

# 5 Lb Expanded Metal

A practical guide to 5 lb expanded metal, covering the reader intent, the relationship to 5 lb 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 industrial filtration and structural engineering, material selection is dictated by a balance of mechanical strength, weight, and permeability. Among the various specifications used to define metal mesh, "5 lb expanded metal" represents a specific weight-to-area ratio that serves as a benchmark for medium-duty industrial applications. Understanding the technical nuances of this specification is critical for engineers designing filtration systems, protective guards, or structural components where precision and durability are paramount.

Expanded metal is produced by simultaneously slitting and stretching a solid sheet of metal, creating a diamond-shaped pattern of openings. Unlike perforated metal, which is created by punching holes and removing material, expanded metal is formed without waste, maintaining the structural integrity of the original sheet while providing a high strength-to-weight ratio. The "5 lb" designation typically refers to the weight of the material per 100 square feet, a standard measurement in the expanded metal industry that helps procurement teams and engineers calculate load-bearing capacities and shipping costs.

## **Understanding the 5 Lb Expanded Metal Specification**

The term "5 lb expanded metal" is most frequently associated with carbon steel standards, specifically referring to a material that weighs approximately 0.05 pounds per square foot. However, in the context of high-performance industrial filtration, where stainless steel is the preferred material due to its corrosion resistance, this specification must be translated into mechanical equivalents such as strand thickness and opening size.

When evaluating Perforated & Expanded Metal, engineers must look beyond the weight alone. The performance of the mesh is defined by several key dimensions:

**SWD (Short Way of Diamond):** The distance from the center of a bond to the center of the next bond across the short axis of the diamond.

**LWD (Long Way of Diamond):** The distance across the long axis of the diamond.

**Strand Width:** The amount of metal fed into the expanding machine between slits.

**Strand Thickness:** The gauge or thickness of the original base metal.

For a 5 lb specification, the mesh typically provides a robust enough structure to resist deformation under pressure while remaining light enough for easy integration into filter housings or removable cartridges. In filtration, this material often serves as the "skeleton" of a multi-layer filter element, providing the necessary rigidity to support finer wire mesh or synthetic media.

## Engineering Characteristics: SWD, LWD, and Open Area

One of the most critical factors for any filtration engineer is the percentage of open area. This metric determines the flow rate and the initial pressure drop across the filter. For 5 lb expanded metal, the open area is a function of the diamond dimensions and the strand width.

If the diamonds are stretched wider (increasing the SWD), the open area increases, which reduces the structural rigidity but improves flow. Conversely, a tighter diamond pattern increases the weight and mechanical strength but creates higher resistance to fluid or gas flow. In industrial hydraulic systems or chemical processing lines, maintaining a low pressure drop is essential to reduce energy consumption and prevent pump cavitation. Therefore, engineers must specify the exact SWD and LWD that align with their flow requirements while ensuring the 5 lb weight class provides sufficient burst strength.

Another engineering consideration is the choice between Raised (Standard) and Flattened expanded metal.

1. **Raised Expanded Metal:** The strands and bonds are set at a uniform angle to the plane of the sheet. This creates a 3D texture that can be useful for creating turbulence in a fluid stream or providing extra grip in structural applications. However, in filtration, the raised edges can sometimes cause mechanical wear on adjacent soft filter media.

2. **Flattened Expanded Metal:** The raised mesh is passed through a cold-roll reducing mill, which flattens the strands and bonds into a single plane. This results in a smoother surface that is easier to clean and less likely to damage delicate filter membranes. Flattened 5 lb expanded metal is the industry standard for outer cages in air and liquid filter cartridges.

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

While the "5 lb" nomenclature is a standard trade size, the material composition is what determines the longevity of the component. At Kaifil, the focus is on providing stainless steel solutions that exceed the performance of standard carbon steel expanded metal.

**304 Stainless Steel:** This is the most common grade used for 5 lb expanded metal in general industrial environments. It offers excellent strength and good corrosion resistance against many atmospheric and chemical exposures. It is widely used in food and beverage processing where hygiene is a priority.

**316 Stainless Steel:** For more demanding applications, such as marine environments, pharmaceutical manufacturing, or highly acidic chemical processing, 316 stainless steel is required. The addition of molybdenum provides superior resistance to pitting and crevice corrosion, ensuring that the structural support of the filter does not fail prematurely.

