

# BASKET & SCREEN DATA

## Basket and Screen Design

The basket or screen is the heart of an Eaton Strainer and is designed to be both effective and durable to perform its function correctly. There are two different designs of both baskets for Eaton basket strainers and screens for Y strainers...standard and heavy duty. Standard baskets and screens meet the needs of nearly all applications.

In those certain cases where either an extremely high viscosity material is being strained or where a high solids load is experienced, the heavy duty basket or screen design is recommended.

Eaton Baskets and screens are available in two materials:

1) type 316 stainless steel and 2) Monel. These materials cover nearly all corrosion resistance levels needed in strainer services. A wide range of perforations and mesh providing removal of solids from 1/2" down to as low as 40 micron. For special, unique applications Eaton can custom fabricate a basket from just about any material to your exact specifications.

## Basket Construction

Each style basket includes a perforated sheet which is induction welded to a rigid top ring and solid bottom cap. Special attention is paid to the welds along the perforated sheet seam to prevent the possible bypass of solids and to maintain the basket's strength. A handle is then welded to the I.D. of the top ring to facilitate easy removal. Heavy duty baskets have reinforcing strips induction welded along the perforation's seam and circumferentially on the outside of the mid-section of the basket. The perforated sheet is placed inside the top ring and bottom cap as well.

## Screen Construction

Y-Strainer screens are rolled to form a perfect cylinder and are induction welded along the seam. A neat, continuous weld must be applied along the perforated sheet seam to prevent the possible bypass of solids and to provide a seam of acceptable strength. Eaton Y-Strainer screen seats are machined to specific dimensions and, accordingly, both the O.D. and length of these screens are closely toleranced.

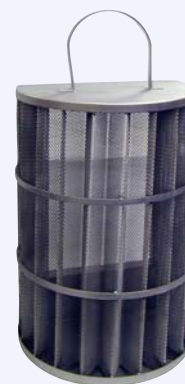
## Perforated Sheet – Specification

All Eaton baskets and screens are made of perforated sheet. The percentage of open area of a screen generally dictates the internal pressure drop that will be experienced across it. Other factors, though, must be taken into consideration to produce a screen that will provide a reasonable service life. The objective is to select a perforation with the best balance of open area, hole arrangement and sheet thickness. There are several styles of perforated sheet to choose from, including ones with round, square, rectangular or diamond shape perforations.

Eaton baskets are made using perforated sheet with round holes because of its greater inherent strength and resistance to stress cracking.



*Cylindrical baskets for simplex and duplex strainers up to 8" size*



*Pleated basket for Model 72 simplex and Model 50 duplex strainers sizes 10" to 18"*



*Slant top baskets for Model 510 simplex and Model 570 duplex strainers sizes 8" to 36"*

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## Open Area

Perforated sheet can have an open area from between 15% to 75%. In general, the larger the open area of perforated sheet, the thinner the sheet thickness must be. As holes are punched closer together to increase the perforated open area, the solid portion between holes distorts and becomes weak. Table A describes the sheet thickness which is used to construct baskets and screens.

Another factor in controlling the sheet thickness is the hole diameter. The smaller the hole diameter, the thinner the sheet. The rule of thumb used by commercial perforated sheet manufacturers is that hole dimensions smaller than the plate thickness are impractical and costly to manufacture. Eaton baskets and screens have between 28% to 51% open area with gauge thickness from 18 (0.048") to 25 (0.021"), depending upon the size of the perforations and the size and model of the strainer.

## Hole Arrangement

Holes can be punched in a straight line or in a staggered pattern. Eaton baskets and screens have a staggered pattern which increases the open area, provides extra strength and creates less pressure drop.

## Perforations

Eaton baskets and screens are available in 1/32", 3/64", 1/16", 5/64", 7/64", 1/8", 5/32", 3/16", 1/4", 3/8" and 1/2" perforations and in mesh sizes: 20, 40, 60, 80, 100, 200 and 325. However, over many years we have found that for general service there is one perforation for each size and type of strainer which is most popular. This is called the standard perforation and is the size furnished with the strainer unless another perforation is specified.

