

BANKER

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C.I. BANKER WIRE & IRON WORKS

Established by Charles Banker in 1896 as C.I. Banker Wire & Iron Works, the company flourished in Milwaukee as one of many early metal fabricators making use of the new engineering marvel - inexpensive steel. Banker Wire specialized in fabricating wrought iron and wire products such as fire escapes, tool room partitions and bank teller cages. Changing times and changing owners gradually took its toll, and by the mid 1960's, the company had withered to a local buyer and seller of industrial wire cloth.

New ownership in 1965 gradually began revitalizing Banker. By the mid 1970's, the business was beginning to transition from a reselling operation into a manufacturer. Over the next 30 years an evolutionary process occurred as the owners, who are also engineers and fabricators, developed new processes and designed new equipment that resulted in heightened efficiency and more perfect products. Unfettered by the inefficient procedures utilized by more established weavers, Banker emerged as the expert source for woven wire cloth, for both industrial and architectural applications.

Today, Banker is the premier manufacturer of Pre-crimped Woven and Welded wire fabrics in North America. Our facility is the most modern and productive mill in the country, and we continue to grow and evolve. Our investment in our people and our equipment provides you, the customer, with innovative and value based products that meet or exceed your design expectation.



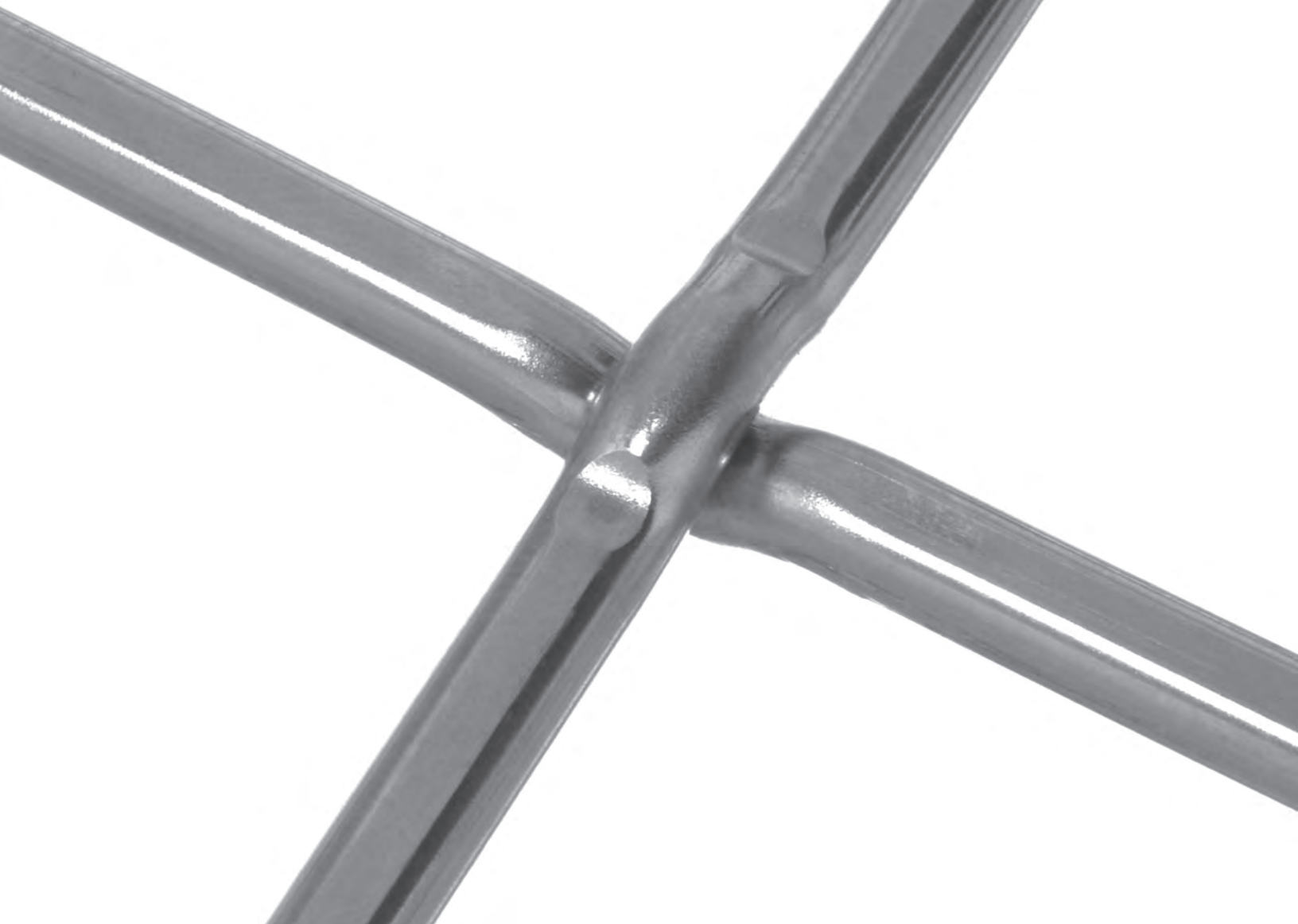
**BANKER WIRE
OFFERS
INDUSTRIAL
SPECIFIERS
THE LARGEST
SELECTION OF
HIGHEST QUALITY
WOVEN & WELDED
METAL MESH,
MADE IN THE USA.**

