

# 5x5 Expanded Metal

A practical guide to 5x5 expanded metal, covering the reader intent, the relationship to 5x5 expanded metal, key evaluation criteria, common risks, and the information the intended project audience should confirm before taking the next step.



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In the landscape of industrial materials, expanded metal stands out as a versatile and resource-efficient solution for filtration, reinforcement, and structural support. Among the various specifications available to engineers and procurement professionals, 5x5 expanded metal—typically referring to a mesh with diamond openings measuring approximately 5mm by 5mm—offers a unique balance of mechanical strength and open area. This specific sizing is frequently employed in precision industrial applications where larger meshes lack the necessary filtration accuracy and finer meshes lack the required structural integrity.

As a specialized manufacturer of stainless steel filtration solutions, Kaifil provides high-performance Perforated & Expanded Metal components designed to meet the rigorous demands of chemical processing, water treatment, and hydraulic systems. Understanding the technical nuances of 5x5 expanded metal is essential for selecting the right material for demanding industrial environments.

## | Understanding 5x5 Expanded Metal Specifications

Expanded metal is produced by simultaneously slitting and stretching a solid sheet of metal. This process creates a continuous piece of mesh without joins or welds, which is a significant advantage over woven wire mesh in terms of structural stability. When discussing 5x5 expanded metal, the dimensions usually refer to the pitch or the size of the diamond-shaped openings.

## | Key Technical Parameters

To accurately specify expanded metal, engineers must consider four primary measurements:

1. **SWD (Short Way of Diamond):** The distance from the center of one bond to the center of the next bond across the short axis of the diamond. In a 5x5 specification, this is typically 5mm.
2. **LWD (Long Way of Diamond):** The distance across the long axis of the diamond. For a square-patterned expansion, this would also be 5mm, though many "5x5" products may have slight variations depending on the expansion ratio.
3. **Strand Width:** The amount of metal between the openings. This measurement dictates the overall strength and the percentage of open area.

4. **Strand Thickness:** The thickness of the original base material. For industrial filtration, this usually ranges from 0.5mm to 2.0mm.

The combination of these factors determines the "open area" percentage, which is a critical calculation for any application involving fluid or gas flow. A 5x5 expanded metal mesh provides a relatively dense pattern, making it ideal for capturing medium-sized particulates while providing a rigid substrate for finer filter media.

## **| Material Selection for Industrial Environments**

The performance of 5x5 expanded metal is heavily dependent on the alloy used. Because these components are often exposed to corrosive chemicals, high temperatures, or high-pressure fluids, material selection is the first line of defense against premature failure.

## **| Stainless Steel (304, 316, 316L)**

Stainless steel is the industry standard for expanded metal used in filtration and chemical processing.

**Grade 304:** Offers excellent corrosion resistance and is suitable for most general industrial applications, including food and beverage processing where hygiene is paramount.

**Grade 316:** Contains molybdenum, providing superior resistance to chlorides and marine environments. This is often the preferred choice for chemical processing and pharmaceutical applications.

**Grade 316L:** The low-carbon version of 316, which is essential for components that require welding. It prevents carbide precipitation, ensuring the mesh remains corrosion-resistant at the weld points.

## | Specialized Alloys

For extreme environments, such as those found in petrochemical refining or specialized aerospace applications, 5x5 expanded metal can be manufactured from nickel alloys, titanium, or galvanized steel. However, for the majority of B2B filtration needs, stainless steel provides the most cost-effective balance of durability and performance.

## | The Role of 5x5 Expanded Metal in Filtration Systems

In the context of industrial filtration, 5x5 expanded metal rarely acts alone. It is most frequently used as a component within a multi-layer filter element or as a robust outer guard.

## | Support for Fine Filter Media

Fine wire mesh or non-woven filter cloth lacks the structural rigidity to withstand high differential pressures. In these instances, 5x5 expanded metal serves as a support core or a drainage layer. The 5mm diamond pattern provides enough contact points to prevent the fine media from sagging or bursting under pressure, while still allowing for high flow rates.

## | Primary Filtration and Strainers

In applications where the goal is to remove larger debris—such as in cooling water intakes or coarse chemical strainers—5x5 expanded metal acts as the primary filtration stage. Its rigid, one-piece construction ensures that the aperture size remains constant even under mechanical stress, unlike woven meshes where wires can shift over time.

