

# #9 Raised Expanded Metal

A practical guide to #9 raised expanded metal, covering the reader intent, the relationship to #9 raised 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 engineering and heavy-duty manufacturing, material selection is often dictated by the balance between structural integrity and functional performance. #9 raised expanded metal represents one of the most versatile and widely utilized specifications in the metal processing industry. As a core component in both structural support and complex filtration systems, understanding the technical nuances of this material is essential for engineers and procurement teams tasked with optimizing industrial equipment.

At its core, expanded metal is produced by simultaneously slitting and stretching a solid sheet of metal. This process creates a continuous, one-piece mesh without joins or welds, which is inherently stronger than an equivalent weight of wire mesh or perforated sheet. The "#9" designation refers to the thickness and weight of the material, while the term "raised" (also known as standard expanded metal) indicates that the strands are set at a sharp angle to the plane of the sheet, providing a three-dimensional profile.

## Understanding the Specifications of #9 Raised Expanded Metal

To specify #9 raised expanded metal accurately, engineers must look beyond the simple gauge number. The term "#9" typically correlates with a nominal thickness of approximately 0.134 inches (equivalent to 10-gauge in many standards) and a weight of roughly 1.80 pounds per square foot for carbon steel variants. However, the performance of the material is defined by its geometric dimensions.

## Key Dimensional Metrics

1. SWD (Short Way of Design): This is the distance from the center of one bond to the center of the next bond measured across the short diamond diagonal. For a standard 3/4" #9 specification, the SWD is usually 0.923 inches.
2. LWD (Long Way of Design): This is the distance measured across the long diamond diagonal. For the same 3/4" #9 spec, the LWD is typically 2.10 inches.
3. Strand Width and Thickness: In #9 raised expanded metal, the strand width is approximately 0.150 inches. Because it is "raised," the thickness of the finished sheet is greater than the original metal thickness due to the angle of the strands.

4. Open Area: This is a critical metric for filtration and ventilation. Depending on the specific diamond size (e.g., 3/4" vs. 1-1/2"), the open area for #9 raised metal can range from 60% to 80%.

By understanding these metrics, engineers can calculate the flow rates for air or liquids and determine the level of mechanical protection the mesh provides.

## **| Structural Advantages of the Raised Profile**

The "raised" profile of #9 expanded metal is not merely an aesthetic choice; it provides several mechanical advantages over its flattened counterpart. When metal is expanded, the strands are naturally tilted. In Perforated & Expanded Metal applications, this orientation contributes to the following characteristics:

### **| Enhanced Rigidity**

The three-dimensional structure acts like a series of interconnected trusses. This makes #9 raised expanded metal significantly more rigid than a flat sheet of the same weight. It can resist deflection under load, making it ideal for spans where structural support is required without adding excessive weight.

### **| Superior Traction and Grip**

Because the strands are angled, the surface provides inherent slip resistance. This is particularly valuable in industrial environments where oil, water, or chemicals may be present on the floor. #9 raised metal is frequently used for catwalks, stair treads, and maintenance platforms where worker safety is paramount.

### **| Directional Flow Control**

The angled strands can be used to deflect light, sound, or fluid flow. In certain filtration applications, this directional property helps in pre-separating larger particulates before they reach a finer secondary filter stage.

## | Industrial Applications and Filtration Support

While #9 raised expanded metal is often seen in architectural and safety contexts, its role in industrial filtration is where its technical properties are most rigorously tested. Within the Kaifil product ecosystem, this material serves as a foundational component for high-performance filtration solutions.

### | Support for Fine Filter Media

In high-pressure hydraulic or chemical processing systems, fine wire mesh or pleated filter media lack the structural strength to withstand the differential pressure. #9 raised expanded metal is used as a "support cage" or outer guard. Its high open area ensures minimal pressure drop, while its rigidity prevents the finer media from collapsing or deforming under stress.

### | Machinery Guarding and Safety

Industrial equipment requires guarding that allows for airflow and visibility while preventing human contact with moving parts. The strength of #9 raised metal ensures that it can withstand impacts that would dent or penetrate lighter materials. It is commonly used in heat exchangers, compressor housings, and belt guards.

### | Primary Coarse Filtration

In water treatment or heavy industrial drainage, #9 raised metal acts as a primary screen. It is capable of capturing large debris (stones, wood, or large metal scraps) that could damage downstream pumps or finer filtration stages. Its one-piece construction means there are no wires to come loose and enter the fluid stream, a common failure point in woven wire mesh.