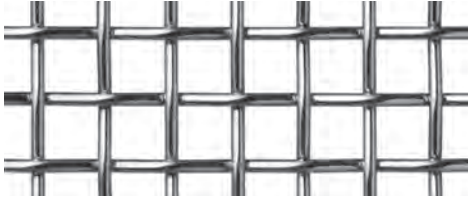
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WOVEN MESH

Banker manufactures the highest quality Pre-Crimped Woven Wire mesh. Pre-crimped mesh differs from Plain weave material in that the individual wires are run through a crimping process prior to mesh assembly. Our high speed crimpers use precision cut crimping wheels that shape each wire to accommodate intersections on an infinite number of mesh specifications. Without a defined crimp, Plain woven material lacks consistency and shape which makes it difficult to work with. It can also lead to lost time and money for the customer.

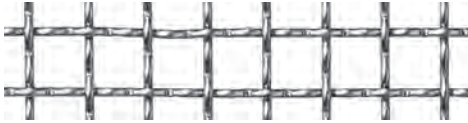
The fundamental Banker Crimp styles listed across are the basis for consistent high quality rigid wire cloth. In addition to more than 900 existing tools, Banker is able to design and cut new wheels in house within 36 hours. Our endless combination of Crimp, Spacing, and Diameter allows the customer to select a mesh that provides uncompromised results. Let Banker create the right combination for your operations.





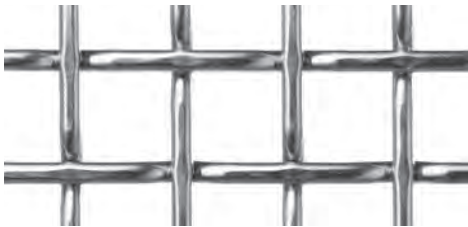
PLAIN CRIMP

Plain crimp (PL) is a simple zig zag style of crimping in which wires intersect at every available pocket. The smooth over, under construction of plain crimp is primarily suited for tightly spaced mesh specifications where wire formation is limited. Plain crimp is seen in all applications and can be used in conjunction with many other standard crimp styles to create custom openings in either square or rectangular patterns.



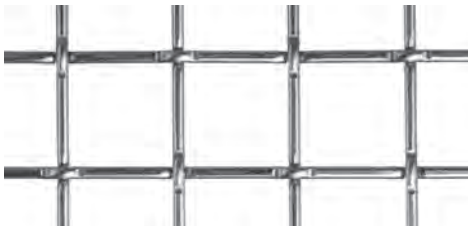
INTERCRIMP

InterCrimp (I3,I5,I7...) or Intermediate crimp is simply a plain crimp except that the wire intersections occur only at odd numbered frequencies. This widespread crimp style is most commonly used when mesh:diameter ratios are in excess of 6:1.



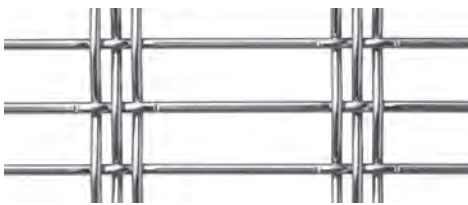
FLAT TOP

Flat top (FT) crimp style creates a smooth top surface in which all wires are woven on a single plane. This provides a screen with all crimps on one side, eliminating high points that will lead to premature wear in high abrasion situations. Flat Top crimp style was originally created to allow the smooth flow of materials over the surface as well as providing a flat face for use as backer screens. Flat top can be variable concerning opening shape, spacing and wire diameter. It is ideal for aggregate sizing and sorting, agriculture, filtration and heat treating applications.