## | Protection and Safety Guards

Beyond fluid filtration, this material is used as a protective barrier for sensitive equipment. The 5x5 opening size is small enough to prevent the ingress of most foreign objects (FOD) while allowing for adequate ventilation and cooling. This makes it a staple in the manufacturing of industrial machinery housings and vent covers.

## | Engineering Considerations: Open Area and Flow Dynamics

When integrating 5x5 expanded metal into a system, engineers must account for the impact on flow dynamics. The "open area" is the percentage of the total area that is not obstructed by metal.

## | Calculating Open Area

For expanded metal, the open area is calculated by comparing the area of the openings to the total area of the sheet. Because the strands are often turned at an angle during the expansion process (unless the metal is flattened), the "effective" open area can change depending on the angle of the fluid flow.

For a standard 5x5 expanded metal, the open area typically falls between 40% and 60%. If a higher flow rate is required with a lower pressure drop, engineers might specify a narrower strand width. Conversely, if the mesh must support a heavy load, a wider strand width is selected at the cost of some flow capacity.

## | Pressure Drop (Delta P)

In hydraulic and pneumatic systems, every component introduces a pressure drop. The diamond geometry of expanded metal creates a slight turbulence in the fluid stream. While this can be beneficial for mixing in certain chemical reactors, it must be accounted for in pump sizing and system efficiency calculations. Using 5x5 expanded metal with a smooth finish or in a flattened state can help minimize this resistance.

## | Manufacturing Variations: Standard vs. Flattened

There are two primary forms of expanded metal that engineers should specify based on their application: standard (raised) and flattened.

### | Standard (Raised) Expanded Metal

In its "as-expanded" state, the strands and bonds are set at a uniform angle to the plane of the sheet. This creates a 3D texture.

Advantages: Higher strength-to-weight ratio, better grip (if used for walkways), and the ability to deflect light or flow.

Disadvantages: Greater thickness than the original sheet, which may not fit in tight filter housings.

### | Flattened Expanded Metal

Flattened expanded metal is produced by passing the standard expanded sheet through a cold-roll reducing mill. This flattens the strands and bonds into a single plane.

Advantages: Provides a smooth, flat surface that is easy to clean and safer to handle. It is ideal for use as a support layer for fine filter membranes because it eliminates sharp edges that could puncture the media.

Disadvantages: Slightly less rigid than the raised version and has a slightly reduced open area due to the compression of the strands.

## | Customization and OEM Capabilities

For B2B buyers, the ability to customize 5x5 expanded metal is critical. Off-the-shelf solutions rarely meet the precise tolerances required for high-performance industrial equipment. Kaifil specializes in providing tailored solutions that go beyond standard dimensions.

## | Dimensional Customization

While "5x5" is a standard starting point, the expansion process allows for fine-tuning. If an application requires a 4.8mm x 5.2mm opening to achieve a specific filtration grade, the tooling can be adjusted. Furthermore, expanded metal can be supplied in custom-cut circles, cylinders, or complex geometries to fit specific filter housings.

## | Secondary Processing

To ensure the longevity of the filter component, several secondary processes may be applied:

**Annealing:** To relieve internal stresses from the expansion process, making the metal easier to form or weld.

**Electropolishing:** Particularly important for the pharmaceutical and food industries, this process removes surface impurities and creates a mirror-like finish that resists bacterial growth.

**Degreasing:** Ensuring the metal is free from manufacturing oils before it is integrated into a clean-room environment.

## | Procurement Guide: Key Questions for Engineers

Before finalizing a purchase order for 5x5 expanded metal, procurement teams and engineers should confirm several factors to ensure the material is fit for purpose:

1. What is the required chemical compatibility? Ensure the chosen grade of stainless steel (304 vs 316L) matches the acidity or alkalinity of the process fluid.
2. Standard or Flattened? Will the mesh be in direct contact with a fragile filter membrane? If so, flattened is generally required.
3. What are the tolerances? Industrial filtration often requires tight tolerances on the LWD and SWD to ensure consistent flow across multiple units.

4. Is there a specific flow direction? In raised expanded metal, the orientation of the diamonds can significantly affect how fluid passes through the mesh.

5. What is the total cost of ownership? While galvanized or carbon steel may be cheaper initially, the durability and reduced maintenance of stainless steel 5x5 expanded metal often lead to a lower total cost over the equipment's lifecycle.

By focusing on these technical details, engineers can leverage the unique properties of 5x5 expanded metal to optimize their filtration processes. Whether used as a primary strainer or a structural support core, this material remains a cornerstone of modern industrial design, offering a blend of efficiency, strength, and versatility that few other materials can match.