

# GÖMBÖC

## PRODUCT CATALOGUE



# PERFECT INSPIRATION IN A PERFECT SHAPE

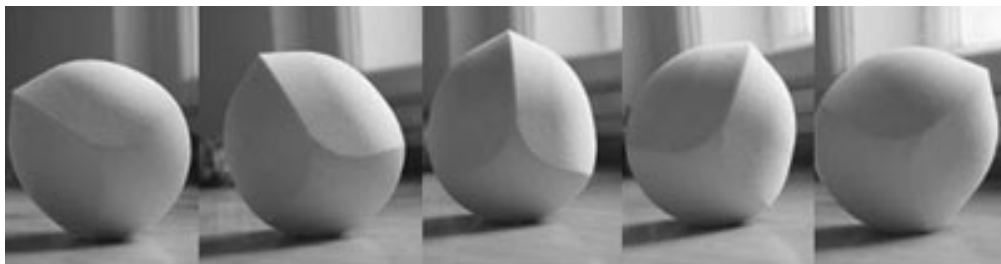
“A shape whose impossibility might have been an elegant theorem, but whose existence may be much more elegant.”

**Chandler Davis – Editor In Chief – The Mathematical Intelligencer**



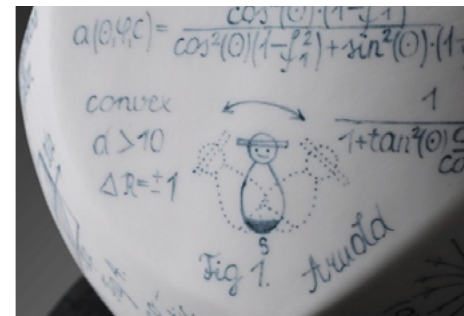
“One of the most interesting ideas of year 2007.”

**The New York Times**



“Gömböc is like a mythological creature. It’s reminding me of the story of the griffon bird.”

**Cedric Villani**



## ABOUT GÖMBÖC

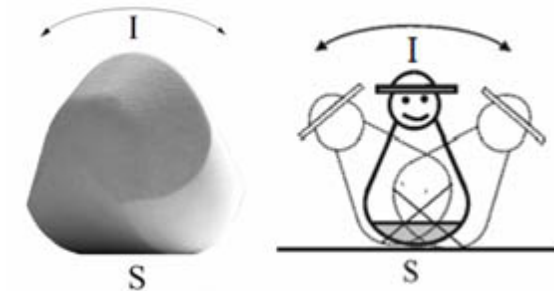
The Gömböc is a mathematical innovation, unique gift and science toy. It can inspire, aid one's train of thought, or even serve as a reminder that it is only a matter of time until you regain your balance. Different versions of Gömböc are available in steel, bronze, aluminium, plexiglass and a unique black substance in our science webshop. This self-righting shape is a perfect gift for business partners, colleagues and friends.



photo: Alain Goriely

The 'Gömböc' (pronounced: 'goemboets') is the first known homogenous object with one stable and one unstable equilibrium point, thus two equilibria altogether on a horizontal surface. It can be proven that no object with less than two equilibria exists.

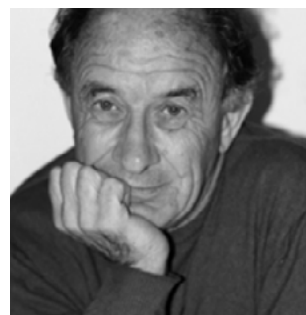
If placed on a horizontal surface in an arbitrary position, the Gömböc returns to a stable equilibrium point, similar to a Weeble toy. Whilst Weebles rely on a weight in the bottom, the Gömböc is a homogenous body, thus the shape itself accounts for self-righting.



# HISTORY OF THE GÖMBÖC

Although the study of the number and location static equilibrium points in rigid bodies dates back to the time of Archimedes, one of the most fundamental questions on the subject has remained open until very recently. How few equilibrium points can a single solid object have?