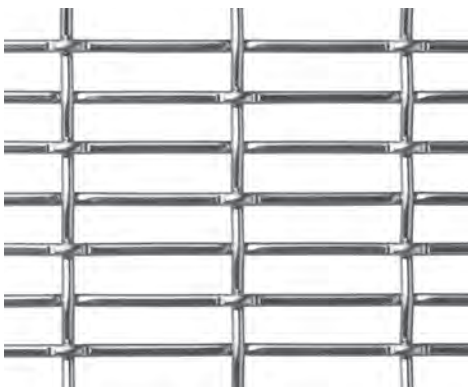
LOCK CRIMP

Lock Crimp (LC) is characterized by straight sections of wire connected by a well defined "bump" at the wire intersections. Lock crimp woven wire mesh yields material with superb dimensional stability under any cutting or bending situation. Using mesh:diameter ratios of 4:1 and larger, Lock crimp is the strongest, and most consistent pre-crimped option attracting a wide variety of industries. Animal confinement, Heat treating, Detention, Aggregate sorting, and Fencing are just some of the many applications for the Lock crimp style.



TRIPLE SHUTE

Triple Shute (TS) is a specialty crimp style that creates maximum open area. It consists of relatively long sections of straight wire connected by groupings of three Plain Crimp pockets. The resulting material has rectangular openings of very high aspect ratio. Used primarily for sizing and sorting applications, triple shute screen is most effective when high flow volumes are required. It can also manage moist or sticky substances without blinding the screen.



HYBRID

Banker wire mesh is highly versatile to meet industry demands. There are times when multiple fundamental crimp styles need to be combined in order to produce quality mesh that satisfies the customer's specifications. Through the experience of doing, Banker Wire has studied the physical characteristics of the many raw materials and taken the guesswork out of what can and can't be crimped and woven together. The result of data collected over many years of trial and error has identified optimum weaving recipes that achieve high quality mesh that exceeds customer standards.

In addition to the weaving industries traditional crimp styles, Banker's understanding of tool making can create innovative and better functioning materials that gain competitive advantage for the customer. Call us to discuss custom weaving and tool options for your operations.

WELDED MESH

Banker Wire now manufactures welded wire mesh. In addition to our well known woven wire mesh products, Banker welded wire mesh comes to you with the same unsurpassed quality and value that is synonymous with the Banker name.



CNC JIG WELDERS

Fully automated 2 and 3 axis single phase DC fixture weld systems excel at small runs and specialty grids.

Banker Wire operates 2 CNC jig welders. These fully automated 2 and 3 axis, single phase DC fixture weld systems excel at small runs and specialty grids. Banker's jig welders accommodate up to .375" diameter wire grids with trimmed or untrimmed edge conditions. The jig welders are capable of producing sheets up to 60" by 120".

- Accommodates up to .375" diameter wire grids
- Trimmed or Untrimmed edge conditions
- Sheet size up to 60" x 120"



CNC GRID WELDING MACHINES

Fully automated welding machines produce welded mesh to your exact specifications.

Banker Wire operates 2 fully automated CNC grid welding machines that can produce welded mesh to your exact specifications. Each piece of equipment accommodates up to .312" diameter wire grids with trimmed or untrimmed edge conditions. The machines are capable of producing sheets up to 78" wide, depending on wire diameter and spacing combinations and our unique cross wire "stretching" system ensures flat material that is above industry standards.

- Welded wire mesh up to 78" wide
- Unique cross wire stretchers creates ultra flat welded wire mesh

COMMITMENT TO QUALITY

Banker's commitment to Quality, Innovation, and Value is the foundation that provides material of the highest industry standards in strength and flatness. Our state of the art grid welding equipment provides an infinite number of spacing and diameter configurations, trimmed or untrimmed.

MATERIALS

- Carbon Steel: Bare, Pre-Galvanized
- Stainless Steel: T-304, T-316



The Banker fabrication department has grown in size and skill over the years offering a full list of value added processes to the customer. We can produce an extensive range of woven and welded wire mesh that is cut to size, formed, welded, or framed to meet the demands of many diverse industries.