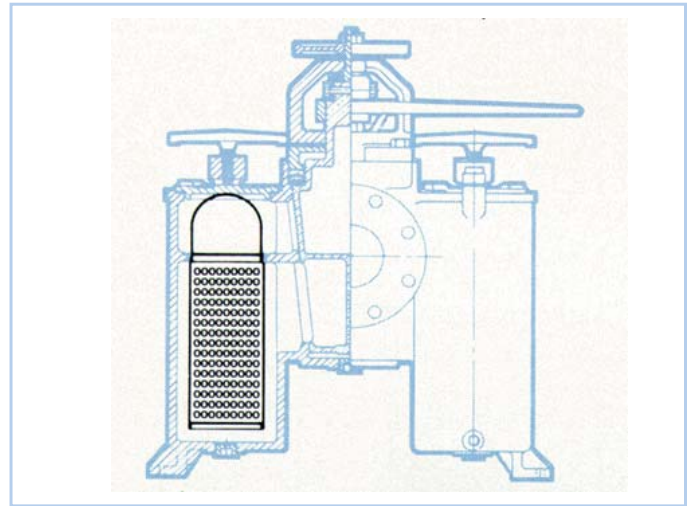
## Wire Mesh Specifications

All Eaton strainers are available with woven wire mesh screens. Wire mesh provides smaller openings than can be obtained by perforating for very fine straining applications ...down to 40 micron.

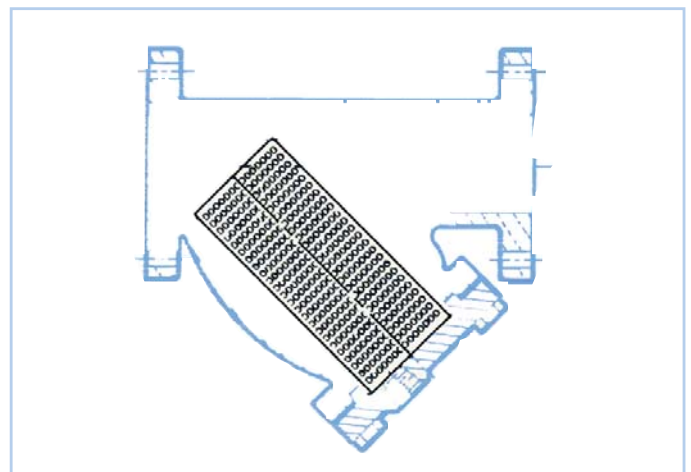
Woven mesh is constructed similarly to fabric and is woven on machines like those used in the textile industry.

Eaton baskets and screens are made using monofilament mesh having equal wire size and wire count in both directions to produce square openings. Other types of mesh such as Dutch (or Hollander) are also available. Dutch weave has a greater quantity of wires in one direction and less wires, but which are of larger in diameter, in the other direction. This creates a rectangular opening. As with perforated sheet, the best wire mesh selection is a balance of open area, wire diameter and type of weave.

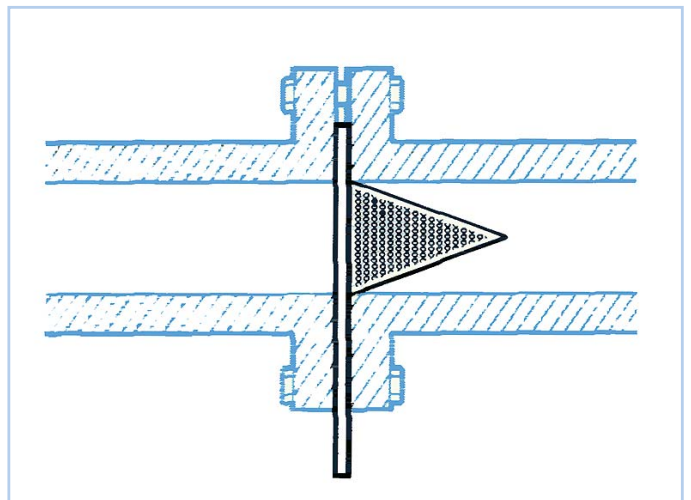
We have standardized certain mesh sizes based on past experience which we feel will provide the best strainer operation and longest life.



