



*Vulkam is a deeptech startup from Grenoble's research centers, based on more than 30 years of research.  
A large technical team that works alongside our industrial partners is ready to handle the development of your new products.*



@vulkam\_metal



linkedin.com/company/vulkam

**GRENOBLE, FR**

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***Vulkalloys®***

*New metals with unbeatable properties  
Unique process and extreme forming abilities...  
...Miniature parts to help you to face your industrial challenges*



**Outstanding metals.  
Extreme forming abilities.  
The innovative solution to face current micro-  
technology challenges.  
A unique and patented process.**



## VULKALLOYS®

a range of metals with unchallenged properties

**Cu**

### Flexibility elasticity

elastic deformation  
ability 2x superior  
as spring steels

### Watchmaking industry



### Accuracy Resistance Hardness

Micro mechanisms  
Wheels and pinions  
Flexible parts

**Ti**

**Zr**

### Biocompatibility

mechanical strength  
2x as strong as  
titanium

### Medical



### Complex shapes Miniaturization

Surgical instruments  
Miniaturized implants  
Medical device  
components

**Zr**

### Lightness

Weight reduced by  
30% compared to  
titanium parts

### Aeronautics



### Miniaturization of mechanical systems

Screw  
Connecting parts  
decorative parts

**Ni**

### Mechanical strength

mechanical strength  
3x as strong as  
titanium alloys

### Micromechanics



### Power transmission

Micromotors  
Gears  
Micro-connectics  
springs

**Hf**

### Thermal insulation

2x more insulating  
than existing  
metallic alloys

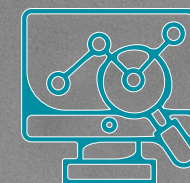
### Aerospace Cryogenics



### Miniaturization of systems

Cryocoolers  
Insulation

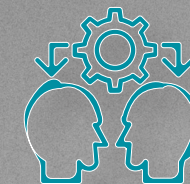
## FROM PROTOTYPE TO MASS PRODUCTION



### Metallurgical expertise

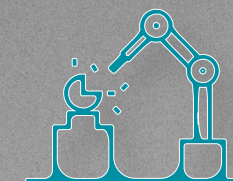
We accompany you in:

- the scientific and technical understanding of these new materials
- the correct Vulkalloy choice to optimize the properties required for the application
- the implementation and analysis of preliminary tests



### Co-design & prototyping

Our teams help you to use the full potential of the Vulkam process to solve your industrial challenges. New geometries, miniaturized design, we accompany you during the design and prototyping phases to validate the properties of your parts.



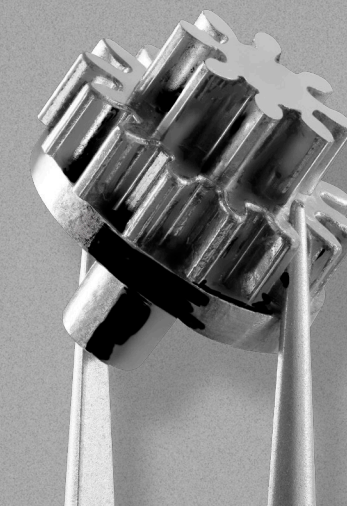
### Parts manufacturing

From prototype to mass production, the process developed by VULKAM allows the production of unique Vulkalloy® components with extreme shapes.

### A unique and patented 2-step process, specific for these materials & optimized for small parts

1. Elaboration of calibrated Vulkalloy® slugs by continuous casting
2. Injection molding of parts

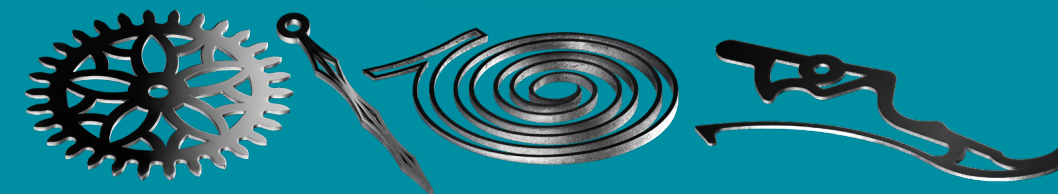
- Expertise in metallurgy and mechanics.
- Optimization of mold design and filling thanks to the numerical simulation tool developed in-house by Vulkam for Vulkalloys®.



10mm



5mm



### Modify the atomic organization of a material = Fundamentally change its properties

Discovered in 1960, AMAs (Amorphous Metallic Alloys) are non-crystalline alloys, exhibiting a glass-like structure, which means they have a random atomic-scale structure. Controlling the injection process - in particular the rapid cooling phase of the liquid metal in the mold - makes it possible to obtain the amorphous structure that gives metallic glasses their extraordinary properties.

Difference in atomic organization between an industrial metal and a Vulkalloy

