

Hendrick Hendrick
METAL PRODUCTS MANUFACTURING

Perforation and Fabrication Buyer's Handbook



Patterns and Capabilities

"Do the right thing"

Michael L. Drake

The Hendrick motto is proudly displayed in the lobby of Hendrick Manufacturing in Carbondale, PA.

The Hendrick Motto:

"Do the right thing," was coined by Michael L. Drake during his tenure as president of the Hendrick Companies. It inspires every employee to do their best, be honest, respectful, and to interact with others with integrity. It embodies Hendrick's commitment to our customers, vendors and employees to always do the right thing.

YOUR PERFORATION AND FABRICATION EXPERTS

Since 1876, Hendrick has been innovating perforated metal solutions for a wide range of industries. Our expertise is unparalleled in the industry. The broad based knowledge that comes from working with multiple industries gives us a unique perspective on the latest manufacturing technologies and applications.

Our capabilities go way beyond perforation. We offer an array of high-tech fabrication options that can eliminate labor, time, and provide cost-savings for your completed assembly. Plus, our extensive range of services go one step further with partial to complete turn-key contract assembly operations.



With three ISO 9001 certified manufacturing locations, we can provide manufacturing flexibility to get product to you faster with minimized shipping costs. Plus, our large material inventory provides shortened lead times.

Why Hendrick

Hendrick
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What makes Hendrick a Reliable Supplier?

Inception Date

1876

Over 140 years of perforating and fabrication experience, providing quality you can trust.

Customer Satisfaction Score

95%

Based on 503 completed surveys between 2016 and 2018.

Equipment Reinvestment Rate

30%

Hendrick's commitment to maintaining the latest technology in equipment.

Raw Material

30m+

In annual purchases. This purchasing power assures you access to metal during shortages.

Average Employee Tenure

10 Years

Offering you knowledge and experience for excellent quality and service.

ISO 9000 Certification

2015

Hendrick's built-in Quality and Lean approach assures you'll get satisfaction with every order.

Industries Served

20+

Hendrick's depth of experience assures that you get products that match your needs.

Perforated Manufacturing Locations

2 Facilities

Localized shipping from Carbondale, PA or Elgin, IL can save you shipping costs.

Perforating Patterns

2000+

In addition to our existing library of options, we can work with you to design a custom pattern.

Other Benefits

Flexible Supply Chain

- Vendor managed inventory
- Kanban
- Consignment - raw material or finished product
- JIT
- Blanket order contracts
- Toll processing

Financial Strength

- Disciplined cost focus
- Solid operating results

Lean Committed

- Dedicated lean resources
- Continuous, best practice lean events company-wide

Vertical Integration

- In-house tooling capabilities (design and manufacturing)
- In-house punch manufacturing

Family Owned

- Privately held
- Nimble-quick decisions

Engineering and design support services

From basic projects, to those requiring complex and challenging solutions, Hendrick provides quality driven design assistance. We promote collaboration with our customers' engineers at each stage in the product life cycle.

Services include:

- Prototyping and production engineering support
- Revision control and product data management throughout the production cycle
- Design assistance for manufacturability and cost savings



Design and value engineering assistance is offered, providing a cost-effective approach to production.

Drafting Software

Solidworks Professional 2018

- Creating 3-D Part and Assembly Models
- Part Fitment Verification
- Creating Technical Drawings for use in Production
- Outputting Flat Patterns for Punching and Laser Cutting
- Determining Weight of Raw Material and Finished Products

AutoCAD 2018

- Creating 2-D Part and Assembly Drawings
- Creating Technical Drawings for use in Production
- Creating Flat Patterns for Punching and Laser Cutting
- Perforation Tooling Design

Learn More About
All Hendrick Services



Capabilities

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Material options

We maintain a large inventory of popular raw materials in stock, in both sheets and coils, providing you with buying power that leads to very competitive pricing and shortened lead times.

Plus, our no-minimum order policy offers the same fast delivery and lower pricing on small to medium volume orders.

Tooling

With hundreds of precision high-speed perforating tools available, we can readily produce most hole pattern requirements. Hendrick's in-house manufacturing of tools and punches assure that tooling can be made for custom jobs.



Aluminum

3003, 5052, 6061, plus more

Cold Rolled Steel

Hot Rolled Steel

Galvanized Steel

G90, G60, E.G. plus more

Stainless Steel

304, 316, 430, plus more

Plus copper, brass, monel, plastic and more

Quality materials for diverse applications

Hendrick supplies perforated metal and fabrication to over 20 end markets across the globe, both directly and through our distribution channel partners. Whether you fit one of our major industries or a smaller, niche market, we have the manufacturing expertise and flexibility to provide quality materials for diverse and demanding applications.

Industries We Serve

- Acoustical
- Agricultural
- Architectural
- Automotive
- Commercial Lighting
- Conveyor Flights
- Distribution
- Electronic
- Environmental
- Filtration
- Food Processing
- Hammer & Powder Mill
- HVAC
- Industrial Equipment
- Medical
- Mining & Aggregate
- Recycling
- Retail
- Security
- Telecommunications
- Transportation

A. Fan Tray for Telecom Chassis

B. Medical Incubator Tray

C. Coffee Roaster Cooling Tray

D. Speaker Grill

E. Automotive Truck Grill

F. Gondola Wall Panel



A



B



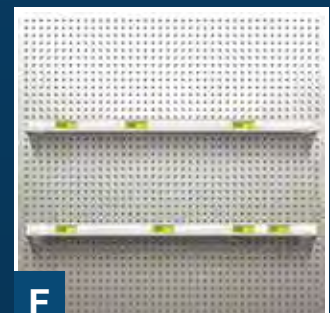
C



D



E



F



Get Industry
Specific Information

Perforating

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All-Across, High Speed Perforating Presses

The Fastest, Most Economical Perforating Method for High Volume Production

All-across perforating presses provide a unique method of producing holes in metal quickly and economically. Unlike other perforating methods, Hendrick's all-across equipment can punch multiple rows of holes across the sheet, up to 60" wide, in one single stroke—and is capable of punching up to 600 strokes per minute. The equipment automatically feeds material and punches to complete a sheet extremely quickly. It's such an efficient way to perforate, other metal fabricators come to Hendrick for projects that require perforating to minimize their costs.

- **Unlimited patterns in round, square, slotted, ellipse, hexagon and a variety of decorative patterns**
- **Perforation sizes from 0.027" in diameter and up**
- **Thicknesses ranging from .002" to 0.25"**
- **Perforate in sheet or coil**

Additional In-House Perforating Services

- **Shearing**
- **Degreasing**
- **Leveling**
- **Knotching**
- **Forming**
- **Deburring**
- **Polishing**



Image of a perforating tool with four rows of punches. Closeup of partial tool shown for detail.



Perforated material costs can be minimized using Hendrick's high-speed, all-across perforating presses. These presses offer the fastest, most efficient method for perforating sheet or coil.



See Hendrick's All-Across Perforating in action

Perforating for Low-Medium Volume Production or Unique Patterns

For low volume or custom patterns, Hendrick can service your needs with our state-of-the-art CNC punch equipment. With punching equipment ranging from 20 to 50 tons, presses can produce components that are up to 60" wide and up to 3/8" thick. Meeting tight tolerances is not an issue. Plus, our punch/plasma combination machines can perform multiple operations that can reduce production costs.



"Hendrick's latest punching equipment provides amazing quality and speed—up to 1600 strokes/min.



Hendrick's COMA CNC turret punch is capable of punching heavy steel gauge—even up to 0.375



Hendrick's punch/laser equipment offers the flexibility of a laser combined with punching equipment—making it ideal for perforating unique patterns in a design cut to any shape.