While there were strong indications that this minimal number should be 4, one of the greatest mathematicians of the 20th century, Vladimir Igorevich Arnold, thought otherwise and suggested in 1995 that the minimal number may be 2. This speculation baffled many scientists as no one had ever seen an object with just 2 equilibrium points. Ten years later, Arnold's theory turned out to be correct, as two Hungarian engineers first proved the existence of such objects and subsequently built a physically functioning shape which they named the "Gömböc." The first functioning Gömböc (with individual serial number 001) was donated in Moscow, on August 20th 2007 by the inventors of the project to Arnold on the occasion of his 70th birthday. Here, upon receiving Gömböc 001, Arnold offered further thoughts connecting the Gömböc to natural sciences.



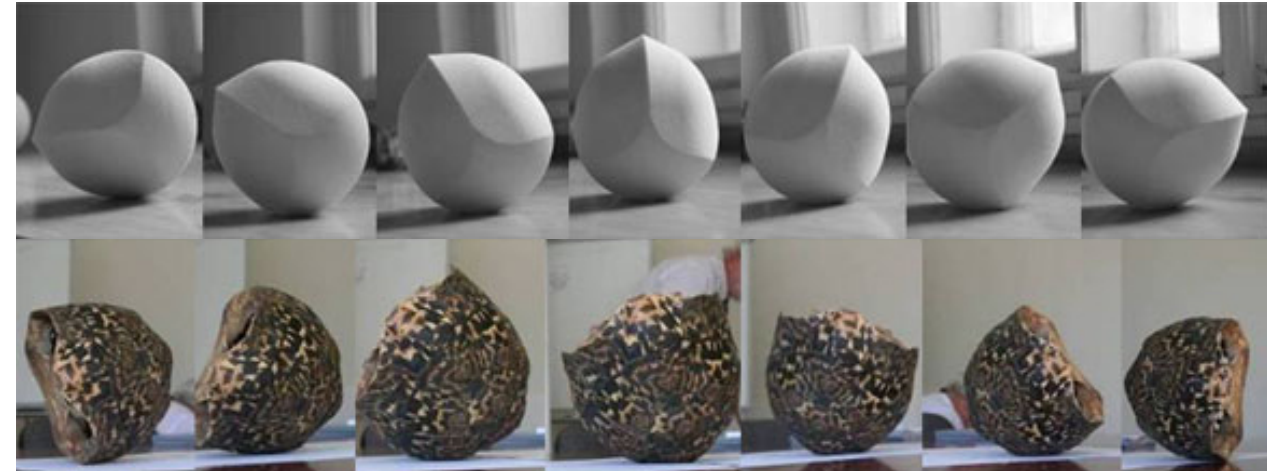
Although he did not live to know, Arnold was once again proven right, as the Gömböc's shape already appeared to be deeply encoded into nature. Since then, the Gömböc not only became a symbol of the Hungarian innovation, but also as a widely recognised example of deep links between mathematics and the natural world.



The Gömböc has made its debut on the cover of the prestigious **Mathematical Intelligencer**. The previous Hungarian invention on the cover of this journal was Rubik's Cube, in 1979. In 2007 the Gömböc was featured among the 70 most interesting inventions of the year by the **New York Times Magazine**. Individual, numbered pieces are on permanent exhibit at world-renowned institutions, such as the University of Cambridge (Gömböc 1209), the University of Oxford (Gömböc 2013), Princeton University (Gömböc 1746), the University of Göttingen (Gömböc 1737) and the Institute Poincaré in Paris (Gömböc 1928). The Gömböc was Hungary's offering at the **World Expo in Shanghai**, in 2010. Recently the Gömböc also at the biennial world chef championship Bocuse d'Or, on the stage of the Halle Opera and on BBC 1 with Stephen Fry. The Gömböc has also inspired high-quality contemporary art. So far, articles in 28 languages have been published about the Gömböc.



The Gömböc is fascinating to look at not only as a static design object but also as it rocks back to its stable equilibrium point. The average sized Gömböc shape (about 10 cm in diameter) has a tolerance of 0.01 millimeters. Failure to achieve this precision results in dysfunctional models.