*Partial cutaway of plug type duplex strainer showing basket in position*



*Cutaway of Y strainer shows strainer screen in position*



*Cone type temporary strainer is shown bolted between two pipe flanges*

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## Openings

Wire mesh liners for Eaton baskets and screens are available from 20 mesh to 400 mesh. For any size mesh, there are several different open area selections based on the diameter of the wires used. Twenty mesh means 20 wires per inch in both a vertical and horizontal direction. Therefore, as the wire size increases, the hole size decreases. Eaton baskets offer wire mesh with openings from 0.034" to 0.0015" (20 mesh to 400 mesh).

## Open Area

The open area of wire mesh is a function of both the weave and the wire diameter. Eaton uses a plain square weave in most cases because its straight-through flow path creates the least pressure drop. In almost all cases, the mesh is reinforced with a perforated metal backing having greater than a 50% open area. This combination affords the greatest degree of strength, yet offers a lower pressure drop than other types of wire mesh.

In certain instances, such as Y strainer steam applications, the increased pressure drop resulting from the use of a Dutch weave is not as critical as the retention of small particles. Therefore, in applications which involve steam, Eaton suggests the use of weave such as the 30 x 160 size which can withstand a much higher differential pressure without bursting. Eaton can supply baskets and screens having open areas from 14% to 46%.

## Plain Square Weave

Woven in an over and under pattern of wire having the same diameter. This weave produces a square opening having excellent flow characteristics.

## Plain Dutch Weave

Woven in an over and under pattern in one direction where the horizontal wires are larger in diameter than the vertical wires which are driven close and crimped at each pass. This weave produces greater strength, but lower flow rates than a square weave. Most often used in steam applications.

## Mesh Liners Available

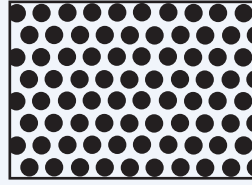
The size of mesh liners is determined by the number of openings per linear inch. The standard sizes Eaton can furnish are 20, 40, 60, 80, 100, 200, 325 and 400.

## Magnetic Inserts

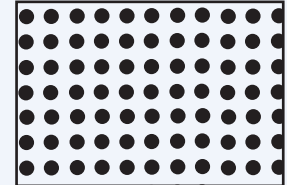
Although a mesh lined Eaton strainer basket will catch and remove very small unwanted particles (down to 400 mesh), there are applications where microscopic iron or steel particles are present in the fluid. Being so tiny they will often pass through the finest mesh screen. The problem is particularly prevalent whenever there is wear of iron or steel parts against each other in the system. Examples are cooling or lubricating lines to bearings, liquids being processed on rolls or roller mills such as paint or ink, and any material passing through a gear system.

A simple, cost effective way to remove these damage-causing particles is to install magnetic inserts in the Eaton strainer basket. All the fluid passes over the powerful magnets which catch those fine steel or iron particles which might otherwise pass through the mesh lining of the basket. The magnets are Alnico, guaranteed to retain their magnetism indefinitely, and so powerful they will hold metal several times their own weight. They are completely encased and sealed in a 1/8" thick type 316 stainless steel shell – thus assuring freedom from contamination or corrosion.