Watch Hendrick's
High Speed Punching
in Action



Fabricating

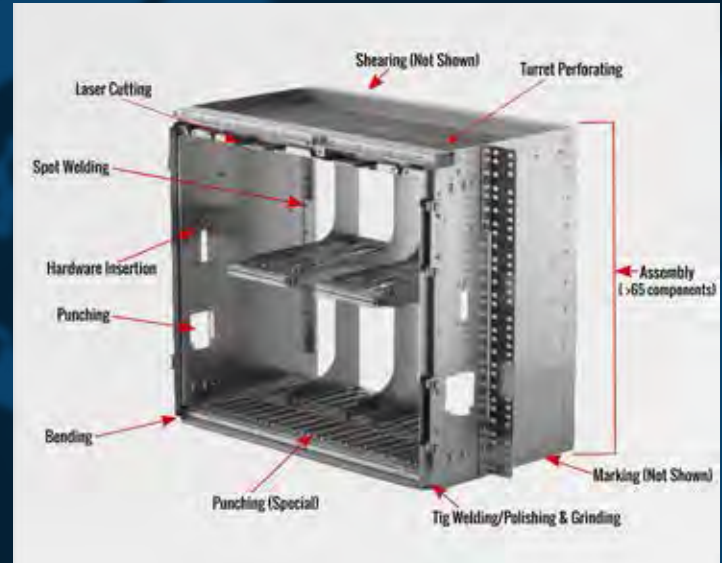
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Broad range of capabilities

Hendrick offers a full-line of sheet metal fabrication capabilities with dedicated equipment and experienced staff. We specialize in low to medium volume work, whether its value-add to our perforating process or a project that uses our complete end-to-end fabricating capabilities. Regardless of size, volume or material, our fabrication options can eliminate labor, time, and provide cost-savings for your completed assembly.

- **Significant tool library**
- **Large to small components**
- **Prototype to production**
- **Partial to complete turn-key contract assembly operations**



Multiple fabrication services available

- | | | |
|-----------------|---------------------------|-------------|
| • Punching | • Laser Cutting & Etching | • Turning |
| • Bending | • Plasma Cutting | • Tapping |
| • Notching | • MIG & TIG Welding | • Grinding |
| • Rolling | • Spot Welding | • Polishing |
| • Drilling | • Hardware Insertion | • Assembly |
| • Water Jetting | • Heat Treating | • Stamping |

Forming	Whether you require one bend or need complex multiple bends, Hendrick can flawlessly form your parts to your exact drawing specifications.	Aluminum (.020" to .250") Stainless Steel (.020" to .250") CRS (.020" to .375") Galvanized, Aluminized, Copper, & Brass (Call for info)
Punching	From high speed punching to our combo punch and laser equipment, Hendrick has the technology to deliver.	Aluminum (.020" to .500") Stainless Steel (.020" to .250") CRS (.020" to .375") Galvanized, Aluminized, Copper, & Brass (Call for info)
Laser	The 8kW of fiber laser technology produces the fastest processing speeds with a high level of accuracy and unsurpassed quality with tolerances down to +/- .005.	Aluminum - to 1" Stainless steel - to 1.5" Mild steel - to 1" Copper - to .390" Brass - to .390"
Welding	Hendrick offers welding support for small weldments to heavy plate welding fabrications to complete your component assembly.	TIG, MIG, Spot, Stud Heavy plate or thin gauge Most alloys, including carbon steel, stainless steel, and aluminum.

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8kW fiber laser cutting

With 8kW of laser cutting power, we've removed several obstacles for precise, custom designs when cutting metal. This latest in laser technology produces the fastest processing speeds, a high level of accuracy with tolerances down to $\pm .005$ and unsurpassed quality. Plus, we've broken the barrier for material gauge. The maximum sheet size is 84" x 160".



Hendrick's 8kW laser produces clean, smooth edges and no material warping.



Hendrick's extensive tooling inventory allows us to keep tooling costs to our customers at a minimum.



With multiple machines of varying capabilities from 60 to 500 tons, Hendrick can form custom parts to precision.

How to order perforated material

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Hendrick offers an unlimited number of pattern configurations in a wide range of materials. To assure quick and accurate quoting or delivery, please refer to these guidelines when ordering Hendrick's perforated materials.

Material – Indicate the type of material required and thickness or gauge. See page 6 for a list of Hendrick's raw materials. Other metals and plastics are available.

Quantity – Indicate number of sheets or linear length of coil required.

Sheet Size – Provide width and length. We can accommodate any size up to 60" wide.

Common sheet widths: 36", 48" and 60".

Common sheet lengths: 96", 120" and 144".

Specify hole specs

1. Hole shape



Round



Square



Slotted



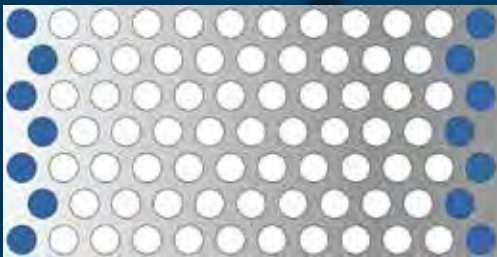
Hexagon



Specialty

2. Pattern Arrangement

Staggered or Straight Pattern



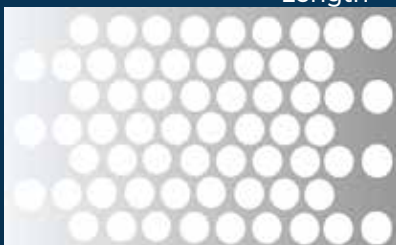
Staggered Pattern, 60°(standard) or 45°



Straight Pattern

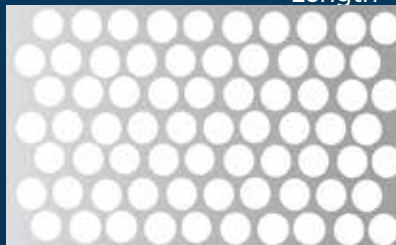
Unfinished or Finished End Pattern

<- Length ->



Unfinished End Pattern*

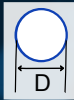
<- Length ->



Finished Pattern

* Pattern is based on a two-row tool. The end pattern for a four or eight-row tool may have a different appearance.

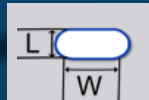
3. The hole size in inches**



Round



Square



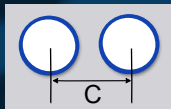
Slotted



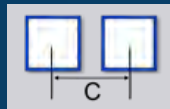
Hexagon

Contact
Hendrick
for
Special
Patterns

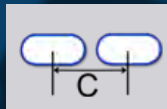
4. The hole centers (distance from the center of one hole to the center of the nearest hole in the next adjoining row) in inches.**



Round



Square



Slotted



Hexagon

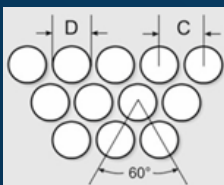
Contact
Hendrick
for
Special
Patterns

**Note: Industry standards recommend not making the distance between holes smaller than the material thickness. If you a smaller distance, contact Hendrick to discuss your needs.

Provide open area

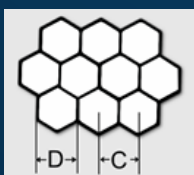
Provide the open area (total hole area, compared to sheet size) on the perforated sheet, indicated by percent. Typical open areas range from 2 to 80%, however 70% and higher can distort the material

**Round - 60°
Staggered Center**



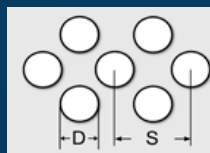
$$\frac{D^2 \times 90.69}{C^2}$$

Hexagon



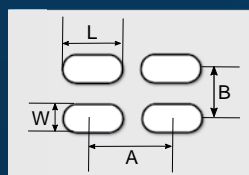
$$\frac{100 \times D^2}{C^2}$$

Round - 45° Staggered Center



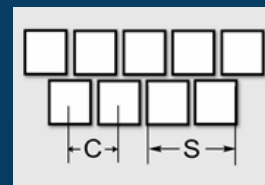
$$\frac{157.08 \times D^2}{C^2}$$

**Round End Slot
- Staggered Center**



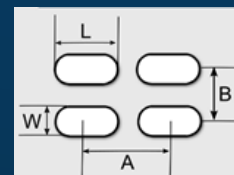
$$\frac{W(L - .215W)}{AB} \times 100$$

**Square - Straight or 45°
Staggered Center**



$$\frac{157.08 \times D^2}{C^2}$$

**Round End Slot
- Straight Center**

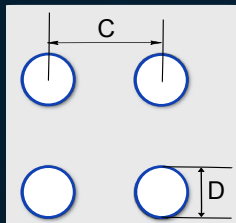


$$\frac{W(L - .215W)}{AB} \times 100$$

How to order perforated material

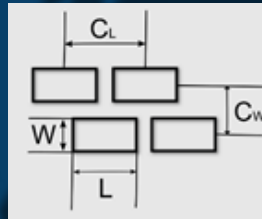
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Round – Straight Center



$$\frac{D^2 \times 78.54}{C^2}$$

Square End Slot – Staggered or Straight Centers



$$\frac{L \times W}{C_W \times C_L}$$

Make it Easy!



