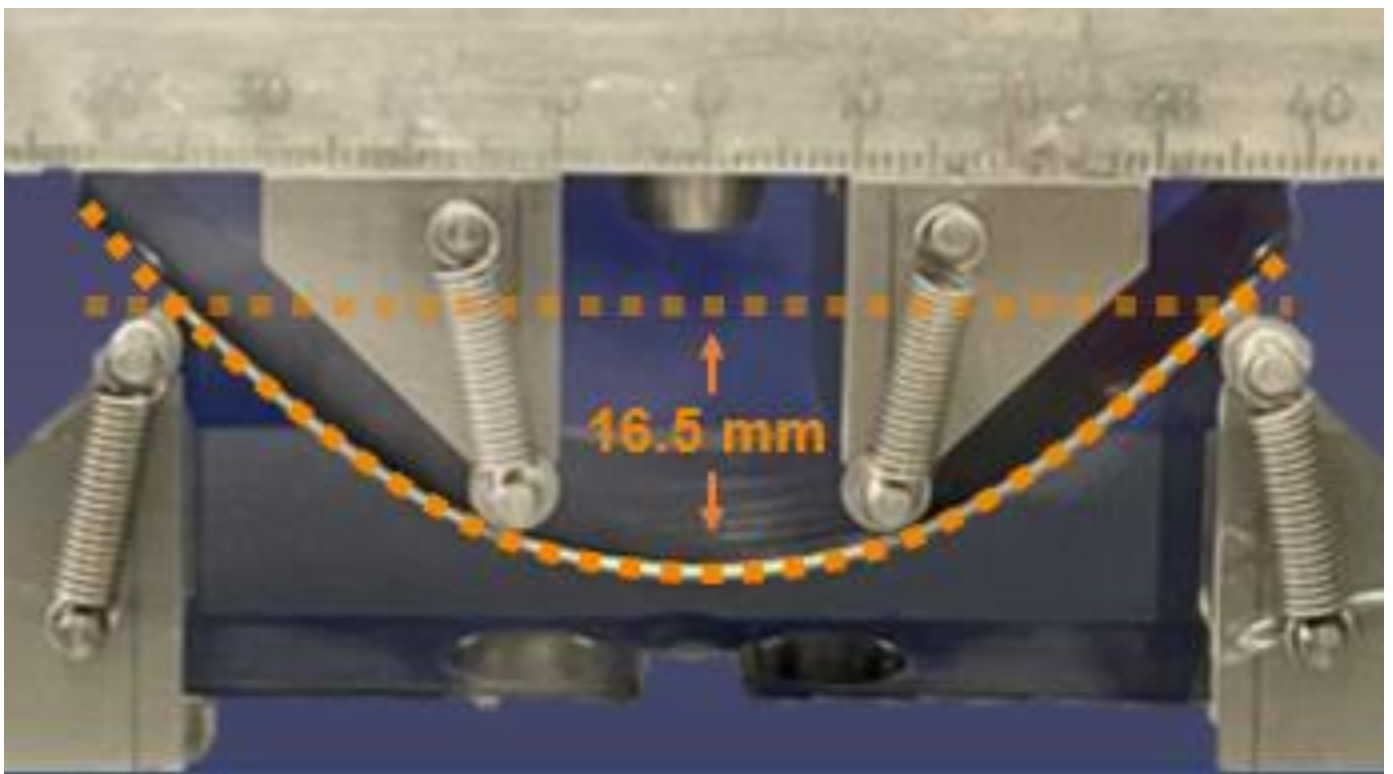


Figure 1: Amorphous plate @ 350 N load, 4-point bending test

The unique atomic structure gives amorphous metals good elasticity and flexibility. Under mechanical stress, the grippers can deform elastically over a wide range, allowing a high degree

of bending without causing fractures or permanent deformation. This increases the gripping and adaptability.

Thanks to manufacturability via injection moulding or 3D printing, amorphous metals can be easily formed near-net-shape into the most complex geometries. This design flexibility enables the development of complicated designs with customised features, such as finger geometry or surface textures, without having to fall back to subtractive manufacturing methods. The material is biocompatible and food-safe, and can therefore be used without hesitation in the medical technology sector as well as in the food industry.



Figure 2: Near-final contour production of highly structured surfaces



Figure 3: Advantages of amorphous metals in the field of high-performance grippers

## BEGIN YOUR AMORPHOUS JOURNEY NOW

### About Heraeus

The Heraeus Group is a broadly diversified and globally leading family-owned technology company, headquartered in Hanau, Germany. The company's roots go back to a family pharmacy started in 1660. Today, Heraeus bundles diverse activities in the Business Platforms Metals and Recycling, Healthcare, Semiconductor and Electronics as well as Industrials. Customers benefit from innovative technologies and solutions based on broad materials expertise and technological leadership.

In the 2022 financial year, the group generated revenues of €29.1 billion (US\$30.6 billion\*) with approximately 17,200 employees in 40 countries. Heraeus is one of the top 10 family-owned companies in Germany and holds a leading position in its global markets.

\* calculated with 2022 average exchange rate, 1€ = 1.0530 US\$)

### About Heraeus AMLOY

Heraeus AMLOY specialises in the development of amorphous alloys and the production of amorphous components. These enable completely new high-tech applications due to their unique material properties such as high strength combined with high elasticity as well as corrosion resistance and biocompatibility.

The near-net-shape process solutions injection moulding and 3D printing from Heraeus AMLOY are ideally suited for industrial manufacturing.

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