# THE LIVING GÖMBÖC

Gömböc shape helps Indian Star Tortoises to self-right themselves.

Self-righting is a life saving exercise for turtles. Flat, aquatic turtles use their long, muscular neck, on the other hand, many terrestrial species are unable to self-right on a horizontal surface.

It is remarkable that from among approximately two hundred extant turtle species a few (among them the Indian Star Tortoise) have evolved, over millions of years, shells that come sufficiently close to a Gömböc shape to admit self-righting under gravity. Biologists often cite this fact as an amazing example on the complexity of evolution.

source: curiosity.com

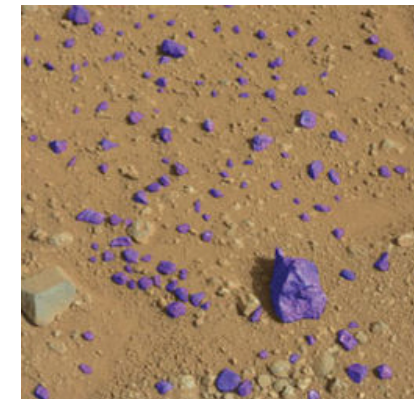
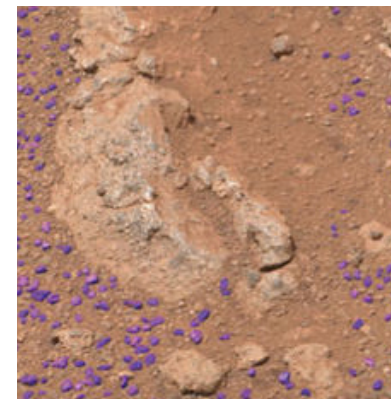


# THE GÖMBÖC IN SPACE

The Gömböc helps to decode the history of pebbles on Mars.

The Gömböc was the key in the identification of governing equations for the temporal morphogenesis of pebbles. Aided by these equations and by using the images of eroded pebbles taken by NASA's Curiosity rover, scientists could estimate the length of ancient Martian rivers which existed 3 billion years ago on the surface of the Red Planet. This result is regarded as one of the most compelling evidence on former fluvial activity on Mars.

source: nature.com



## GÖMBÖC FEATURES IN DRONE DESIGN

Cutting-edge drone design inspired by the Gömböc. The GRASP laboratory at the University of Pennsylvania is one of the world's foremost research and development centres for helicopter drones. The lab's team has pioneered to design a bio-inspired flying robots with collective behaviour. Their latest breakthrough is super-stable pico-drone capable of in-flight self-righting, designed by Yash Mulgaonkar. The carbon-fibre composite exoskeleton of the miniature robot was inspired by the Gömböc shape. Although the Gömböc shape is very sensitive and in case of a homogeneous body deviations of 1/100 millimetre may destroy its mechanical properties, the shape itself is a good starting point for any kind of self-righting mechanism. The Penn scientists are already working on its larger variant.