## | Material Selection: Stainless Steel vs. Carbon Steel

Selecting the right base material for #9 raised expanded metal is critical for the longevity of the installation. While carbon steel is cost-effective for dry, indoor environments, industrial applications often demand the properties of stainless steel.

## | The Stainless Steel Advantage

As a specialist in stainless steel filtration, Kaifil emphasizes the use of Grade 304 or Grade 316 stainless steel for #9 expanded metal.

Grade 304: Offers excellent corrosion resistance for most food processing, chemical, and general industrial applications. It maintains its structural integrity at high temperatures and is easy to clean.

Grade 316: Contains molybdenum, providing superior resistance to chlorides and marine environments. This is the preferred choice for pharmaceutical manufacturing and offshore oil and gas applications where chemical pitting is a risk.

## | Corrosion and Longevity

In many B2B environments, the total cost of ownership (TCO) is more important than the initial purchase price. Carbon steel #9 raised metal may require galvanizing or powder coating to prevent rust, which can chip or wear over time. Stainless steel provides a homogenous, corrosion-resistant structure that requires no additional coatings, reducing maintenance cycles and the risk of process contamination.

## | Engineering Evaluation: Load Bearing and Open Area

When integrating #9 raised expanded metal into a project, engineers must perform a detailed evaluation of its load-bearing capacity. Unlike solid plate, the load-bearing capacity of expanded metal is directional.

## | Loading Considerations

The LWD (Long Way of Design) should typically run parallel to the span for maximum strength. If the sheet is oriented with the SWD running parallel to the span, the material will exhibit significantly more deflection. For #9 raised metal used in flooring, engineers should consult load tables to ensure the material can support the required pounds per square foot (PSF) based on the distance between supports.

## | Calculating Open Area for Fluid Dynamics

For filtration and cooling applications, the open area percentage is vital. A standard 3/4" #9 raised metal offers approximately 68% to 75% open area. This allows for high-velocity airflow or fluid throughput without creating a significant bottleneck. In custom OEM designs, the strand width can sometimes be adjusted to fine-tune this percentage, though this may impact the overall weight and strength of the sheet.

## | Customization and OEM Integration

Every industrial application has unique requirements that standard off-the-shelf sheets cannot always meet. Customization is a core part of the value Kaifil provides to its global partners. When specifying #9 raised expanded metal for an OEM project, several customization factors should be considered:

1. **Precision Shearing:** Standard sheets often come with "random" edges where diamonds are cut mid-pattern. For filtration cartridges or safety guards, precision shearing to a "bond" edge ensures a smooth, safe perimeter that is easier to weld or frame.
2. **Forming and Rolling:** #9 raised metal can be rolled into cylinders for use as filter cores or outer shrouds. This requires specialized equipment to ensure the diamond pattern remains uniform and the structural integrity is not compromised during the bending process.

3. Surface Finishing: Beyond the raw finish, stainless steel expanded metal can be electropolished. This is particularly important in the pharmaceutical and food industries to remove microscopic burrs and create a surface that is resistant to bacterial growth.

4. Welding and Assembly: Integrating #9 raised metal into a larger assembly requires expertise in TIG or spot welding. Because the material is expanded, the contact points for welding are specific, and improper technique can lead to burn-through or weak joints.

## **| Conclusion: Selection Criteria for Purchasing Teams**

Before finalizing a purchase order for #9 raised expanded metal, purchasing teams and engineers should confirm a specific set of criteria to ensure the material is fit for purpose:

**Material Grade:** Is the environment corrosive enough to require Grade 316 stainless steel, or is Grade 304 sufficient?

**Diamond Size:** Is 3/4" #9 the correct balance of strength and open area, or would a 1-1/2" #9 be more appropriate for the required airflow?

**Dimensional Tolerances:** Does the application require precision-cut edges or standard mill edges?

**Load Requirements:** If used for structural support, has the span-to-load ratio been verified with the LWD oriented correctly?

By focusing on these technical details, industrial professionals can ensure that their use of #9 raised expanded metal contributes to a durable, efficient, and safe operation. Whether used as a robust guard for machinery or a critical support component in a complex filtration system, the inherent strength and versatility of this material make it a cornerstone of modern industrial design.