



Differences Between Hollow Linear Shafts vs. Solid Linear Shaft

1. Weight and Construction

A **Hollow Linear Shaft** has a central bore that reduces material usage and overall weight. This lightweight construction can be beneficial for moving systems where lower inertia and faster acceleration are required. A **solid linear shaft** contains material throughout its cross-section, making it heavier but structurally robust.

2. Strength and Rigidity

Solid shafts generally provide greater resistance to bending and deformation when comparing shafts of similar outer dimensions and material. Hollow shafts, however, can achieve an excellent strength-to-weight ratio when their wall thickness and diameter are properly engineered. The right design depends on load, span, and operating conditions.

3. Weight Reduction

For automated equipment and high-speed motion systems, reducing moving mass can improve efficiency and responsiveness. The hollow construction of a **Hollow Linear Shaft** makes it a practical solution when weight optimization is a priority without unnecessarily sacrificing structural performance.

4. Internal Routing

One major advantage of hollow shafts is the available internal space. Cables, pneumatic lines, wiring, or other components may be routed through the bore where the design permits. This can help create cleaner layouts and save valuable installation space.

5. Precision and Tolerance

Both hollow and solid shafts can be manufactured to precise dimensional requirements. Diameter tolerance, straightness, roundness, concentricity, and surface finish are important factors that influence bearing performance and smooth linear movement.

Read More:

www.sdbksteel.com/product/custom-hollow-linear-shaft



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Choosing the right shaft design is important for achieving smooth movement, accurate positioning, and dependable performance in industrial equipment. **Hollow linear shafts** and **solid linear shafts** are both widely used in linear motion applications, but their different structures provide distinct advantages. Understanding these differences can help engineers select the best option for their machinery.

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Hollow Linear Shafts vs. Solid Linear Shaft

Choose the Right Shaft for Your Application

HOLLOW LINEAR SHAFT



- LIGHTWEIGHT**
Hollow design reduces overall weight
- INTERNAL ROUTING**
Cables, wires or tubes can pass through the center
- GOOD STRENGTH TO WEIGHT RATIO**
Engineered wall thickness provides reliable performance
- IDEAL FOR**
Automation, robotics, lightweight systems, and internal component integration

VS

SOLID LINEAR SHAFT



- HIGH STRENGTH**
Solid structure provides maximum rigidity and load capacity
- HIGHER LOAD BEARING CAPACITY**
Better for heavy loads and high rigidity requirements
- EXCELLENT STABILITY**
Less deflection and higher accuracy under heavy loads
- IDEAL FOR**
Heavy machinery, long strokes, high loads, and demanding industrial applications

HOLLOW LINEAR SHAFT	KEY COMPARISON	SOLID LINEAR SHAFT
Lighter weight	Weight	Heavier
Internal space for cables and tubes	Internal Space	No internal space
Good strength with optimized design	Strength & Rigidity	Higher strength and rigidity
Ideal for speed, efficiency, and integration	Best Use	Ideal for heavy loads and maximum stability

4. Internal Routing

One major advantage of **hollow shafts** is the available internal space. Cables, pneumatic lines, wiring, or other components may be routed through the bore where the design permits. This can help create cleaner layouts and save valuable installation space.

5. Precision and Tolerance

The **hollow linear shaft** and solid linear shafts can be manufactured to precise dimensional requirements. Diameter tolerance, straightness, roundness, concentricity, and surface finish are important factors that influence bearing performance and smooth linear movement.

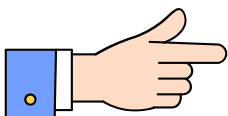
6. Application Considerations

Solid linear shafts are often selected for applications demanding high rigidity and substantial load support. Hollow designs are particularly useful for automation, robotics, linear guides, and other equipment where reduced weight, internal routing, or customized dimensions provide advantages.

Choosing the Right Shaft

The ideal choice depends on load capacity, shaft length, operating speed, material, wall thickness, tolerance, and installation requirements. **Shandong Baokun Metal Material Co., Ltd** offers custom shaft solutions for different industrial applications, helping customers select suitable specifications for reliable and precise performance.

For more details about **Hollow Linear Shaft**, visit <https://tinyurl.com/5b4cjm7k> and give us a call at **+86 15763576989** or email us at info@sdbkmetal.com today!



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