Visit Hendrick's Online Open Area Calculator Page

Specify margins

Indicate the areas around the sheet which are un-perforated. Specify “Minimum” or “No Margins” when it's not important. When margins are required, state the margins for each side of the sheet. Wider margins can lead to distortion and may require additional leveling, increasing costs.

Provide additional information

1. Forming – Provide forming operations that will be required to assure formability of the sheet.
2. Finishing – If additional finishing is required to achieve a decorative appearance, durability or protection.
3. End use – Our experienced engineering staff will review your design to assure all your end requirements are met.

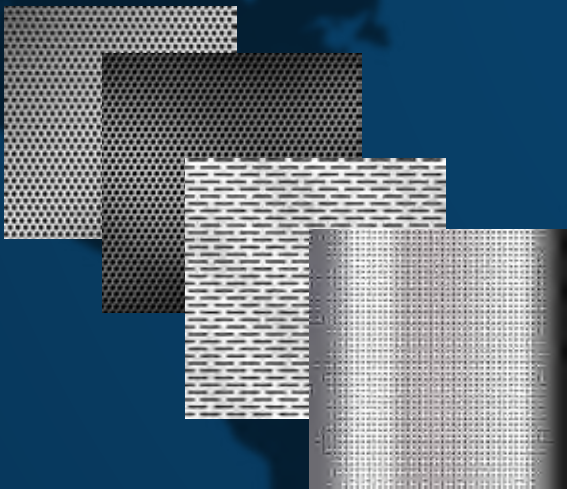
Regardless of order size, small to large, Hendrick partners with our customers to optimize designs for improved quality, functionality and cost-savings.

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Pattern Samples

A wide selection of perforated patterns are available in a variety of shapes, sizes and materials. The following pages provide a quick reference of Hendrick's popular perforated pattern options. If you don't see what you need, contact a sales representative to discuss your requirements at 800.225.7373.



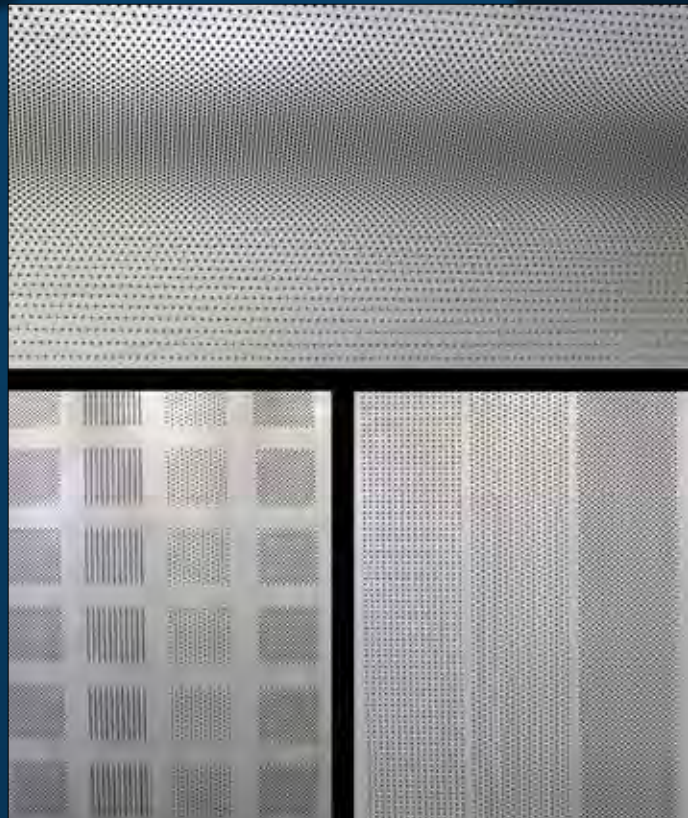
Visit Hendrick's Searchable
Database of 100+ Popular
Patterns & Download PDF/CAD
Files of Any Pattern



UNIQUE PATTERNS AVAILABLE

Hendrick is now capable of providing unique patterns on our high-speed, multi-punch Perforating Presses. No special tooling is required to punch these distinct patterns. Our software control systems and multi-stage gagging produces the custom patterns, all in the same set up for a truly distinctive look.

Hendrick is the only perforator in North America who has the capabilities of producing these unique patterns using a high-speed press.



Pattern Samples

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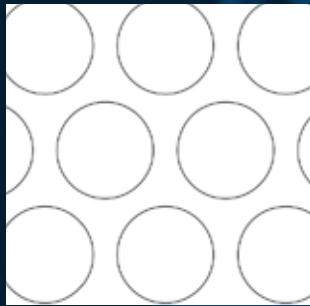
Round Holes, Staggered Patterns
Pictures are shown at 50% scale

Key:

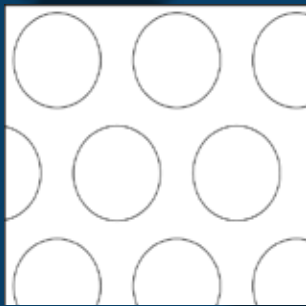
Hole Size

Centers

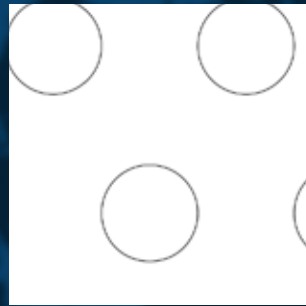
Open Area



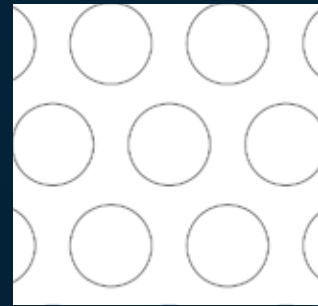
1.000 1.250 58%



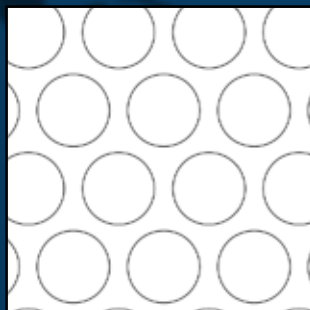
1.000 1.375 48%



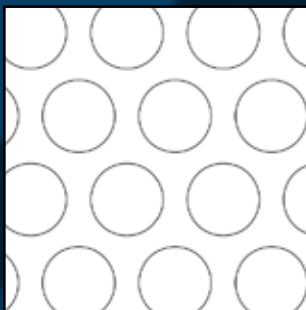
1.000 2.000 23%



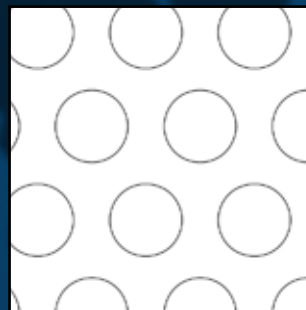
0.875 1.250 44%



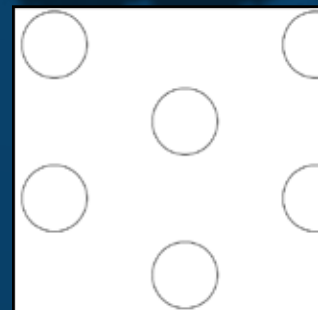
0.750 0.938 58%



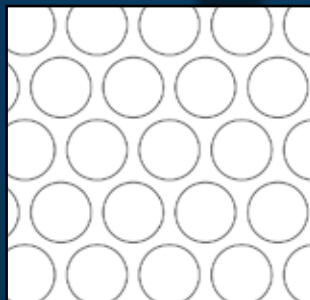
0.750 1.000 0.51%



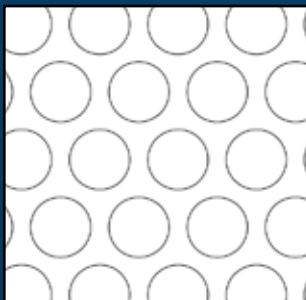
0.750 1.125 40%



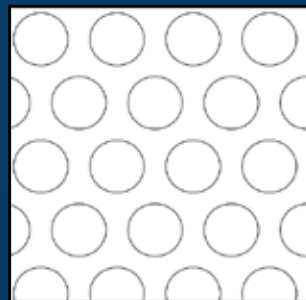
0.750 1.732 17%



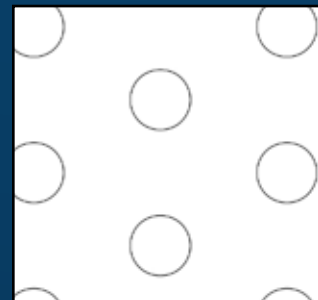
0.625 0.750 63%



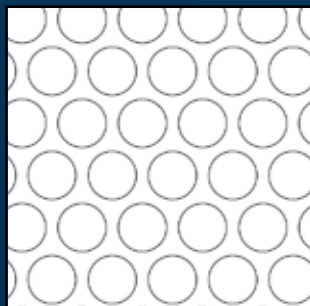
0.625 0.813 54%



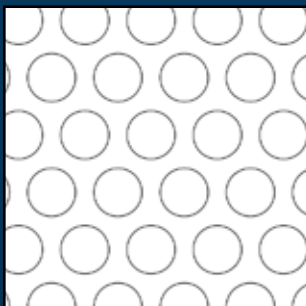
0.625 0.875 13%



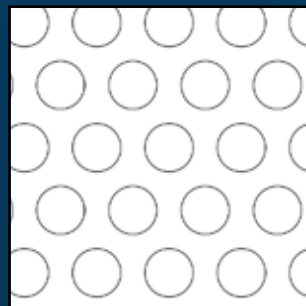
0.625 1.516 15%



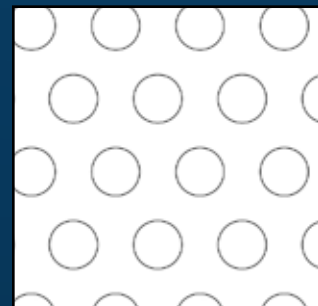
0.500 0.625 58%



0.500 0.688 48%



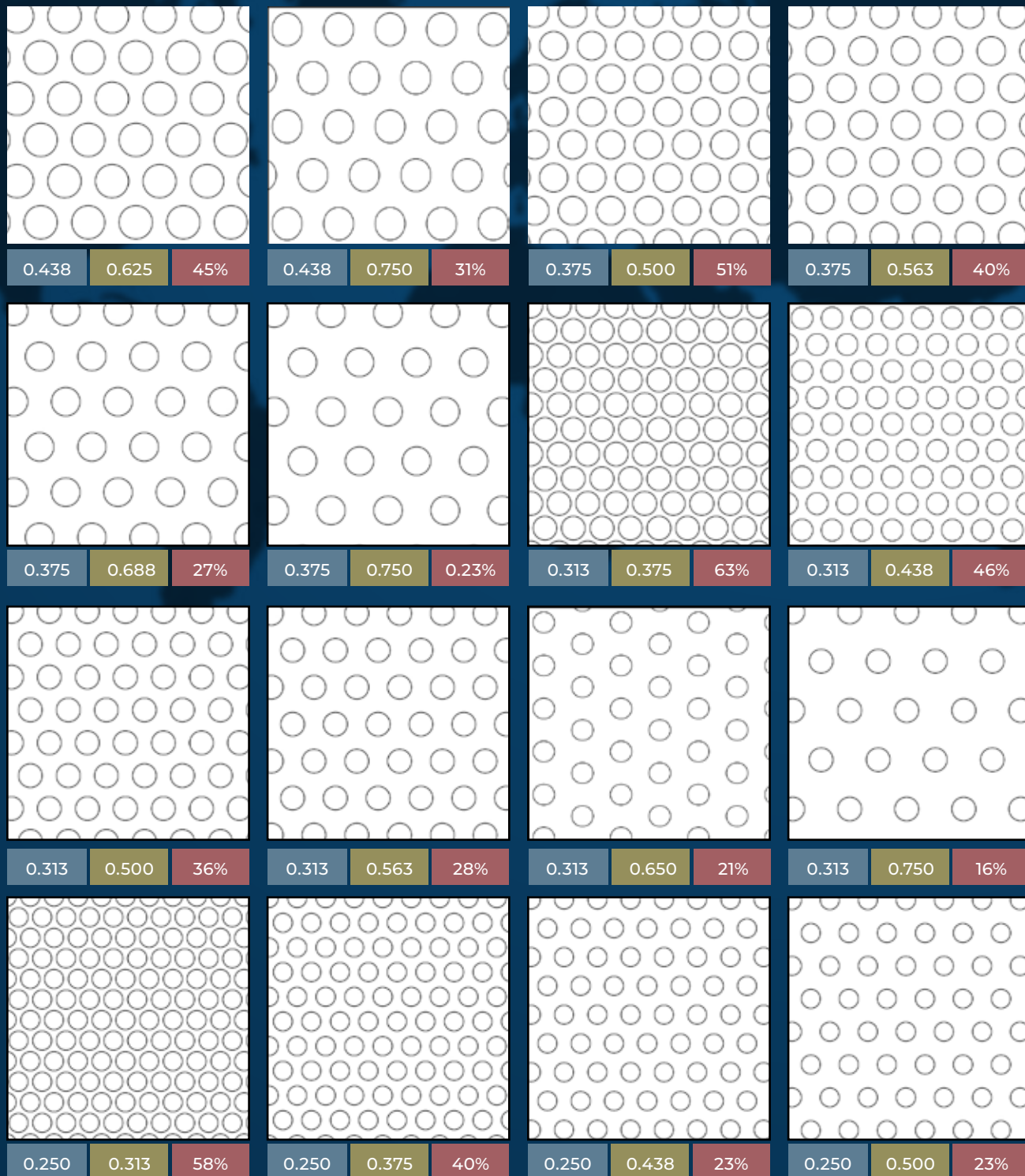
0.500 0.750 40%



0.500 0.875 30%

Round Holes, Staggered Patterns
Pictures are shown at 50% scale

Key: Hole Size Centers Open Area



Pattern Samples

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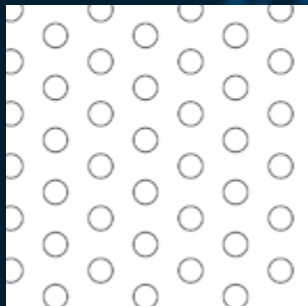
Round Holes, Staggered Patterns
Pictures are shown at 50% scale

Key:

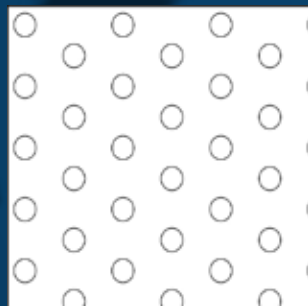
Hole Size

Centers

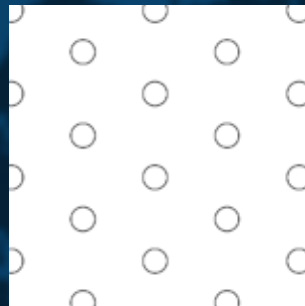
Open Area



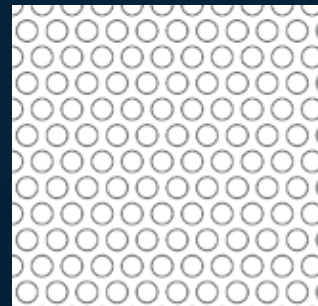
0.250 0.541 19%



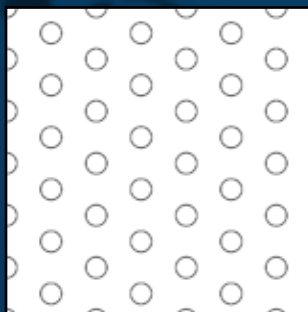
0.250 0.650 48%



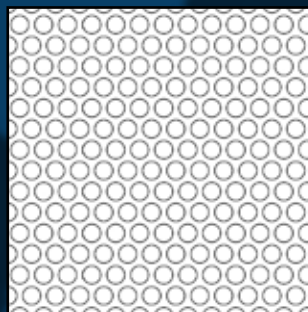
0.250 0.866 8%



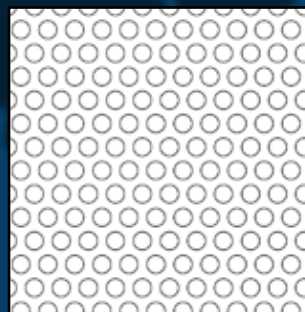
0.219 0.313 44%



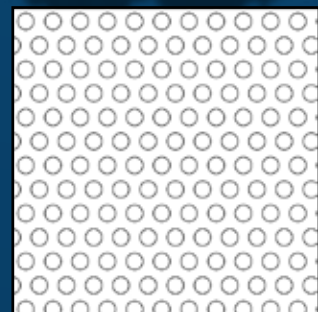
0.219 0.541 15%



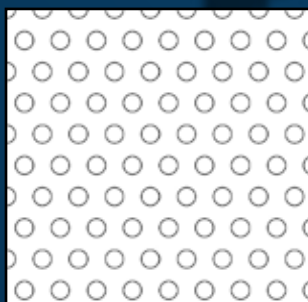
0.188 0.250 0.51%



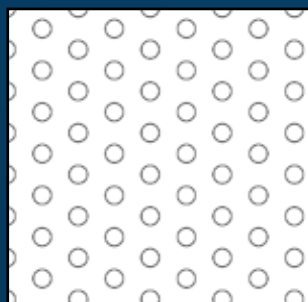
0.188 0.281 41%



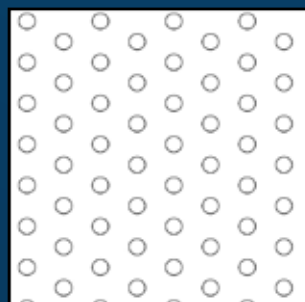
0.188 0.313 33%



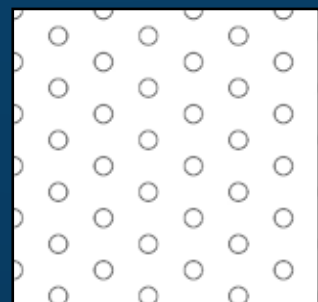
0.188 0.375 23%



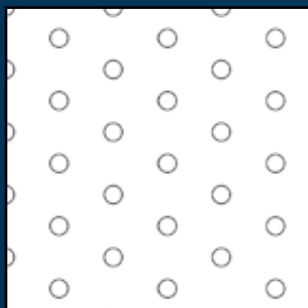
0.188 0.433 17%



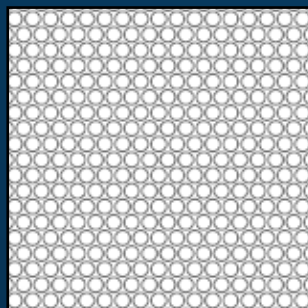
0.188 0.487 14%



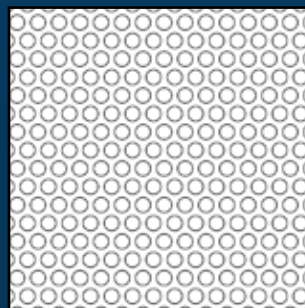
0.188 0.541 11%



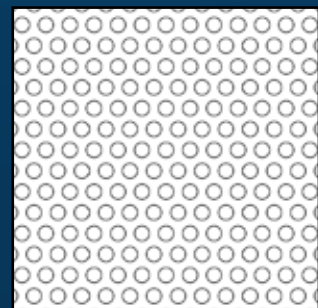
0.188 0.650 8%



0.1563 0.188 62%



0.1563 0.219 46%



0.1563 0.250 35%

Round Holes, Staggered Patterns
Pictures are shown at 50% scale

Key: Hole Size Centers Open Area

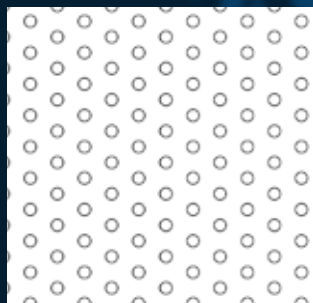
0.156 0.313 23%	0.156 0.325 21%	0.156 0.375 16%	0.156 0.379 15%
0.156 0.443 12%	0.156 0.541 8%	0.156 0.650 5%	0.141 0.188 51%
0.141 0.219 38%	0.141 0.250 29%	0.141 0.325 17%	0.141 0.379 13%
0.141 0.433 10%	0.125 0.188 40%	0.125 0.219 30%	0.125 0.250 23%

