

# 7 Strainer

A practical guide to 7 strainer, covering the reader intent, the relationship to 7 strainer, key evaluation criteria, common risks, and the information the intended project audience should confirm before taking the next step.



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In industrial liquid processing, the efficiency of a filtration system often depends on the precision and durability of its internal components. The 7 strainer, typically referring to a 7-inch diameter basket used in high-capacity liquid filtration housings, serves as a primary defense against particulate contamination. These components are essential for protecting downstream equipment, such as pumps, valves, and spray nozzles, from damage caused by debris. As a specialized manufacturer, Kaifil provides engineered Strainers & Baskets designed to meet the rigorous demands of chemical, pharmaceutical, and food processing environments.

Selecting a 7 strainer requires a deep understanding of fluid dynamics, material compatibility, and mechanical stress. This article explores the technical specifications, engineering considerations, and selection criteria necessary for optimizing industrial filtration performance.

## **Understanding the Role of 7-Inch Basket Strainers in Industrial Filtration**

The designation of a "7 strainer" usually identifies the nominal diameter of the filter basket. In the industry, 7-inch baskets are most commonly associated with Size 1 and Size 2 filter housings. A Size 1 basket typically has a 7-inch diameter and a 16-inch length, while a Size 2 basket maintains the 7-inch diameter but extends to a 32-inch length. This standardization allows for high flow rates while providing a significant surface area for contaminant collection.

The primary function of these strainers is coarse filtration or pre-filtration. Unlike fine membrane filters, a 7 strainer is designed to handle high solids loading. It acts as a mechanical barrier, capturing larger particles while allowing the liquid phase to pass through with minimal resistance. The choice between a 16-inch or 32-inch length (Size 1 vs. Size 2) is dictated by the required flow rate and the expected dirt-holding capacity. A larger surface area reduces the frequency of cleaning cycles, thereby decreasing downtime in continuous industrial processes.

## **Material Selection and Engineering Standards**

Material integrity is the foundation of any industrial filtration component. Because 7 strainer units are often exposed to corrosive chemicals, high temperatures, and high-pressure differentials, the choice of alloy is critical.



## | Stainless Steel 304 vs. 316L

Stainless steel is the industry standard due to its mechanical strength and corrosion resistance.

- SS304: Suitable for general-purpose applications, including water treatment and mild chemical processing. It offers excellent durability and cost-effectiveness.
- SS316L: The preferred choice for pharmaceutical, food and beverage, and highly corrosive chemical applications. The addition of molybdenum provides superior resistance to pitting and crevice corrosion, particularly in chloride-rich environments.

## | Structural Reinforcement

An industrial 7 strainer is not merely a piece of mesh. It is a structural component. For high-pressure applications, the basket consists of a heavy-duty perforated metal support cylinder lined with a precision wire mesh. The perforation pattern—usually staggered to maximize open area without sacrificing hoop strength—provides the necessary rigidity to prevent the basket from collapsing under high differential pressure ( $\Delta P$ ).

## | Performance Evaluation: Flow Rate and Pressure Drop

Engineers must calculate the clean pressure drop of a 7 strainer before installation. The pressure drop is influenced by the fluid's viscosity, the specific gravity, the flow velocity, and the open area of the strainer media.

## | Open Area Ratio

The "Open Area Ratio" is the relationship between the total area of the openings in the strainer and the cross-sectional area of the inlet pipe. A well-engineered 7 strainer should ideally offer an open area ratio of at least 4:1. This ensures that even as the basket begins to fill with debris, the pressure drop remains within acceptable limits, preventing cavitation in centrifugal pumps located downstream.

## | Viscosity Considerations

As fluid viscosity increases, the resistance through the wire mesh or perforated holes increases exponentially. For high-viscosity liquids, such as resins, syrups, or heavy oils, engineers often specify a larger 7 strainer or a coarser mesh to maintain the required flow velocity. Kaifil's engineering team works with clients to determine the optimal mesh-to-perforation ratio to balance filtration efficiency with flow requirements.