source: gomboc.eu



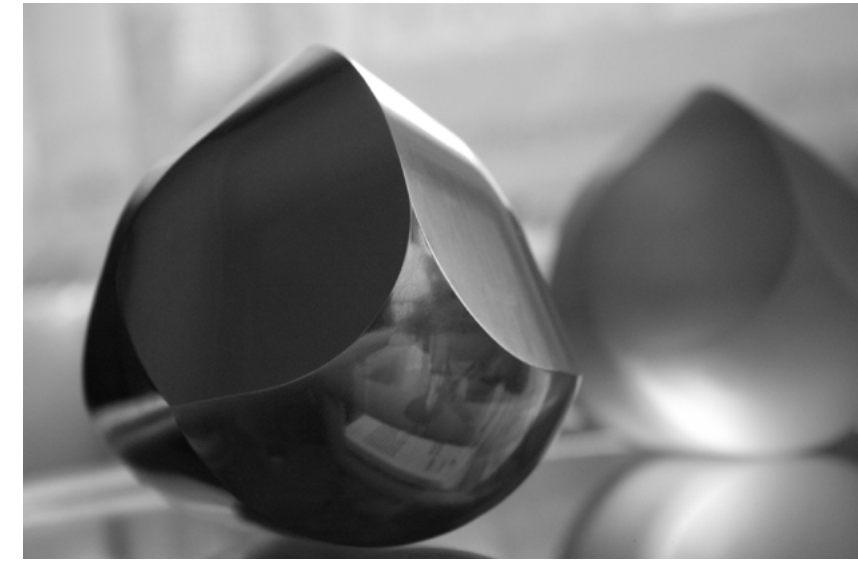
## PRODUCTION

Gömböc models are produced by using CNC (Computer Numerical Control) milling technology. The Manufacture of one single Gömböc requires several hours of precision milling. Every hundredth of millimetre counts for Gömböc-type of objects, so we work to a high degree of accuracy. The smallest change in the process may result in a dysfunctional Gömböc shape. Therefore, if we engrave a Gömböc, we have to recalculate the whole self-righting shape to be able to balance the mass inequalities.



# GÖMBÖC PRODUCTS

Choose our different Gömböc products as inspiring and exclusive gifts for your friends, family members, or business partners!





## ALUMINIUM GÖMBÖC

The Aluminium Gömböc is beautifully simple. As our best-selling product, it is a great gift to anyone wishing to take a relaxing pause in the daily rush. If you need some inspiration or entertainment, our silver, shining Aluminium Gömböc is the right choice for you.

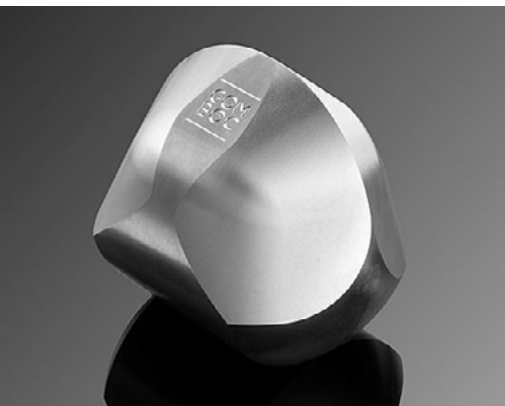
This Gömböc is made of a special aluminium alloy and its unpolished version is the perfect fit for the Gömböc.

### Product details

**Surface:** partly polished

**Weight:** 1000g

**Dimensions:**  
height: 3.5 inches  
width: 3.1 inches  
length: 3.9 inches



## SANDBLASTED ALUMINIUM GÖMBÖC

The Sandblasted Aluminium Gömböc is the most modern looking Gömböc in our webshop.

This Gömböc is made of a combination of special Aluminium, Magnesium and Silicon alloy. Sandblasted Aluminium gives this Gömböc a highly unique and unforgettable appearance.

### Product details

**Surface:** sand blasted

**Weight:** 1000g

**Dimensions:**  
height: 3.5 inches  
width: 3.1 inches  
length: 3.9 inches



## BLACK GÖMBÖC

The Black Gömböc looks like an amazing artwork from a different world. Its dark look is mysterious as well as elegant, elevating the Gömböc shape into modern artistic heights. You only need to enjoy the view of this unique combination of shape and color and fall into its deepness. As this polished Gömböc is made of a highly sensitive material, it is recommended to use it on smooth surfaces to prevent scratches. Black Gömböc is made of colored Polyoxymethylene (POM), which is often used in precision parts requiring high stiffness, low friction and excellent dimensional stability.

### Product details

**Surface:** fully polished

**Weight:** 500g

**Dimensions:**  
height: 3.5 inches  
width: 3.1 inches  
length: 3.9 inches





## POLISHED ALUMINIUM GÖMBÖC

The Polished Aluminium Gömböc is a sparkling gem of science. This is the new version of our best-selling product, the Aluminium Gömböc. The highly polished Gömböc is an ideal gift for people who like elegant design. Anyone can admire the beauty of this masterpiece, bringing your imagination to life through its swing. Its reflective surface highlights the unique shape of the object, giving it an air of exclusivity in any environment. This Gömböc is made of a special aluminium alloy, and its polished version raises the Gömböc to a new dimension.

