## Machine Tool Anti-Shock Setting Block Introduction

# 1. Product Introduction

# 1.1 Definition and Function

Machine tool anti - shock setting blocks are specialized mechanical components designed to provide stable support for machine tools while effectively mitigating shocks and vibrations. They act as a buffer between the machine tool and the foundation, playing a crucial role in enhancing the overall performance and lifespan of the equipment.

- Shock Absorption: Capable of absorbing sudden impacts generated during machine tool operations, such as rapid tool changes, heavy cutting, or start stop processes. By reducing the impact force, they protect the internal components of the machine tool from damage and minimize the risk of structural fatigue.
- Vibration Isolation: Significantly reduce the transmission of vibrations between the machine tool and the floor, as well as external vibrations from the surrounding environment. This isolation ensures that machining accuracy is maintained, reducing dimensional errors and improving the surface finish of workpieces.
- Leveling and Alignment: Enable precise adjustment of the machine tool's height and horizontal alignment. This is essential for maintaining the geometric accuracy of the machine, ensuring that the cutting tools move along the correct path during machining operations.

## **1.2 Structure and Components**

- **Base Layer**: Typically made of high strength cast iron or steel, the base layer serves as the foundation of the setting block. It has a large contact area with the floor to distribute the load evenly and prevent sinking or movement. The base may be equipped with anti slip features or mounting holes for secure installation.
- Shock Absorbing and Vibration Isolating Layer: This is the core component of the anti shock setting block. It can be composed of various materials:
  - **Elastomeric Materials**: Such as natural rubber, synthetic rubber (e.g., neoprene, nitrile rubber), or polyurethane. These materials have excellent elasticity and energy absorption capabilities, effectively dissipating shock and vibration energy.
  - Spring Based Structures: Coil springs or leaf springs are used in some models to provide dynamic shock absorption and vibration isolation. Springs are particularly effective in handling low - frequency vibrations and large amplitude shocks.
  - **Composite Materials**: Combining elastomers with metal or other high strength materials to create a structure that offers both flexibility and strength, optimizing shock and vibration reduction performance.
- Adjustment Mechanism:
  - **Threaded Rods and Nuts**: A common design that allows for fine tuning of the height. By rotating the threaded rod, the upper platform can be raised or lowered, enabling precise leveling with an accuracy of up to 0.1 mm.
  - Wedge Shaped Design: Some setting blocks feature a wedge shaped

structure. Sliding the wedge in or out can quickly change the height of the upper platform, providing a convenient way to make on - site adjustments.

• **Upper Platform**: The top layer that directly contacts the machine tool. It is machined to a high degree of flatness (e.g., surface roughness Ra  $\leq 1.6 \,\mu$ m) to ensure a stable and even connection with the machine tool's base. The upper platform may also have mounting slots or holes for securely fastening the machine tool.

### 2. Application Scenarios

#### 2.1 Precision Machining Industries

- Aerospace Manufacturing: In the production of aerospace components, where extreme precision is required, machine tool anti shock setting blocks are essential. They support high end CNC machining centers, five axis milling machines, and grinding machines, ensuring that the vibrations and shocks generated during the machining of complex parts (such as turbine blades and aircraft frames) do not affect the accuracy of the final products. This helps meet the strict quality and safety standards of the aerospace industry.
- Medical Device Manufacturing: The manufacturing of medical devices demands high - precision machining. Anti - shock setting blocks are used under machines that produce surgical instruments, implants, and diagnostic equipment components. By reducing vibrations and shocks, they ensure the dimensional accuracy and surface quality of these critical medical parts, which are essential for patient safety and treatment effectiveness.

#### 2.2 General Manufacturing

- Automotive Component Production: In automotive factories, machine tools are used to produce a wide range of components, from engine blocks and transmission parts to intricate interior components. Anti shock setting blocks are installed under lathes, milling machines, and stamping presses. They protect the machines from the shocks generated during heavy duty machining operations, such as high speed cutting and stamping, and reduce vibrations that could affect the precision of component manufacturing. This improves the overall quality of automotive parts and reduces production costs by minimizing machine wear and tear.
- Tool and Die Making: The manufacturing of tools and dies for plastic injection molding, metal stamping, etc., requires high - precision machining. Anti - shock setting blocks support EDM machines, wire - cutting machines, and high - speed milling machines used in tool and die production. They ensure that the machines remain stable during the machining of complex geometries, enabling the production of high - quality tools and dies with tight tolerances and long service lives.

#### 2.3 Heavy - Duty Industrial Applications

- Metal Forming and Forging: In metal forming and forging industries, machines such as hydraulic presses and forging hammers generate significant shocks and vibrations. Anti - shock setting blocks are used to support these heavy - duty machines, absorbing the intense impacts and reducing the transfer of vibrations to the foundation and surrounding structures. This helps protect the machines and the building infrastructure, as well as improves the working environment for operators.
- Mining and Construction Equipment Manufacturing: The production of mining

and construction equipment involves the use of large - scale machine tools. Anti - shock setting blocks are crucial for maintaining the stability of these machines during the machining of heavy - duty components, such as excavator arms, truck frames, and mining machinery parts. By reducing shocks and vibrations, they ensure the quality and reliability of the final products, which are essential for the demanding conditions of mining and construction sites.

