



SYFT Solutions Screen Cloth Sizing & Selection Guide

Scope & Intent:

This document can be used to aid in properly selecting the right cloth size/specification for your application.

This guide covers plain-weave, square-aperture industrial woven wire cloth used as screening media in dry sizing circuits. It is intended as an entry/intermediate technical starting point for selecting and optimizing screen cloth using mesh designation, aperture, wire diameter, and percent open area. Terminology and dimensional conventions follow ISO 9044 (requirements/tests), ISO 9045 (vocabulary), and ISO 4783-1 (aperture and wire diameter combinations, including percent open area).

Reference Sizing Table:

SYFT-TBL-001 (Square Wire Mesh Sizing Table) can be used alongside this guide to compare mesh-per-inch, wire diameter, aperture width, and open surface area (%) for square mesh.



Section 1: Key Definitions for Woven Wire Mesh

1.1 MESH (Tyler Mesh)

Tyler mesh (often shortened to “MESH”) is commonly used as an ordering shorthand and sizing metric for woven wire cloth. “Mesh” is defined as the number of openings or wires in one linear inch of cloth.

For Example:

8 Mesh: “There are 8 openings in one linear inch.”

32 Mesh: “There are 32 openings in one linear inch.”

However, MESH alone does not uniquely define the separation opening because multiple wire diameters can be manufactured at the same mesh count, producing different apertures and open areas. ISO guidance therefore treats screen mesh selection as an aperture/wire diameter combination rather than MESH alone. Figure 1 below shows a depiction of MESH count, opening (aperture) and wire diameter for reference.

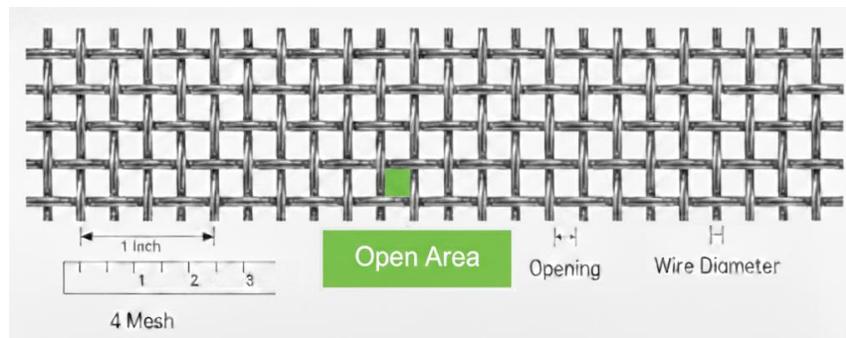


Figure 1: Woven Wire Screen Mesh Count and Definitions

1.2 Aperture

The “*Aperture*” (or opening) is defined as the linear distance between two adjacent wires and the primary geometric variable that governs size separation in a screen panel. Particles smaller than the opening have some probability to pass (undersize), while larger particles should retain (oversize). For plain-weave square mesh, the aperture is determined by both the mesh count and the selected wire diameter. ISO 4783-1 tabulates aperture/wire diameter combinations to support consistent specification and comparison, and a comprehensive sizing table guide can be found on SYFT Solutions website as (SYFT-TBL-001).

In practice, screen aperture selection is governed by many interacting variables which can force changes to aperture, wire diameter, and open area including:

- bed depth
- deck inclination
- residence time on the deck
- feed particle size distribution (PSD)
- Required screen life and Capacity
- particle shape
- particle density
- proportion of near-size material
- moisture content (blinding/pegging tendency)
- acceptable screening efficiency

However, in high-level terms aperture is selected based on the size of particles intended for separation. To remove oversized particles, the effective opening is selected just smaller than the largest particles you want to retain above your screen. To remove fines, an effective opening is selected just larger than the particles intended to pass through the screen. Figure 2 below shows a schematic of the difference between aperture and the effective opening for sizing.

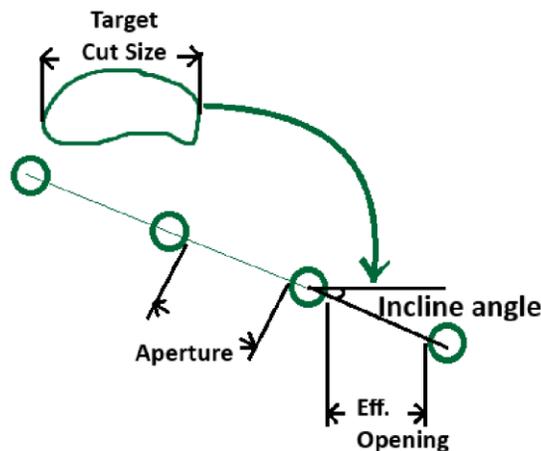


Figure 2: Aperture and Effective Opening for Screen Sizing

1.3 Wire Diameter and Percent Open Area

Wire diameter influences many aspects of screening:

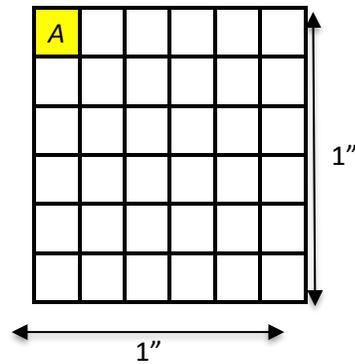
1. Durability and resistance to wear/fatigue (thinner wires are less robust)
2. Wire diameter affects the resulting aperture for a given mesh count which dictates the separation partition
3. Wire diameter controls percent open area (%OA), which strongly affects screening efficiency and capacity. It must be selected together with mesh count and aperture, and matched to the application's mechanical/chemical severity and target cut size.

