

01 | Wire retaining ring

Flattened wire retaining ring



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01. Introduction

A retaining ring, also known as a circlip, is a part used for axial limiting, and a flattened wire retaining ring is one type of retaining ring made of flattened wire. It can prevent other parts from axial movement and ensure the stability and reliability of the mechanical device.

02. Classification

According to the different usage scenarios and installation positions, it can be divided into hole retaining rings, shaft retaining rings, and C-type retaining rings:

Hole retaining rings: Mainly used to be installed in the hole, and its elasticity or rigidity is used to limit the axial movement of the shaft or other parts.

Shaft retaining rings: Mainly used to be installed on the shaft, and its structural characteristics are used to fix the parts on the shaft to prevent their axial movement.

C-type retaining rings: Mainly used to be installed on the shaft. Due to the influence of its use environment, it cannot be installed with a flattened steel wire retaining ring for the shaft (that is, installed into the groove from one end of the shaft), and it needs to be installed in a radial manner.

In addition, affected by the usage scenario and installation position, some retaining rings have added mounting holes or slots to cooperate with calipers for installation operations.



Hole retaining ring

Hole retaining ring

Shaft retaining rings

Shaft retaining rings

C-type retaining ring

03. Material

Our company's flattened wire retaining rings are mainly made of 65Mn, SWRH72B, SWRH82A, 60Si2Mn and other materials. We can choose the appropriate material according to the use environment of the retaining ring, and support personalized material design and processing according to customer drawing requirements.

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04. Molding process

The forming process of the flattened wire retaining ring mostly adopts sheet punching or wire winding. Among them, the functional cross-section of the retaining ring made by the sheet punching process is conical, and it is mostly "linear contact" after assembly; while the wire winding forming process is made by punching excess materials, and its cross-section is a regular rectangle, and it is "surface contact" after assembly.

Our company uses the wire winding forming process to process this type of flattened wire retaining ring to increase the contact surface between the retaining ring and the groove to form a "surface contact", so that it has a greater radial clamping force to meet the transmission shaft when it rotates and does not fall out.

Our manufacturing process includes:

Winding → heat treatment → forming → vibration grinding → surface treatment → packaging

According to the requirements of parts of different sizes and thicknesses, we will also add grinding, laser engraving and other processes. At the same time, according to the specific use environment of the parts, the surface treatment process can be divided into: anti-rust oiling, oxidation blackening, phosphating, ultrasonic cleaning and other processes. Among them, ultrasonic cleaning is particularly suitable for environments that require high cleanliness, such as DCT, AT gearboxes and new energy box applications, which can meet strict cleanliness requirements.

The superiority of the wire winding forming process enables some of our company's flattened wire retaining rings to reach a maximum speed of 20,000r/min, and will not fall off during high-speed operation, fully meeting the needs of high-speed environments such as new energy high-speed motors, AT and DCT gearboxes.

05. Specifications and dimensions

Our company provides a variety of specifications and sizes of flattened wire retaining rings to meet the needs of different mechanical devices. Common specifications include nominal diameter, height and thickness, and can be customized according to the actual needs of customers.

For customers who are not sure about the matching size, they can refer to the automotive industry standards QC/T 344 "Flattened wire retaining rings for holes", QC/T 345 "Flattened wire retaining rings for shafts" and GB/T 305 "Rolling bearing radial bearing retaining groove and retaining ring dimensions, product geometric technical specifications (GPS) and tolerance values" and other standards for selection. For demanding use environments, we can use precision grinding to meet the minimum thickness tolerance: $t \pm 0.015\text{mm}$ ($\Phi 25 \sim 100\text{mm}$, thickness above 1.5mm), $t \pm 0.025\text{mm}$ ($\Phi 20 \sim 200\text{mm}$), $t \pm 0.05\text{mm}$ ($\Phi 20 \sim 400\text{mm}$).

06. Precautions

When using a flattened wire retaining ring, the appropriate specifications and installation position should be selected to ensure the best axial limit effect. Standard operations must be followed during installation to avoid damage or failure.

07. Application areas

Flattened wire retaining rings are widely used in the fields of automobiles, aerospace, ships, machine tools, etc. to ensure the normal operation and safety of mechanical devices.