### Product details

**Surface:** polished

**Weight:** 1000g

**Dimensions:**

height: 3.5 inches

width: 3.1 inches

length: 3.9 inches





## PLEXIGLASS GÖMBÖC

Plexiglas Gömböc is the combination of perfection and clarity. Because of light transmission, this product can show you a new world in your room on sunny days. This Gömböc is made of acrylic glass, which allows you to see through the object. This unique material can prove clearly the magic of the existence of the Gömböc. We do not need any additional weights or tricks, we can rely on the miracle of geometry alone.

### Product details

**Surface:** fully polished

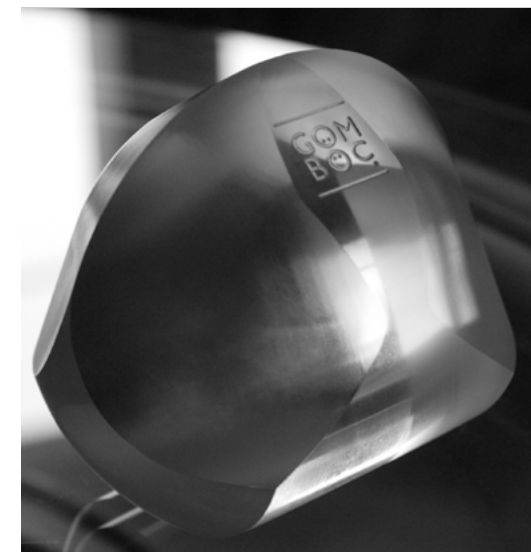
**Weight:** 500g

**Dimensions:**

height: 3.5 inches

width: 3.1 inches

length: 3.9 inches



## STEEL GÖMBÖC

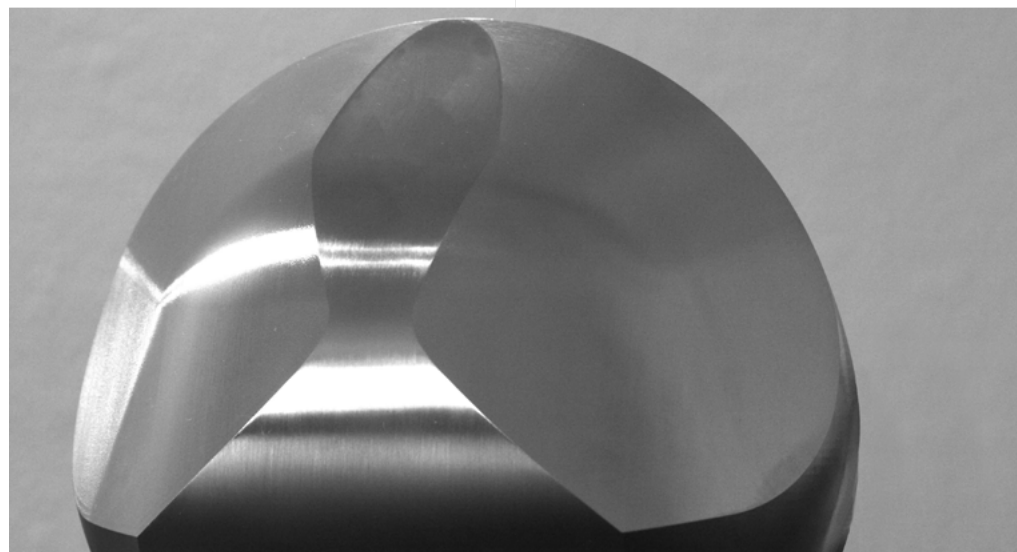
The Steel Gömböc is our latest metal product, one with a particularly relaxing effect. This large Gömböc is ideal for powerful minds and visionaries, who have to solve problems on a daily basis. The Steel Gömböc is the perfect desk toy to help you to have fresh and new ideas. It is made of a very strong material, which is extremely robust and almost as heavy as bronze. Our stainless steel the most ideal substance for an exclusive gift out of any pure design objects.