**Specialty Alloys:** In high-temperature or extremely corrosive environments, alloys like Monel or Inconel may be used. While these change the weight-to-volume ratio compared to standard 5 lb carbon steel, the structural dimensions are often designed to mimic the 5 lb mechanical profile to ensure compatibility with existing hardware.

## **| Structural Role in Filter Cartridge Design**

In a typical industrial filter cartridge, the filtration media (such as sintered wire mesh or pleated fiber) is relatively thin and flexible. Under high differential pressure—caused by either high flow rates or the accumulation of contaminants—the media can collapse or distort. This is where 5 lb expanded metal becomes indispensable.

## | Core Support

As an inner core, the expanded metal provides a rigid cylinder that prevents the media from collapsing inward. The diamond pattern is particularly effective here because it distributes mechanical stress evenly across the circumference of the cylinder. The 5 lb specification provides enough wall thickness to resist the compressive forces of the fluid pushing against the media.

## | Outer Guards

As an outer guard, the expanded metal protects the filter media from mechanical damage during installation, maintenance, or backwashing cycles. It also helps to maintain the spacing of pleats in a pleated filter, ensuring that the entire surface area of the media is utilized. The open area of the 5 lb mesh ensures that the guard itself does not become a restriction point for the incoming fluid.

## | Comparing Expanded Metal vs. Perforated Metal for Support

Designers often weigh the pros and cons of using expanded metal versus perforated metal for filtration support. While both can be specified to similar weights (like the 5 lb class), their performance characteristics differ:

**Material Efficiency:** Expanded metal is more cost-effective because it is produced by stretching rather than punching. There is no scrap material, which is a significant cost factor when using expensive alloys like 316L stainless steel.

**Weight vs. Strength:** Expanded metal generally offers a higher strength-to-weight ratio than perforated metal. The interconnected bonds of the diamond pattern act like a series of trusses, providing excellent rigidity.

**Flow Dynamics:** Perforated metal offers more predictable flow patterns due to its uniform hole sizes. However, expanded metal can create beneficial micro-turbulence that may prevent the rapid buildup of a filter cake in certain liquid applications.

Surface Texture: Perforated metal is naturally flat and smooth. Expanded metal requires the additional step of flattening to achieve a similar profile, which is a necessary consideration for engineers concerned about media abrasion.

## | Procurement Checklist: What Engineers Must Verify

When sourcing 5 lb expanded metal for industrial projects, purchasing teams and engineers should confirm a specific set of technical parameters to ensure the product meets the application requirements. Relying solely on the "5 lb" label can lead to discrepancies in performance.

1. Dimensional Tolerances: Confirm the allowable variance in SWD and LWD. In precision filtration, even a small deviation in opening size can affect the support characteristics of the mesh.

2. Edge Conditions: Specify whether the sheets or cylinders should have "random sheared" or "bond sheared" edges. Bond shearing provides a smoother, finished edge that is safer to handle and easier to weld into a filter housing.

3. Flattening Requirements: If the expanded metal will be in direct contact with a thin filter membrane, ensure it is specified as "flattened" and check for any burrs or sharp edges resulting from the expansion process.

Material Certification: Always request Mill Test Reports (MTRs) to verify the chemical composition of the stainless steel, ensuring it meets ASTM or ISO standards for the intended industry (e.g., FDA compliance for food processing).

4. Total Cost of Ownership (TCO): While carbon steel 5 lb expanded metal may have a lower initial purchase price, the TCO in a chemical or hydraulic environment is often higher due to the need for frequent replacements. Stainless steel components from a specialized manufacturer like Kaifil offer longer service life and reduced downtime.

## **| Conclusion**

5 lb expanded metal is a versatile and robust material that plays a vital role in the efficiency and structural integrity of industrial filtration systems. By understanding the relationship between the weight specification and the mechanical dimensions like SWD, LWD, and strand thickness, engineers can optimize their designs for maximum flow and durability. Whether used as a support core in a high-pressure hydraulic filter or as a protective guard in a chemical processing plant, the selection of the right material grade and finish is essential for long-term operational success.