CUTTING

Laser: The Banker fabrication team operates a Mazak 4000W Space Gear laser table capable of 2-D or 3-D cutting operations. This high precision cutting tool has an operating envelope of 5'x10' that cuts through wire mesh, sheet metal, or tube with ease. Central to the fabrication department, this machine can cut wire mesh to size and shape for such applications as car grilles, railing infill's, filtration, and machinery guards.

Plasma: The 60" x 120" CNC plasma cutting table works through heavy wire mesh or heavy plate with speed and accuracy. The plasma cutting torch is the Banker cutting work horse when it comes to Carbon Steel and Pre-Galvanized coarse wire mesh shapes and sizes.

Shear: Banker wire has multiple power squaring shears used for precision cutting of all mesh types and materials. Our shears are capable of shearing up to .250" plate steel.

WELDING

Manual: Banker's skilled welders can Mig, Tig, or Spot weld Aluminum, Carbon steel, and Stainless Steel alloys for use in a variety of industrial and architectural applications.

Robotic: For jobs that represent repetitive welding tasks, Banker operates a robotic welding cell for quick and accurate weld placements.

FORMING

Press Brake: Pre-crimped wire mesh as well as Welded wire mesh can be formed using a press brake and is capable of providing infinite bend configurations. Many types of plain steel or stainless steel edging can be formed as a perimeter frame for attachment or as hooks for sizing and sorting operations. Banker operates numerous CNC controlled press brakes up to 14' wide.

Roller: Pre-Crimped wire mesh is a tight and rigid product that can be formed into any shape required. Banker can offer a rolling operation of light to medium duty wire mesh as another method to achieve a smooth radius.

FRAMING

Woven and Welded wire mesh often requires a perimeter that frames the mesh and provides a method of attachment to its intended surroundings.

There are many frame styles and materials available that can be applied. Traditional roll formed u-edge, angle iron, or perimeter rod are examples that are used in applications such as Heat Treating, Machine Guards, and Security. Call us to discuss your needs and let our Sales and Engineering develop the right option for your application.

MATERIALS

Banker uses only high quality raw materials that meet or exceed ASTM standards. All wire used in production can be traced back to specific heat numbers that can be supported by Wire Mill Test Reports. These Wire Certifications are always available free of charge and can be supplied to you whenever requested.

STAINLESS STEEL WIRE

Banker can produce any of the numerous types of stainless steels commonly used in Wire cloth. There are many stainless steel compositions available to suit any number of corrosive or high temperature specialized applications. The most common types of stainless steels are listed below. Please call for more information about other available options.

T304 stainless steel contains 18% Chromium and 8% Nickel, it is often referred to as simply 18/8. T304 is the most common of the 300 series stainless steels. It is primarily used in food production, pharmaceuticals, and chemical processes because of the advantage of corrosion resistant and antibacterial properties.

T316 stainless steel is commonly referred to as marine grade stainless. The addition of molybdenum gives T316 an increased resistance to chloride corrosion when compared to T304. T316 wire cloth is most commonly used in food processing, mining screens, exterior architectural applications, and nuclear power production.

HIGH CARBON STEEL

High Carbon steel is commonly used in wire mesh for sizing and sorting applications when resistance to impact and abrasion is required. Typically, abrasion resistant wire contains at least 40% and up to 65% carbon. High Carbon steel maintains a balance of strength and ductility, so that a large variety of screen specifications can be manufactured. Coal, sand, gravel, and stone are just a few materials that commonly get sized and sorted by with the help of this long lasting material.

LOW CARBON STEEL

Mild Steel - or low carbon steel - typically contains 6% to 12% carbon content and is directly drawn from hot rolled rod. This material represents very good value and is widely used in applications where its weld-ability, strength, and economy make it a popular option.

GALVANIZED WIRE

Galvanized wire is carbon steel which has been coated with a very thin layer of Zinc during the wire drawing process. It is only slightly more expensive than bare steel wire, but offers improved corrosion resistance. Pre-Galvanized steel wire cloth is typically not suitable for outdoor applications, however performance is greatly improved when a wet or powder paint is applied.