## | Customization Options for Specialized Applications

Standard off-the-shelf strainers often fail to meet the unique requirements of complex industrial systems. Customization is frequently necessary to ensure a perfect fit and optimal performance.

## | Mesh and Micron Ratings

A 7 strainer can be customized with various linings ranging from coarse 20-mesh (approx. 840 microns) to fine 400-mesh (approx. 37 microns). For applications requiring even finer filtration, multi-layered sintered mesh can be utilized, providing the structural support of a basket with the precision of a filter cartridge.

## | Handle and Sealing Configurations

The ease of maintenance is often determined by the basket's top design. Customizations include:

- Slant-top baskets: Designed for specific housing geometries to ensure a tight seal.
- Heavy-duty handles: Ergonomic designs that facilitate rapid removal during change-outs.
- O-ring seals: Integrated grooves for Viton, EPDM, or PTFE encapsulated gaskets to ensure zero-bypass filtration.

## **| Reinforced Bottoms and Specialized Coatings**

In high-velocity systems, the bottom of the strainer experiences the greatest impact from incoming debris. Reinforced solid bottoms or double-layered mesh bases can prevent premature wear. Additionally, specialized coatings like Teflon (PTFE) can be applied to reduce adhesion for sticky or viscous fluids, making the cleaning process more efficient.

## **| Maintenance Protocols and Service Life Optimization**

The total cost of ownership (TCO) of a 7 strainer is heavily influenced by its maintenance requirements. Unlike disposable filter bags, stainless steel baskets are designed for long-term reuse, provided they are maintained correctly.

## **| Cleaning Procedures**

Effective cleaning is essential to restore the original flow characteristics. Depending on the contaminant, cleaning methods may include:

- Backwashing: Reversing the flow to dislodge particles.
- Ultrasonic Cleaning: Using high-frequency sound waves to remove fine particles trapped within the mesh weave.
- Chemical Soaking: Utilizing compatible solvents to dissolve organic or mineral buildup.



## | Monitoring Differential Pressure

The most critical maintenance tool for a 7 strainer is a differential pressure gauge. Operators should establish a "clean"  $\Delta P$  baseline. When the  $\Delta P$  reaches a predetermined limit (typically 10-15 psi above baseline), the basket must be removed and cleaned. Delaying this process can lead to "media migration" or structural failure of the basket, potentially contaminating the entire downstream system.

## | Strategic Selection Factors for Engineering Teams

When specifying a 7 strainer for a new project or as a replacement part, purchasing teams and engineers should confirm several key data points to ensure compatibility and performance:

1. **Fluid Characteristics:** Confirm the chemical composition, temperature range, and viscosity of the process fluid.
2. **Contaminant Profile:** Determine the size and type of particles (hard, soft, fibrous) to select the appropriate mesh or perforation size.
3. **Housing Compatibility:** Verify the exact dimensions of the housing. Even a 1/16-inch discrepancy in the flange diameter can lead to bypass, rendering the filtration system ineffective.
4. **Regulatory Compliance:** For food and pharmaceutical applications, ensure the materials meet FDA or 3A sanitary standards. Kaifil provides material traceability reports (MTRs) to verify alloy composition.
5. **Flow Dynamics:** Calculate the maximum and minimum flow rates to ensure the strainer can handle surge conditions without excessive pressure spikes.

## **| Conclusion: The Value of Precision Engineering**

A 7 strainer is a small but vital component in the industrial infrastructure. Its ability to withstand harsh conditions while maintaining precise filtration determines the reliability of the entire production line. By focusing on high-quality materials, robust structural design, and customized configurations, manufacturers can significantly improve process efficiency and protect expensive capital equipment.

For engineers seeking reliable, high-performance filtration components, Kaifil offers extensive expertise in the design and manufacture of custom Strainers & Baskets. Whether the application requires a standard Size 2 basket or a highly specialized 7-inch strainer for a unique chemical process, prioritizing technical excellence in selection and maintenance is the key to long-term operational success.