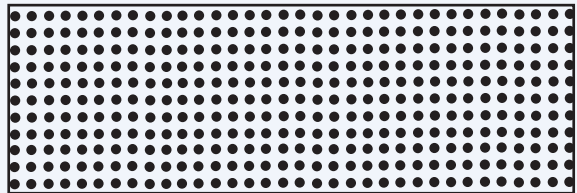
## Pattern Examples



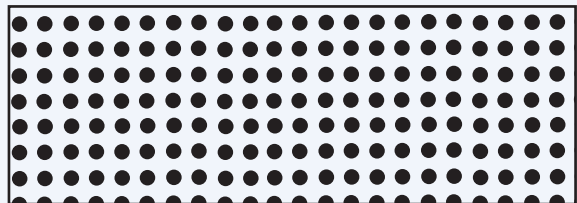
Staggered Holes



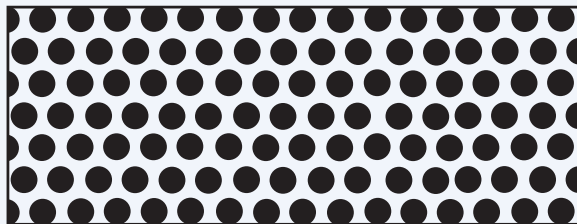
Straight Holes



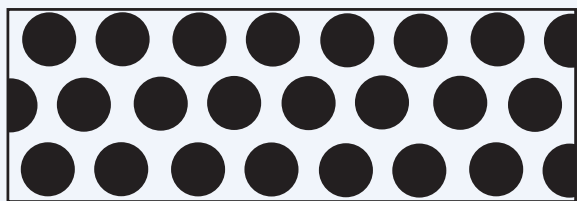
1/32" – Actual Size



1/16" – Actual Size



1/8" – Actual Size



1/4" – Actual Size

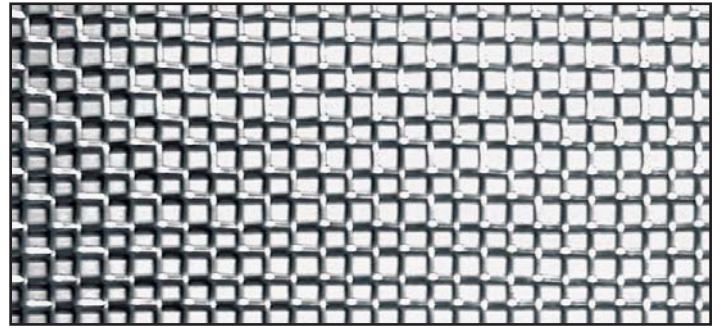


Magnetic strainer element captures microscopic iron and steel particles

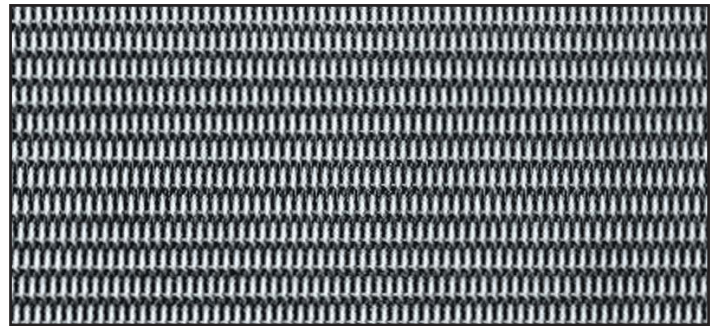
## Wire Mesh Weaves

Table A. Perforated Basket Sheet Specifications

Perforation Size Inches	Sheet Thickness USS Gauge #	Hole Pattern	% Open Area
0.020	26	Straight	16.0
1/32	26	Straight	28.0
3/64	24	Straight	30.2
0.045	26	Staggered	36.0
1/16	26	Straight	31.0
1/8	26	Staggered	47.9
5/32	26	Staggered	63.0
3/16	26	Staggered	50.0
1/4	26	Staggered	42.0
3/8	26	Staggered	52.0
1/2	26	Staggered	47.9