GALFAN®

Galfan® is a superior alternative to Hot Dipped and conventional pre-galvanized zinc coatings. The hot dipped coating process yields a heavier coating thickness which offers better corrosion resistance, however the coating is brittle and can flake off during weaving. Conventional pre-galvanized steel wire coatings can be applied only in an extremely light thickness, this offers minimal corrosion resistance. With Galfan®, the addition of 5% aluminum to the zinc coating increases ductility and permits the application of a heavier coating thickness. This added thickness dramatically increases overall corrosion resistance.

BRASS WIRE

Brass wire is commonly used in woven wire cloth as filtration material as well as particle analysis test sieves. Brass wire combines proportions of Copper and Zinc. The most common Brass used in wire cloth contains 70% copper and 30% zinc and takes on a very yellow, almost gold like appearance before tarnishing. An anti-sparking characteristic makes this material a good choice in and around explosive gases.

BRONZE WIRE

Bronze wire combines Copper and Tin. Commercial Bronze is the most common wire used in wire cloth containing 90% copper and 10% tin. Bronze resists corrosion and will not spark making it a useful material in explosive atmospheres.

COPPER WIRE

Copper wire has excellent electrical and thermal conductivity. Copper has high corrosion resistance in the marine environment making this alloy a good choice for salt and briny conditions. Copper is also resistant to marine life such as snails and mussels and has antibacterial properties.

ALUMINUM WIRE

At only 1/3 the weight of steel, Aluminum has very adaptable qualities as a woven wire product. It is highly resistant to atmospheric corrosion, reasonably priced, and it has a variety of surface treatment options that make it a good candidate for many applications. Aluminum is an excellent option for protective screening, or any situation in which weight or deterioration are concerns.

In some applications aluminum might not be suitable due to its relatively low strength and stiffness. To maintain the required rigidity for a particular application, it is advisable to increase wire diameter somewhat. Multiple alloys are available. Consult our Sales department for recommendations.

MESH FUNDAMENTALS

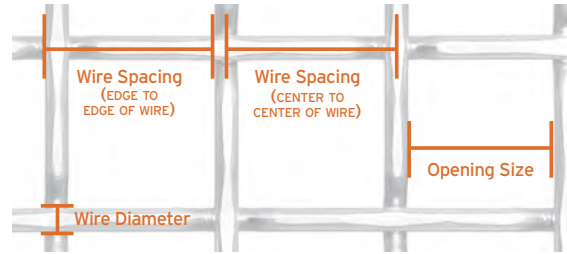
SPACING, OPENING, DIAMETER RELATIONSHIP

The basic relationship between wire spacing, wire diameter, and clear opening can be expressed by an algebraic relationship:

Wire Spacing = Wire Diameter + Opening Size

Opening Size = Wire Spacing - Wire Diameter

Wire Diameter = Wire Spacing - Opening Size



WIRE SPACING

Wire spacing (also called mesh spacing) can be defined either as a measured distance expressed in inches, or as the number of opening per lineal inch expressed as a count. Beware! Countless errors have occurred due to confusion between 2 mesh (1/2" on centers) and 2" mesh (2" on centers).



WIRE DIAMETER

Most industrial specifications are produced with round cross section wire. Whenever possible, refer to the wire diameter in decimals of an inch, rather than gauge. Confusion between ferrous and non ferrous gauge numbers and sheet steel numbers results in incorrect wire diameters being specified. Standard wire diameters used are as follows:

STANDARD WIRE DIAMETER				
.035	.041	.047	.054	.063
.072	.080	.092	.105	.120
.135	.148	.162	.177	.192
.207	.225	.250	.312	.375

WEIGHT AND CONVERSIONS

Weight is simply the weight per unit area. It is typically expressed as lbs per square foot or kilograms per square meter. Generic weights per square foot shown in this brochure are for steel. Conversion factors for other typical alloys are located in the table on the right:

STEEL WEIGHT CONVERSION TABLE	
ALUMINUM	0.346
COPPER	1.14
NICKEL	1.13
TITANIUM	0.58

PERCENT OPEN AREA (POA) AND MESH TO DIAMETER RATIO (MD)

Percent open area is the ratio of hole area to total screen area at a 90° angle of incidence to the plane of the material, expressed as a percentage. Material with 40% open area will have 40 square inches of opening for every 100 square inches of material. Percent open area helps in comparing various materials as to how readily a product, whether it be corn, air, or light, will pass through the screen.