Example (why "MESH" alone is incomplete):

In a MESH sizing table (such as SYFT-TBL-001), a single MESH designation can have multiple wire diameters. For example, 16 MESH can be supplied with many different wire sizes, changing both aperture and open surface area (capacity tendency). Use an aperture/wire table (such as SYFT-TBL-001) to make the correct selection.

Example %OA Calculation

- Mesh: 6 MESH
- Wire Diameter: 0.035 in
- Aperture: 0.132 in
- Aperture Area (A): 0.0174 in²
- # Openings/in² (N): 36



$$\% OA = \frac{\text{Open Area } (N \times A)}{\text{Total Area}} \times \%100$$

$$\% OA = \frac{36 \times 0.0174 \text{ in}^2}{1 \text{ in}^2} \times \%100$$

$$\% OA = 62.7 \%$$



Section 2: Selecting the Correct MESH Size and Wire Diameter

The intent of this section is to provide a high-level starting point for woven wire mesh selection and sizing criteria for generic applications. In practice, screening performance also depends on feed particle size distribution (including near-size content which can reduce screening performance and increase pegging), moisture, particle shape, bed depth, and operating variables; therefore, final selection should be validated with plant data and/or testing if available.

- STEP 1** **Define the Intended Separation (Target Cut Size)**
As a starting point, select an aperture near the desired cut size, then validate performance on the plant. This “aperture \approx cut size” guidance is a starting assumption only; screening performance can change significantly with high near-size fractions and operating conditions.
- STEP 2** **Select a Starting MESH Designation (Tyler Mesh)**
Using the rough aperture, define the MESH option(s) as an index for later calculations and decisions of the wire diameter.
- STEP 3** **Decide Optimization Strategy: Capacity-Limited or Life-Limited**
Screens can either be optimized for throughput or service life, or potentially compromised for both. Select what symptoms are already present or expected to be present:
- Capacity-limited symptoms:** Frequent high bed depth, reduced throughput, or persistent loading can justify biasing toward higher percent open area (often lighter, thinner wire at a given MESH). Confirm that issues are not primarily driven by near-size or moisture before changing cloth.
- Life-limited symptoms:** If wear-through or wire breakage dominates due to non-operational issues, bias toward heavier, thicker wire diameter and/or a more suitable material, accepting reduced open area.
- STEP 4** **Shortlist Wire Diameters and Compare Aperture to Percent OA**
For the candidate MESH range and optimization strategy, compare two to three wire diameters using: (1) resulting aperture, (2) percent open area, and (3) expected durability. Higher open areas generally support capacity (all else equal), while heavier wire generally supports longer service life.



Section 3: Material Selection and Additional Considerations

Material selection can be extremely important in the screen selection process as it plays a vital role in screen reliability, service life, and potential contamination of product. Generally, material selection is best approached by first identifying the dominant degradation mechanism in the application (abrasion or corrosion), then confirming mechanical loading/fatigue risk and any temperature constraints. The following items should be considered in detail for proper material selection. Table 1 below provides a generic list of common and specialty wire mesh materials available.

3.1 Abrasion Severity (Wear Rate Driver)

Where abrasion is dominant, service life is often improved by increasing wire diameter (more wear allowance) and selecting materials or treatments that improve wear resistance, subject to corrosion compatibility and mechanical constraints. An example would be selecting a high-carbon steel such as AISI 1045 for an abrasive environment where corrosion is less of a concern.



3.2 Corrosion Environment (Compatibility Driver)

Where corrosion is a concern (e.g., humid environments, chloride exposure, washdown, or corrosive dust/products), stainless steels or higher-grade alloys are commonly used. The most common stainless options in wire mesh are 304 SS and 316 SS, however 400 series, duplex materials, and specialty alloys are also available.



3.3 Mechanical Loading and Fatigue

Woven wire cloth typically operates under cyclic loading from vibration of the unit and the solids loading/movement. Fatigue and wire breakage risk can increase with shock loading, poor support/tensioning, and harsh operating dynamics. Operating conditions and feed characteristics are sometimes key influences on performance and outcomes. In high tonnage or extreme vibratory conditions, a material with higher tensile strength may be more suitable.



3.4 Screen Unit or Product Temperature

If the circuit sees elevated temperatures (hot product, upset conditions), confirm that the selected material maintains adequate mechanical properties and oxidation resistance for the service. High-temperature common stainless materials (such as AISI 430 and others) may be suitable, or Nickel based alloys such as Inconel's or Hastelloy's are also known to weather high temperatures and harsh environments.





Table 1: Common and Specialty Wire Mesh Materials

Common Wire Mesh Materials	Specialty Wire Mesh Materials
AISI 304 Stainless Steel	Inconel
AISI 316 Stainless Steel	Hastelloy
AISI 410 Stainless Steel	Duplex
AISI 430 Stainless Steel	Monel
AISI 1045 High Carbon (Spring) Steel	Various Other 300/400 Stainless