*Plain Square Weave*

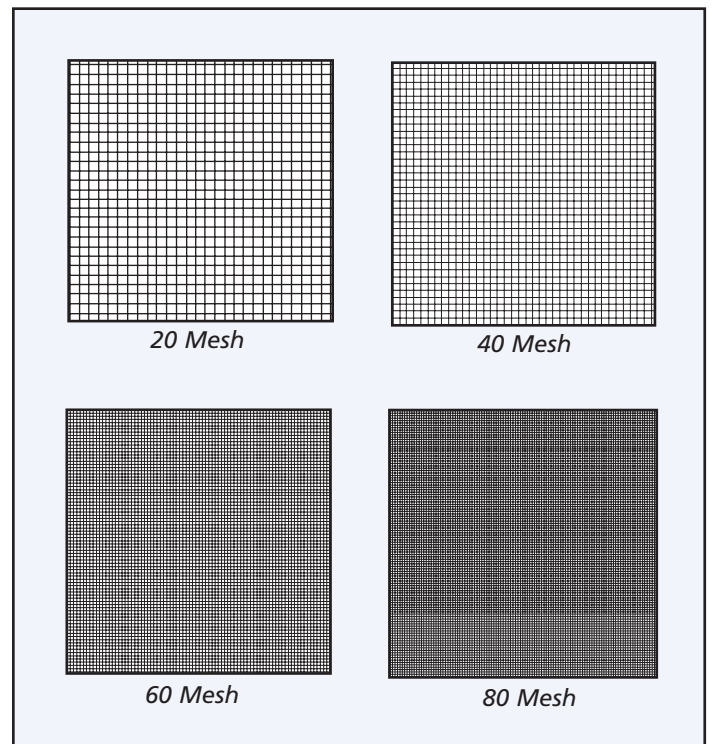


*Plain Dutch Weave*

Table B. Mesh Basket Sheet Specifications

Mesh Size	Wire Diameter Inches	Mesh Opening Inches	Mesh Opening Microns	% Open Area
20	0.016	0.0340	864	46.2
40	0.010	0.0150	381	36.0
60	0.0075	0.0092	234	30.5
80	0.0060	0.0065	165	27.0
100	0.0045	0.0055	140	30.3
200	0.0021	0.0029	74	33.6
325	0.0014	0.0017	43	30.0
400	0.0015	0.0381	38	36.0

## Mesh Liners



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## Basket Effective Area

Strainer Model	Pipe Size	Perforation Size	Nominal Area of Pipe (sq in)	Gross Screen Area (sq in)	Free Area (sq in)	Ratio Free Area to Pipe Area
30R	1-1/2	5/32	2.03	35.4	22.3	11.0
30R	2	5/32	3.35	50.9	32.1	9.6
30R	2-1/2	5/32	4.78	84.7	53.4	11.2
30R	3	5/32	7.39	84.7	53.4	7.2
30R	4	5/32	12.73	114.5	72.1	5.6
30	5	5/32	20.0	158.1	99.6	5.0
30R	6	5/32	28.9	180.9	113.9	4.0
30R	8	5/32	50.03	275.6	171.8	3.4
50	3/4	1/32	0.53	19.5	5.2	9.8
50	1	1/32	0.86	19.5	5.2	6.1
50	1-1/4	1/8	1.49	39.7	19.0	12.8
50	1-1/2	1/8	2.03	39.7	19.0	9.4
50	2	1/8	3.35	64.0	30.7	9.2
50	2 -1/2	1/8	4.78	64.0	30.7	6.4
50	3	3/16	7.39	85.6	42.8	5.8
50	4	3/16	12.73	146.1	73.0	5.7
50	5	3/16	20.0	216.1	106.0	5.4
50	6	3/16	28.9	265.4	132.7	4.6
50	8	3/16	50.02	506.7	253.4	5.1
50	10	3/16	78.8	800	400	5.1
50	12	3/16	113.1	1200	600	5.3
50	14	3/16	137.9	2000	1000	7.3
50	16	3/16	182.6	2000	1000	5.5
50	18	3/16	182.6	2000	1000	5.5
53BTX	3/4	1/32	0.53	19.8	5.5	10.4
53BTX	1	1/32	0.86	19.8	5.5	6.4
53BTX	1-1/4	1/8	1.49	45.0	22.0	14.4
53BTX	1-1/2	1/8	2.03	45.0	22.0	10.6
53BTX	2	1/8	3.35	65.0	31.0	9.3
53BTX	2 -1/2	1/8	4.78	65.0	31.0	6.5
53BTX	3	3/16	7.39	110.3	55.1	7.4
53BTX	4	3/16	12.73	152.0	76.0	5.9
72	3/8	1/32	0.19	12.7	3.4	18.0
72	1/2	1/32	0.30	12.7	3.4	11.3
72	3/4	1/32	0.53	19.5	5.2	9.9
72	1	1/32	0.86	19.5	5.2	6.1
72	1-1/4	1/8	1.49	30.1	14.4	9.7
72	1-1/2	1/8	2.03	49.7	19.0	9.4
72	2	1/8	3.35	50.9	24.4	7.3
72	2-1/2	1/8	4.78	80.2	38.4	8.0
72	3	3/16	7.39	114.5	57.2	7.8
72	4	3/16	12.73	168.3	84.1	6.6
72	5	3/16	20.0	265.4	132.7	6.6
72	6	3/16	28.9	324.2	162.1	5.6
72	8	3/16	50.02	555.3	277.7	5.6
72	10	3/16	78.8	800	400	5.1
72	12	3/16	113.1	1200	600	5.3
72	14	3/16	137.9	2000	1000	7.3
72	16	3/16	182.6	2000	1000	5.5
72	18	3/16	182.6	2000	1000	5.5