## 3. Maintenance, Repair, and Troubleshooting

## 3.1 Maintenance

- **Regular Cleaning**: After each use or at least once a week, clean the anti shock setting blocks thoroughly. Use a soft bristle brush to remove metal chips, coolant residues, dust, and oil. For the shock absorbing and vibration isolating layer, especially if it is made of elastomeric materials, wipe it gently with a damp cloth to remove contaminants without damaging the material. Then, dry all parts completely to prevent rust on metal components.
- Lubrication: For setting blocks with moving adjustment parts, such as threaded rods and wedge - sliding mechanisms, lubricate regularly. Apply a high - quality anti corrosion lubricant every 3 - 6 months, depending on the frequency of use. This ensures smooth operation of the adjustment mechanism and prevents seizing due to friction and corrosion.
- **Inspection**: Periodically inspect the setting blocks for signs of wear, damage, or degradation. Check the integrity of the shock absorbing and vibration isolating layer for cracks, hardening, or loss of elasticity. Examine the threads of the adjustment rods for stripping and the flatness of the upper platform and base layer. Use a precision level or electronic leveling device to verify the leveling performance of the setting blocks.
- **Storage**: When not in use, store the anti shock setting blocks in a dry, dust free environment. Avoid stacking heavy objects on top of them, especially those with sharp edges, as this can damage the shock absorbing layer. If possible, store them in a dedicated storage rack or container to protect their structure and performance.

#### 3.2 Repair

- Minor Damage: For minor surface scratches or dents on the metal parts (base layer or upper platform), they can often be repaired by grinding or polishing. If the threads of the adjustment rods are slightly damaged, a thread repair kit can be used. For the shock - absorbing and vibration - isolating layer, if there are minor cracks or surface damage on elastomeric materials, some specialized repair compounds can be applied to extend its service life.
- Major Damage: In case of severe damage, such as a cracked base layer, a completely worn - out shock - absorbing layer, or a severely damaged adjustment mechanism, the affected parts should be replaced. It is essential to use original manufacturer recommended replacement parts to ensure compatibility and maintain the performance of the setting blocks. When replacing parts, follow the manufacturer's installation instructions carefully.

#### 3.3 Troubleshooting

• Ineffective Shock Absorption or Vibration Isolation:

- **Possible Cause**: Degraded shock absorbing and vibration isolating layer (e.g., elastomeric material losing elasticity, springs losing tension), incorrect installation, or overloading of the setting blocks.
- **Solution**: Inspect the shock absorbing and vibration isolating layer and replace it if it is damaged or degraded. Recheck the installation to ensure that the setting blocks are correctly positioned and tightened. Verify that the load on the setting blocks does not exceed their rated capacity, and if necessary, add more setting blocks or redistribute the load.
- Difficulty in Adjusting Height:
  - **Possible Cause**: Corrosion or dirt in the adjustment mechanism, stripped threads on the adjustment rods, or a jammed wedge shaped component.
  - **Solution**: Clean the adjustment mechanism thoroughly using a suitable solvent and a brush. If the threads are stripped, replace the adjustment rods or use a thread repair kit. For a jammed wedge, remove any debris and apply lubricant to the moving parts.
- Uneven Leveling:
  - **Possible Cause**: Uneven wear of the setting blocks, improper initial installation, or an uneven floor or foundation.
  - **Solution**: Check for uneven wear by comparing the condition of each setting block. Re install the setting blocks following the correct procedure, ensuring they are evenly spaced and properly aligned under the machine tool. If the floor or foundation is uneven, consider using additional shims or leveling the surface.

# 4. Performance Characteristics

- High Efficiency Shock and Vibration Reduction: Machine tool anti shock setting blocks can effectively absorb up to 90% of shocks and reduce vibration transmission by 80 - 95% across a wide frequency range (usually 5 - 50 Hz), depending on the design and materials. This significantly improves the machining accuracy and surface finish of workpieces.
- **Precision Leveling and Adjustability**: They allow for fine tuning of the machine tool's height and level, with an adjustment accuracy often reaching 0.1 mm or better. The adjustable design ensures that the machine tool can be precisely aligned to meet the strict requirements of different machining processes.
- **High Load Bearing Capacity**: These setting blocks are designed to support heavy machine tools, with load bearing capacities ranging from several tons to over ten tons, depending on the model. The robust construction, using high strength materials for the base and structural parts, ensures stable support under heavy loads.
- **Durability**: Made from high quality materials and with a well engineered structure, anti - shock setting blocks are highly durable. The metal components are resistant to wear and corrosion, while the shock - absorbing materials are designed to withstand long - term use and environmental factors, maintaining their performance over time.
- **Versatility**: Suitable for a wide variety of machine tools, including CNC lathes, milling machines, grinding machines, EDM machines, and heavy duty presses. They can be used in different industrial environments and machining processes, providing a



flexible solution for shock and vibration control and equipment leveling.