POA=35% MD=2.38	POA=47% MD=3.17	POA=62% MD=4.76	POA=80% MD=9.52

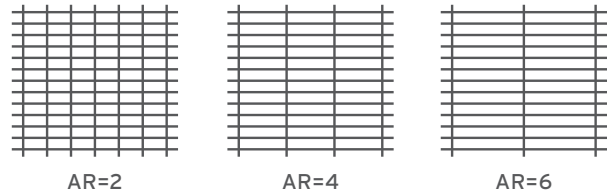
Mesh to Diameter ratio MD is the mesh spacing (center to center) divided by the wire diameter. We find this a very useful relationship. The MD can be used to determine appropriate crimp styles, and percent open area.

$$POA = 100 \times \frac{(MD-1)^2}{(MD)^2}$$

For square mesh material (same spacing in both directions) and using the same wire dimensions in both directions, the Percent Open Area is:

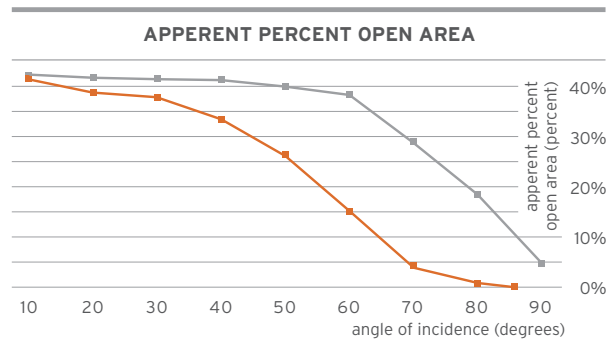
ASPECT RATIO (AR)

Aspect Ratio is a useful way to characterize materials that have non-square or slotted openings or repeat patterns. It is the ratio of the larger pattern repeat distance to the smaller pattern repeat distance.



APPARENT PERCENT OPEN AREA

Banker Wire does recognize the fact that the traditional use of open area is inadequate for many applications involving light transmittance, whether it be for solar shading, or ascertaining the relative transparency of a material viewed at oblique angles. We have developed optical testing procedures and can provide performance curves for all our products. We refer to this enhanced version of Percent Open Area as Apparent Percent Open (APO).



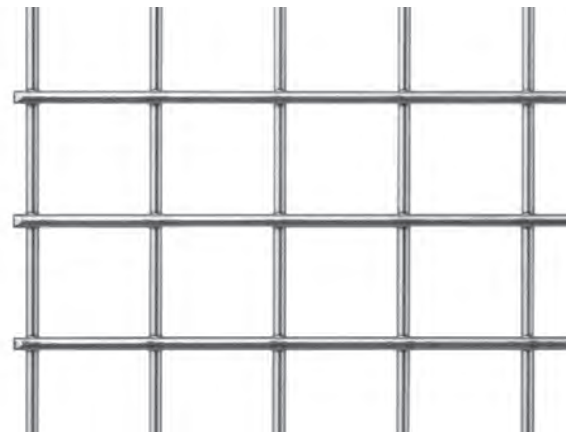
WELDED MESH STANDARDS

Banker Wire manufactures premium welded wire mesh exactly to your specifications. Unless specified, Banker will manufacture the following edge conditions per the following standards.

Untrimmed: When ordering welded wire mesh that is "Untrimmed", we will produce material with balanced tails opposite sides. The tail length will not exceed the pitch spacing unless specified by the customer.

Trimmed: Material is trimmed; stubs will be 1/8" or less all 4 sides. When overall dimension is not divisible by mesh spacing, the outer most cells will be modified to accommodate.

Squareness tolerance: +/- .125"
Dimensional tolerance: +/- .125"



SCALE AND VISUALIZATION

One of the more difficult problems a specifier is faced with is visualizing what characteristics a particular piece of material, presented as a small hand sample, will exhibit when used at real-world dimensions. Especially difficult are the attributes of stiffness and pliability. Simple math and classic beam theory can be a big help.

The top is a cantilevered straightedge and two scaled fabrics, one made with a 0.20" diameter wire, the other with a 0.10" diameter wire.



SIMPLE BEAM THEORY

Deflection is proportional to both the length raised to the third power, and total weight applied.

Deflection is inversely proportional to both the Modulus of Elasticity and Rectangular moment of Inertia.

$$Df \propto \frac{L^3 W}{EI}$$

- **L** Length
- **E** Modulus of Elasticity
- **W** Weight
- **I** Rectangular moment of Inertia



AGGREGATE



WATER SCREENS



DETENTION

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