Pattern Samples

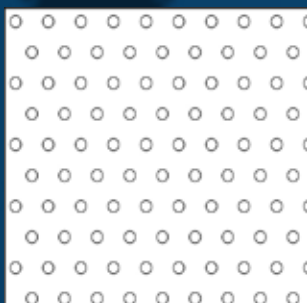
Hendrick
METAL PRODUCTS

Round Holes, Staggered Patterns
Pictures are shown at 50% scale

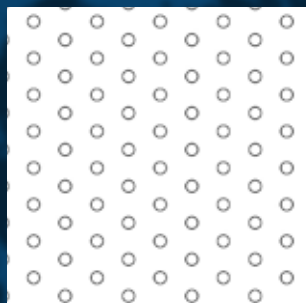
Key: Hole Size Centers Open Area



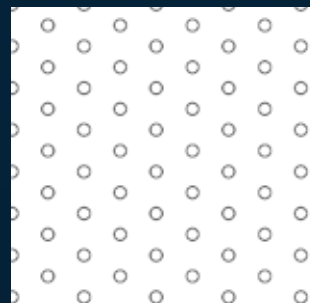
0.125 0.325 13%



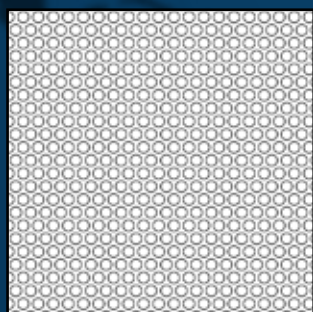
0.125 0.375 10%



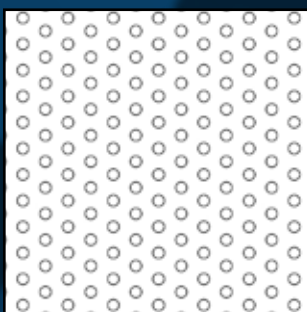
0.125 0.379 10%



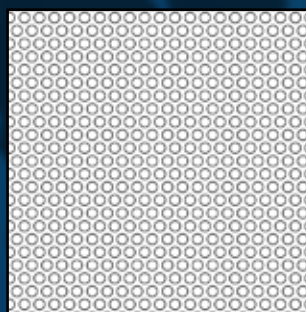
0.125 0.433 8%



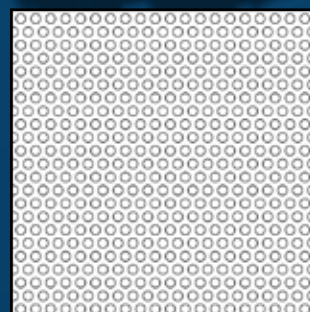
0.117 0.156 51%



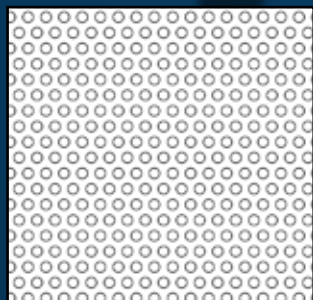
0.117 0.271 17%



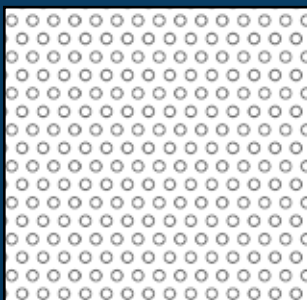
0.109 0.156 44%



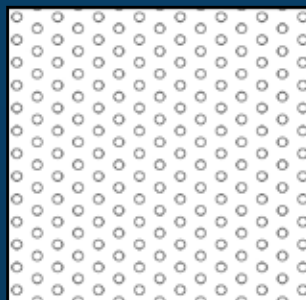
0.109 0.172 36%



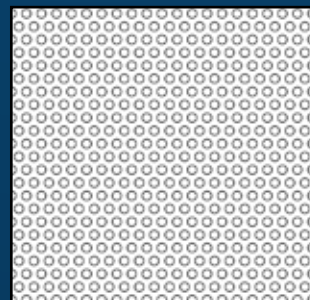
0.109 0.188 30%



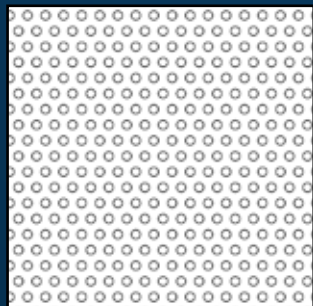
0.109 0.219 22%



0.109 0.271 15%



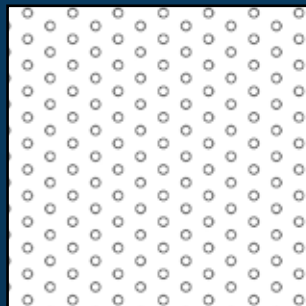
0.094 0.156 33%



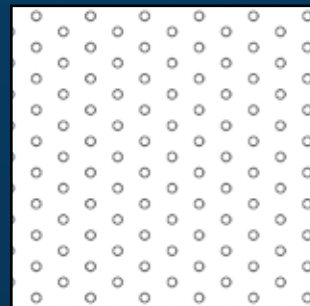
0.094 0.1875 22%



0.094 0.250 13%



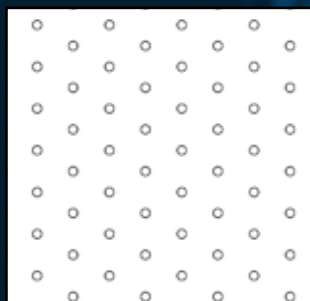
0.094 0.271 11%



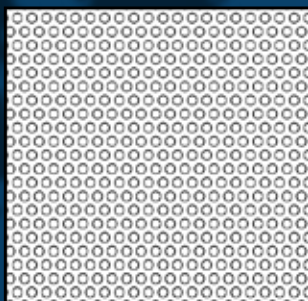
0.094 0.325 8%

Round Holes, Staggered Patterns
Pictures are shown at 50% scale

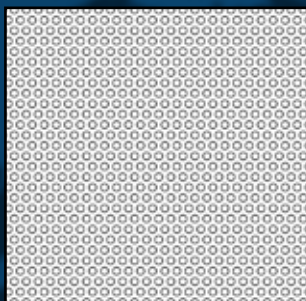
Key: Hole Size Centers Open Area



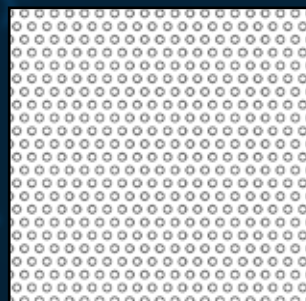
0.094 0.433 4%



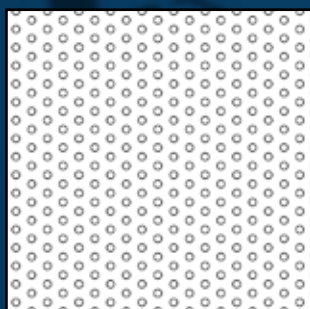
0.079 0.125 38%



0.078 0.125 38%



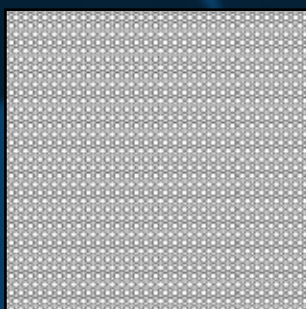
0.078 0.158 23%



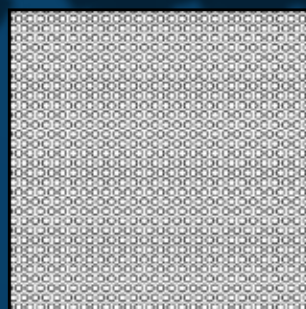
0.078 0.189 15%



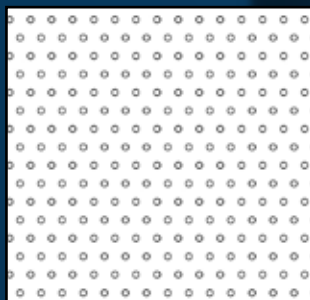
0.078 0.875 0.72%



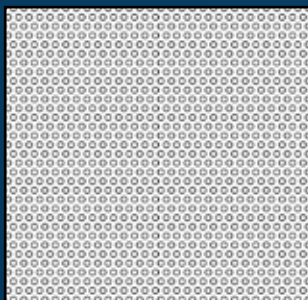
0.075 0.100 51%



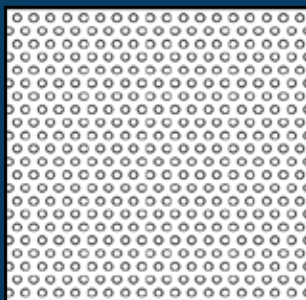
0.085 0.094 43%



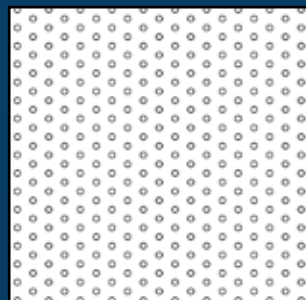
0.065 0.219 8%



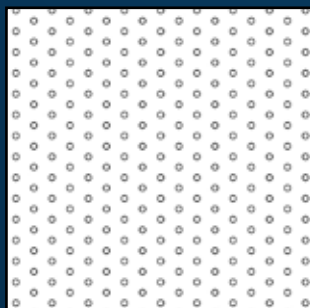
0.0625 0.1094 29%



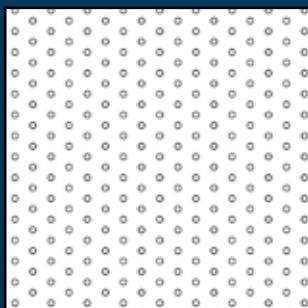
0.0625 0.125 22%



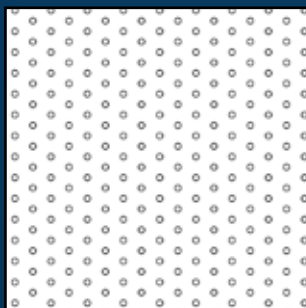