### Product details

**Surface:** unpolished

**Weight:** 2900g

**Dimensions:**  
height: 3.5 inches  
width: 3.1 inches  
length: 3.9 inches



## BRONZE GÖMBÖC

The Bronze Gömböc is the heaviest in our product line. It appears unstoppable as it moves, slowly finding its balance. This Gömböc is for deep-thinkers who like to think over their possibilities thoroughly before deciding. The slow movement of this Gömböc can reinforce consciousness and bring simplicity into the chaos of thought.

### Product details

**Surface:** unpolished

**Weight:** 3500g

**Dimensions:**  
height: 3.5 inches  
width: 3.1 inches  
length: 3.9 inches





## PORCELAIN GÖMBÖC

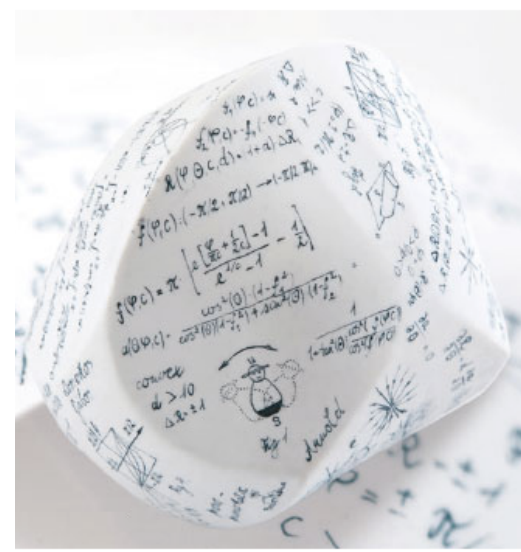
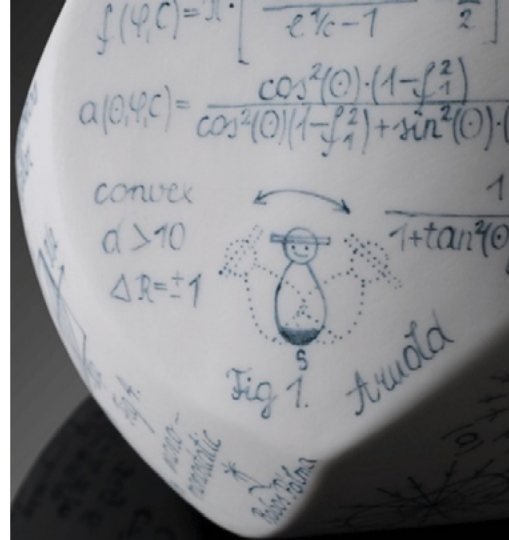
The Porcelain Gömböc is the world's first artistic representation of this mathematical innovation. This fascinating masterpiece is ideal for collectors, porcelain and design lovers. The world famous porcelain manufactory in Herend (Hungary) produces this exciting science toy. The Porcelain Gömböc is made of white porcelain, which is fired at 1,400°C. After firing, the Gömböc shaped porcelain is hand-painted by master-craftsmen. This porcelain version is a pseudo-Gömböc because of its hollow interior.

### Product details

**Surface:** hand painted

**Weight:** 345g

**Dimensions:**  
height: 4.1 inches  
width: 3.0 inches  
length: 4.1 inches





## LIGHT GÖMBÖC

The Gömböc Light is the least heavy and least sensitive Gömböc produced so far, which serves primarily as a show-piece. You can release the features of this mathematical innovation perfectly using this type of Gömböc model. It is the perfect gift for real science fans or mathematical innovation seekers.

