04 | Circlip

Elastic retaining ring for hole

01. Introduction

The retaining ring, also known as the circlip, is a part used for axial limiting. The elastic retaining ring is one of the types made by the plate punching process. Its radial width is gradually deformed, that is, from wide to narrow, and an additional ear with a mounting hole is added at the opening. 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:

- Elastic retaining rings for holes: mainly used to be installed in holes, and limit the axial movement of shafts or other parts through their elasticity or rigidity.
- Elastic retaining rings for shafts: mainly used to be installed on shafts, and fix the parts on the shafts through their structural characteristics to prevent their axial movement.
- E-type open retaining rings: mainly used to be installed on shafts. Due to the influence of its use environment, shaft elastic retaining rings cannot be used for assembly (i.e., installed into the groove from one end of the shaft), and radial installation is required.

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

03. Material

The main materials of our company's flattened wire retaining rings are 65Mn, 60Si2Mn, C67S~C75S, etc., which can be processed according to the final customer requirements of the retaining rings.

04. Application Areas

Retaining rings are widely used in various mechanical devices, such as automobiles, aerospace, ships, machine tools, etc. They play an important axial limiting role in these fields, ensuring the normal operation and safety of mechanical devices.

E-type open retaining ring

Circlip

Elastic retaining ring for shaft

05. Molding process

The forming process of elastic retaining rings is mostly processed by plate punching. For some elastic retaining rings with larger nominal diameters, manufacturers in Europe, the United States and other countries have begun to use the processing method of wire winding and then punching to obtain better product characteristics. At present, the leading enterprises in the domestic industry have carried out this forming process, and our company is also actively developing this forming process. The functional cross-section of the retaining ring made by the plate 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 plate punching forming process to process this type of elastic 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, which can meet the requirement that the transmission shaft will not fall out when it rotates.

Our company's manufacturing process is: punching → heat treatment → vibration grinding → surface treatment → packaging. According to the different sizes and grouping requirements of the parts thickness, grinding, laser engraving and other processes will be added. According to the different use environments of the parts, the surface treatment can be divided into anti-rust oiling, oxidation blackening, phosphating, ultrasonic cleaning and other processes. Among them, ultrasonic cleaning can meet the use environment of DCT, AT and new energy box types with higher cleanliness requirements.

06. Specifications and dimensions

The specifications and sizes of elastic retaining rings are varied to meet the needs of different mechanical devices. Common specifications and sizes include nominal diameter, height, thickness, etc. The specific dimensions can be customized according to actual needs.

For customers who are not familiar with the matching dimensions, you can also choose according to the requirements of GB/T893.1 "Elastic retaining rings for shafts", GB/T894.1 "Elastic retaining rings for holes", or GB/T 896 "Open retaining rings".

For use environments with strict matching dimension requirements, parts can be processed into different thickness groups by grinding, and the parts can be used to adjust the shaft tooth clearance. At present, the minimum thickness requirement that our company can meet is t±0.015mm (diameter Φ25~100mm).

07. Precautions

When using a flattened wire retaining ring, you should pay attention to selecting the appropriate size and installation position to ensure that it can play the best axial limit effect. At the same time, during the installation process, you should follow the relevant installation specifications and operating requirements to avoid damage or failure caused by improper operation.