0.065 0.094 43%



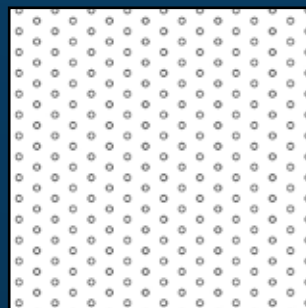
0.0625 0.217 8%



0.0625 0.217 8%



0.0625 0.217 8%



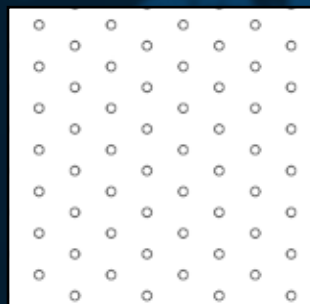
0.0625 0.217 8%

Pattern Samples

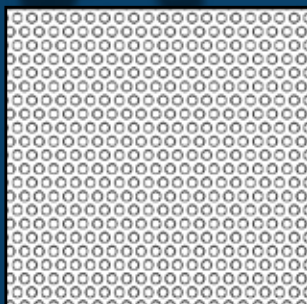
Hendrick
METAL PRODUCTS

Round Holes, Staggered Patterns
Pictures are shown at 50% scale

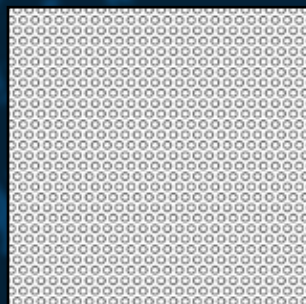
Key: Hole Size Centers Open Area



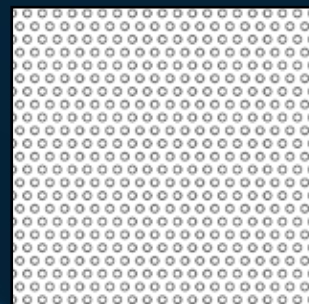
0.094 0.433 4%



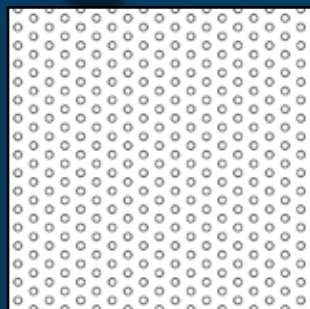
0.079 0.125 38%



0.078 0.125 38%



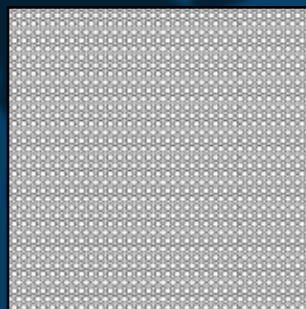
0.078 0.158 23%



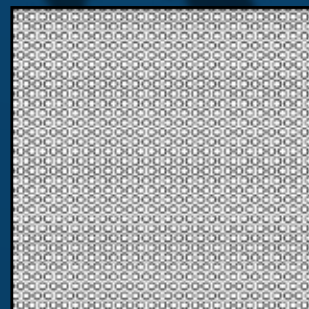
0.078 0.189 15%



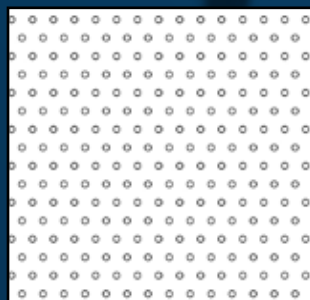
0.078 0.875 0.72%



0.075 0.100 51%



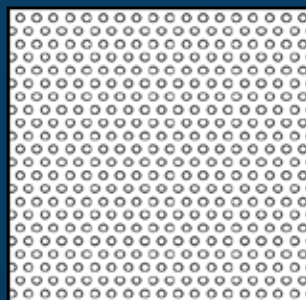
0.085 0.094 43%



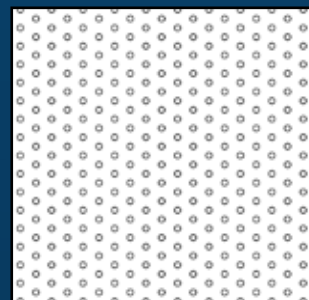
0.065 0.219 8%



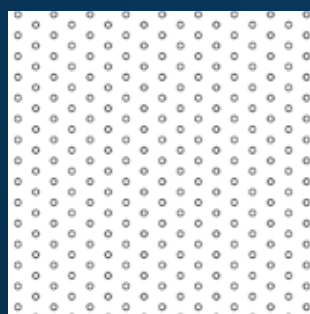
0.0625 0.1094 29%



0.0625 0.125 22%



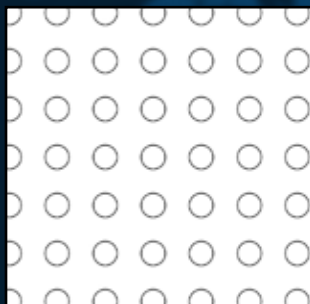
0.065 0.094 43%



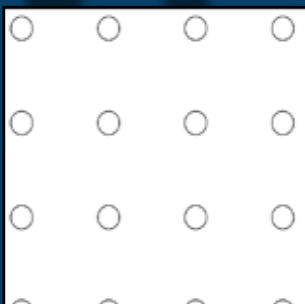
0.0625 0.217 8%

Round Holes, Straight Patterns
Pictures are shown at 50% scale

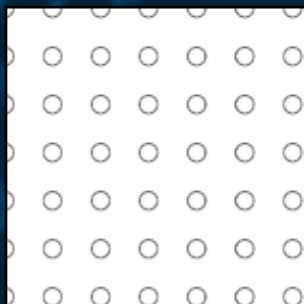
Key: Hole Size Centers Open Area



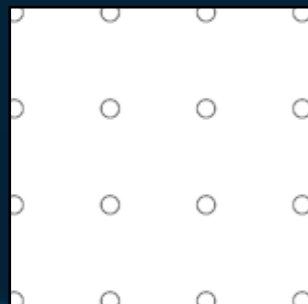
0.250 0.500 4%



0.250 1.000 5%

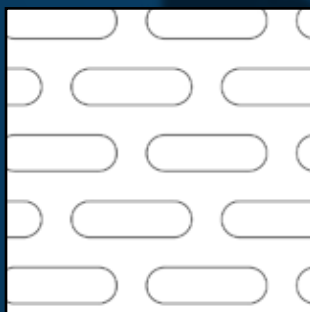


0.188 0.500 38%

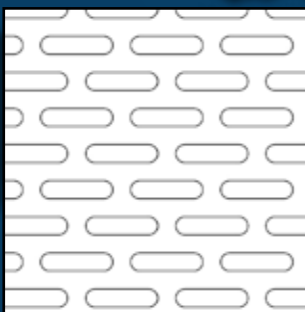


0.078 0.158 29%

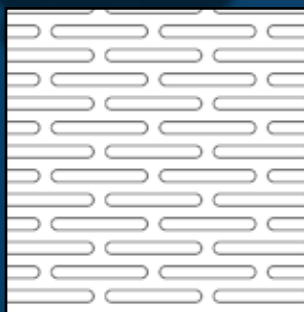
Slotted Holes, Staggered Patterns



0.375 x 1.120 0.688 41%

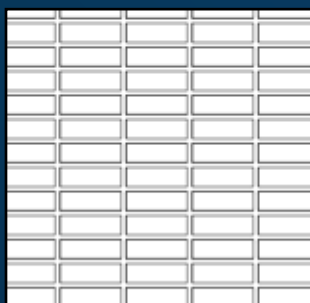


0.188 x 0.75 0.375 37%

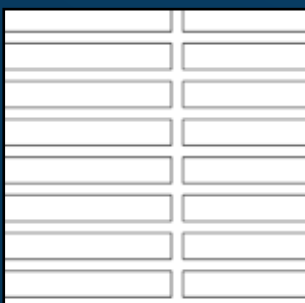


0.125 x 1.0 0.250 43%

Slotted Holes, Straight Patterns



0.200 x .637 0.250 74%



0.281 x 1.844 1.969 65%

Pattern Samples

Hendrick
METAL PRODUCTS

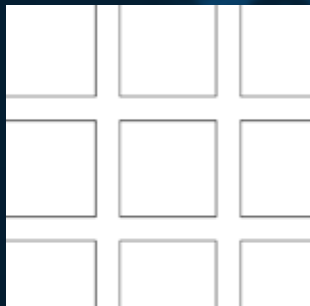
Square Holes, Straight Patterns
Pictures are shown at 50% scale

Key:

Hole Size

Centers

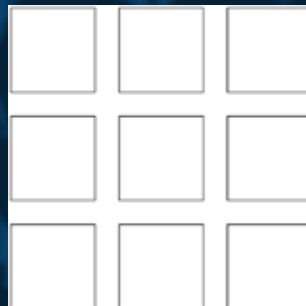
Open Area



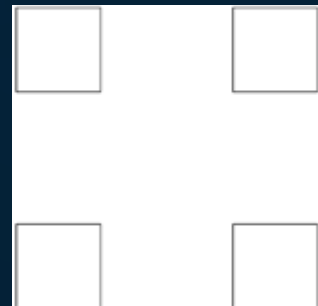
1.000 1.250 64%



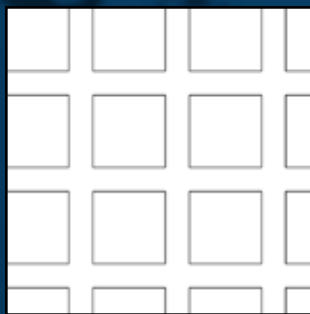
1.000 2.500 16%



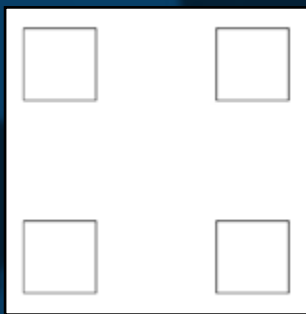
0.875 1.125 60%



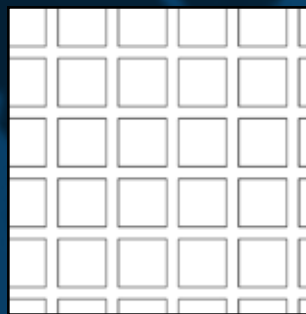
0.875 2.250 16%



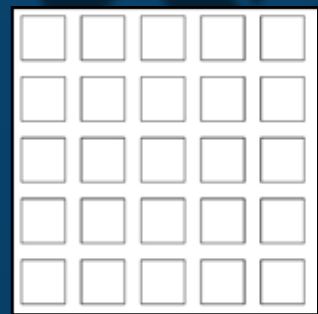
0.750 1.000 56%



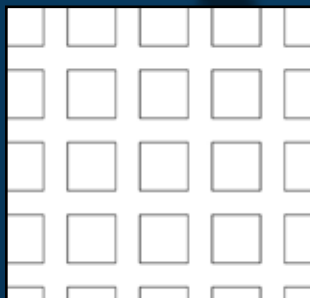
0.750 2.000 0.14%



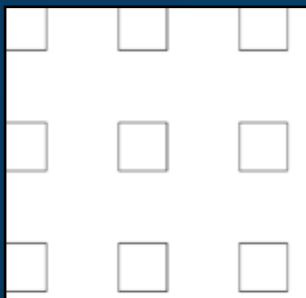
0.500 0.625 64%



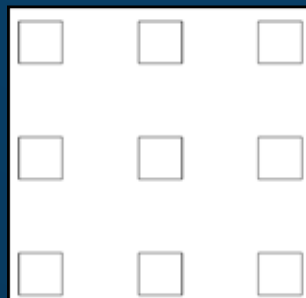
0.500 0.688 53%



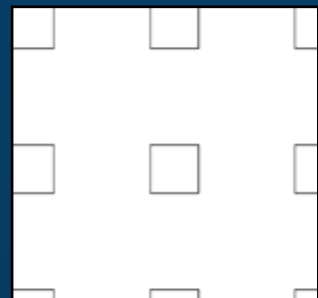
0.500 0.750 44%



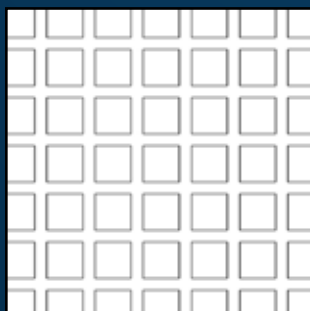
0.500 1.250 16%



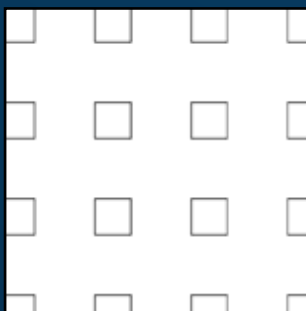
0.500 1.375 13%



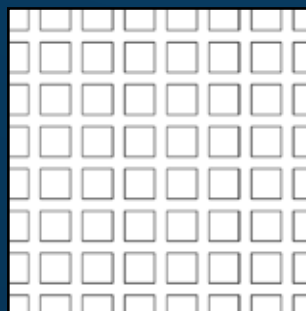
0.500 1.500 11%



0.375 0.500 56%



0.375 1.000 14%



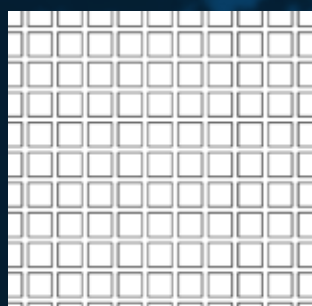
0.313 0.438 51%



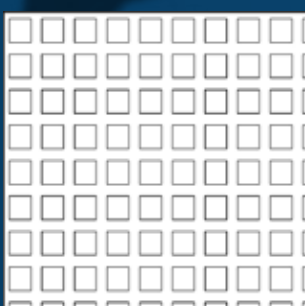
0.313 0.875 13%

Square Holes, Straight Patterns
Pictures are shown at 50% scale

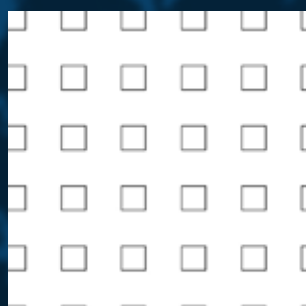
Key: Hole Size Centers Open Area



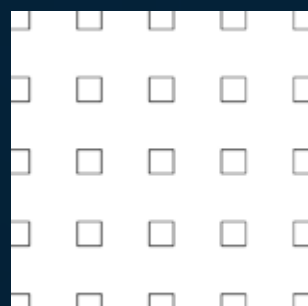
0.250 0.313 64%



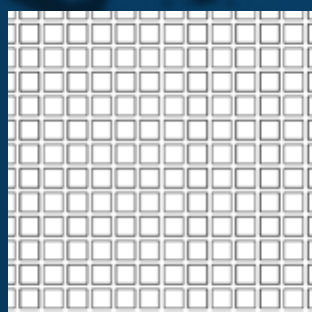
0.250 0.375 44%



0.250 0.625 16%



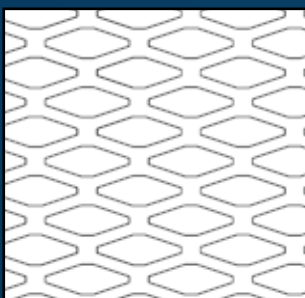
0.250 0.750 11%



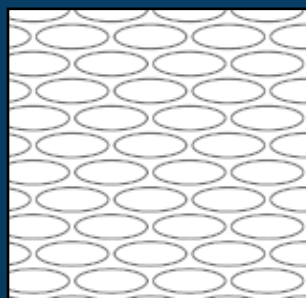
0.375 x 1.120 0.688 41%

Other Patterns

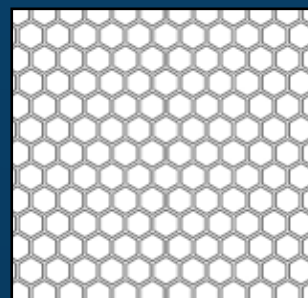
Diamond (Left)
Ellipse (Center)
Hexagon (Right)



0.313 x 0.875 0.250 55%

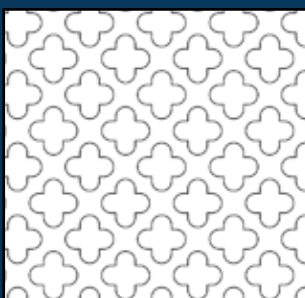


0.250 x 0.750 0.813 65%

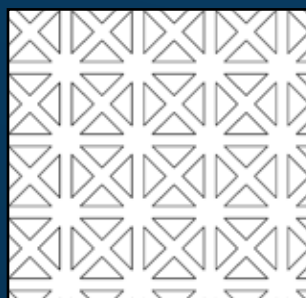


0.250 0.281 79%

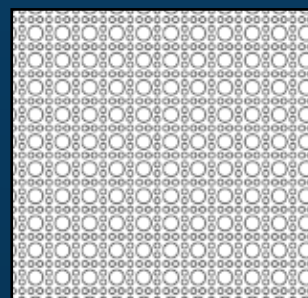
Cloverleaf (Left)
Malcane (Center)
Minicane (Right)



0.281 x 1.844 1.969 65%



0.625 0.625 36%



0.062 0.157 45%

**Hendrick delivers solutions that
give you the competitive edge.**

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