### Product details

**Surface:** unpolished

**Weight:** 300g

**Dimensions:**  
height: 3.5 inches  
width: 3.1 inches  
length: 3.9 inches



# PACKAGING

## STANDARD BOX

Our standard box can optimally protect the chosen product during shipping. Its inner layer can be used separately to present the Gömböc. A transparent layer with the mathematical formula covers the Gömböc to give some extra insights to its new owner.

### Dimensions:

height: 6.6 inches

width: 5.7 inches

length: 4.9 inches



GOM  
BÖC



## GIFT BOX

Our gift box was developed for special needs. The velvet interior provides an elegant look. It is the perfect choice if you would like to buy Gömböc as a present for different occasions like birthdays, corporate events or anniversaries.



### Dimensions:

height: 3.9 inches  
width: 3.1 inches  
length: 3.5 inches



## ENGRAVED STANDARD BOX

Engraving on a standard box is a fast and affordable technique to have a unique present. The brown coloured engraving can be placed on the top of the box, above the small window.



### Dimensions:

height: 6.6 inches  
width: 5.7 inches  
length: 4.9 inches



## ENGRAVED GIFT BOX

Our customized presentation box was developed for special needs. In order to create a personalized gift, unique Gömböc titles or your company's logo can be placed on top of the box. Further, the velvet interior provides an elegant look.

It is the perfect choice if you would like to buy the Gömböc as a present for corporate events or anniversaries. Silver coloured graphics can harmonize with the brand logo of Gömböc on the front of the box. Our special screen printing technique is responsible for this unique look.



## GIFT BOX WITH SILVER LOGO

Our customized gift box was developed for special needs. In order to create a personalized gift, unique Gömböc titles or your company's logo can be placed on top of the box. Furthermore, the velvet interior gives the product an even more elegant appearance.

It is the perfect choice if you would like to buy the Gömböc as a present for corporate events or anniversaries. Silver coloured graphics can harmonize with the brand logo of Gömböc on the front of the box. Our special screen printing technique is

The production time of the screen-printed box is 5-7 business days.



### Dimensions:

height: 3.9 inches  
width: 3.1 inches  
length: 3.5 inches



### Dimensions:

height: 3.9 inches  
width: 3.1 inches  
length: 3.5 inches





# ACCESSORIES

## ENGRAVED GLASS PLATE

The 25 x 25 cm size glass plate is a decorative representation of Gömböc. We can engrave your company's logo, unique titles or images. You can place this exclusive gift on conference tables or on your desk. We recommend using this unique plate with our Aluminium, Plexiglas or Black Gömböc models.

### **Dimensions:**

height: 9.84 inches

width: 9.84 inches



## 3D POSTCARD AND FIRST DAY COVER

Our 3D postcard does not only depict Gömböc in 3D, but also shows several movement phases of it as an animation when the viewing angle of the card is changed. This optical effect is possible due to the use of a special printing technology called lenticular printing. The postcard has a standard size and it can be an ideal accessory to the Gömböc stamp, which is also available in our webshop.

Size of the envelope: 148 x 105mm



Have you collected stamps or are you still a collector? If your answer is yes, our first day cover is a perfect choice for you! Our first day cover is provided with Gömböc stamps. We also send you two first day of issue postmarks (one with date and Gömböc logo and an extra one).

## STAMPS

Our Gömböc stamps can be the latest special piece in your collection! Our stamp series show you the movement of Gömböc in 30 steps. Gömböc was in focus in the Hungarian pavilion at the Expo in Shanghai, in 2010. Because of the importance of this event, the Hungarian Post Office has issued a block of stamps and a booklet in memory of this special occasion. Each unique stamp (with a face value of HUF 100) shows a different characteristic position during the movement of Gömböc.

A block of 30 stamps has a face value of HUF 100 each.

Date of issue: 30 April 2010 (printed by Pénzjegynyomda)



This is a stamp size booklet with 30 Gömböc stamps. Our booklet is special because you can see Gömböc in movement if you leaf through our booklet.

# CONTACT US

[www.gomboc-shop.com](http://www.gomboc-shop.com)

OUR SUPPORT TEAM IS HERE TO ASSIST YOU ANYTIME!

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