Q5: How to master the three links to improve the loss caused by stress on die-casting molds?

A5: In die-casting production, the most common forms of mold damage are cracks, and stress is the main cause of mold damage. So, how is stress generated? In fact, stress includes thermal stress and mechanical stress. Thermal, mechanical, chemical, operational shock and other factors are the main sources of stress. For die-casting, it is specifically produced in the processes of "die-casting production", "mold processing" and "mold processing and manufacturing".

- **During the die casting production process**

The die-casting mold should be preheated to a certain temperature before production. Otherwise, when the high-temperature molten metal is filled, a chilling condition will cause the temperature gradient of the inner and outer layers of the mold to increase, forming thermal stress, and causing cracks on the mold surface. , And even cracking phenomenon.

During the die-casting production process, the mold temperature continues to rise. When the mold temperature is overheated, it is easy to produce sticking membranes, which will cause the failure of moving parts and cause damage to the mold surface. Therefore, it is recommended to install a cooling temperature control system to keep the mold working temperature within a certain range.

- During mold processing

The stress generated during steel quenching is the result of the superposition of the thermal stress during the cooling process and the structural stress during the phase transformation. The quenching stress is the cause of deformation and cracking, so tempering must be performed to eliminate the stress.

In addition, improper heat treatment will also lead to die cracking and premature scrapping, especially if only quenching not tempering is used, and the surface nitriding treatment is performed, after thousands of castings, surface cracking and cracks will appear.

- During mold processing and manufacturing

A bright white layer is formed on the surface of the mold, and this layer itself will have cracks and stress. When performing EDM, a higher frequency should be used to minimize the white layer, so it must be polished and removed and tempered.

Furthermore, in practice, there will be cracks in die-casting molds that only produce a few hundred pieces, and the cracks develop very quickly. It is possible that only the outer

dimensions are guaranteed during manufacturing, and the dendrites, carbides, shrinkage holes, bubbles and other loose defects in the steel are stretched to form streamlines due to processing. This streamline affects the subsequent quenching, deformation, cracking, embrittlement, and failure tendency during use have a great influence.

The hardened steel will also produce grinding stress during grinding, and friction heat will be generated during grinding, resulting in a softened layer and decarburized layer, which reduces the thermal fatigue strength and easily leads to hot cracks and early cracks. After precision grinding, H13 steel can be heated to 510-570°C, and the thickness is kept at 25mm for one hour for stress relief annealing. In addition, the cutting stress generated during final processing such as turning, milling, and shaving can be eliminated by intermediate annealing.

I believe that step by step and careful inspection in the above three processes will inevitably reduce the loss caused by stress, and the output of die-casting molds will also be improved to a certain extent.

▲This article is organized by Assistant Hu of DITSA Office and is taken from: How to improve die-casting mold damage caused by stress, quoted from Read01.com, 2015-05-08, original URL: http://t.cn/AiYFfRxS.