PARTS & ACCESSORIES:
EATON DUPLEX BASKET STRAINERS
MODEL 53BTX & 50

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FEATURES

MODEL 53BTX DUPLEX (3/4” TO 4”)

- Dynamic sealing design for long life
- Easy-to-operate lever handle — no gear box required
- Unique seat and seal design requires no adjustments
- PTFE seats for longer service life
- Foot pads for rock solid installation
- Double-stem O-rings for positive sealing
- Easy to access body vent valve
- Side drain plugs on each basket well
- Piston seal strainer basket cover
- Easy access for diverter cartridge removal
- 316 stainless steel ball design

MODEL 50 DUPLEX (5”, 6”, 8”)

- Continuous flow, no shutdown for basket cleaning
- Rugged tapered plug design
- Lift jack prevents galling of the plug
- Quick open cover—no tools needed
- Large capacity baskets
- Threaded drain
- Machined basket seat
- Perforated or mesh 316 stainless steel basket

OPTIONS

- Iron, Carbon Steel, Stainless Steel
- Basket perforations from 1/32” to 1/2”
- Basket mesh from 20 to 400
- Vent valves
- Drain valves
- Gauge/vent taps - 1/4” NPT
- Differential pressure gauges, with or without switches
- Magnetic separators installed in the strainer basket for removing fine ferrous particulate matter from the process media

PARTS & ACCESSORIES:
EATON DUPLEX BASKET STRAINERS
MODEL 53BTX & 50

TO SELECT A STRAINER:

STEP 1

Determine the objective of the strainer:

Protect the pump, protect components in the system or to remove unwanted contaminants from the fluid.

If the objective is to strain the fluid, select the appropriate size mesh opening size (see at right – Table 1A).

NOTE: A strainer, even with a 100 mesh basket, may not provide total protection for the pump. Particles of 0.0055" size can pass through a 100 mesh strainer. On a "K" size pump, the mean radial clearance between the rotor and casing is only 0.003". This means that the 0.0055" particles are larger than the radial clearance, which can result in some wear between the casing and the rotor. On smaller pumps, particle size is more critical since the mean radial clearance between the rotor and casing on a "F" pump is less than 0.001". For small pumps, a strainer with a 20 mesh basket is highly recommended.

In many cases, a perforated basket is used to strain any large foreign object which can jam or cause breakage of the rotor or idler. A strainer comes with a standard perforated basket based on size (see at right - Table 1B).

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	0.0015	38	36.0

TABLE 1A
Mesh Basket Sheet

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

TABLE 1B
Perforated Basket Sheet

STEP 2

Determine correction factor for baskets using viscosity of the liquid in Table 2.

EXAMPLE: 60 Mesh basket with 2,000 SSU liquid = 2.7.

VISCOSITY (SSU)	UNLINED PERFORATED BASKET	40 MESH LINED BASKET	60 MESH LINED BASKET	80 MESH LINED BASKET	100 MESH LINED BASKET	200 MESH LINED BASKET	325 MESH LINED BASKET
30 (water)	1	1.2	1.4	1.6	1.7	2.0	2.5
500	1.6	1.9	2.1	2.4	2.6	3.1	3.6
1000	1.7	2.2	2.4	2.6	2.8	3.3	3.8
2000	1.9	2.4	2.7	2.9	3.2	3.8	4.0
3000	2.0	2.6	2.9	3.2	3.5	4.1	4.3
5000	2.2	3.0	3.5	4.0	4.5	5.3	6.3
10000	2.5	3.5	4.2	5.0	6.0	7.1	8.5

TABLE 2

STEP 3

Divide maximum recommended clean strainer pressure drop of 2 PSI by the correction factor from Step 2.

This gives the maximum corrected pressure drop in units of water.

Example:

2 PSI / 2.7 (correction factor from Step 2) = 0.74 PSI

STEP 4

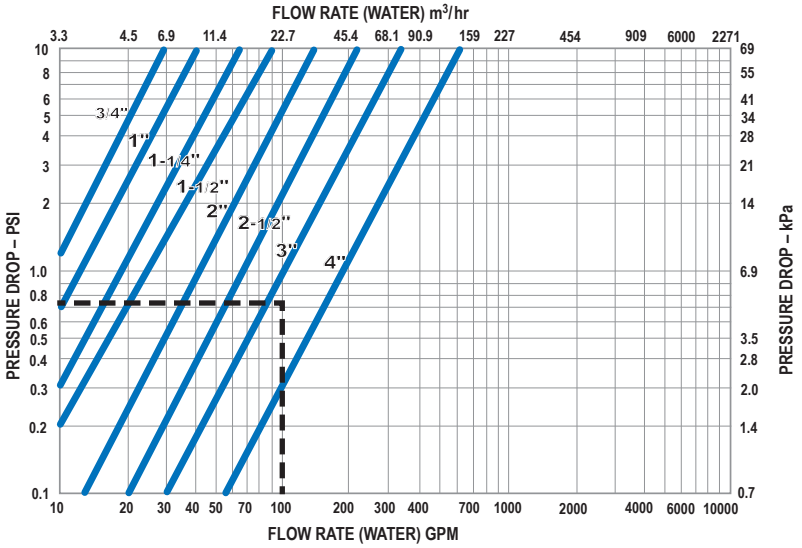
Determine the size of strainer using the pressure drop curves.

With the corrected pressure drop from Step 3 and the flow rate in GPM, determine the maximum size of the strainer. Any larger size strainer will improve pressure drop.

Example:

100 GPM with a max pressure drop of 0.74 PSI determines a 4" strainer size or larger is to be selected.

Note: For Duplex Strainers, refer to pressure drop curves for Model 53BTX (3/4" – 4") on page 4 or Model 50 (5", 6", 8") on page 5.



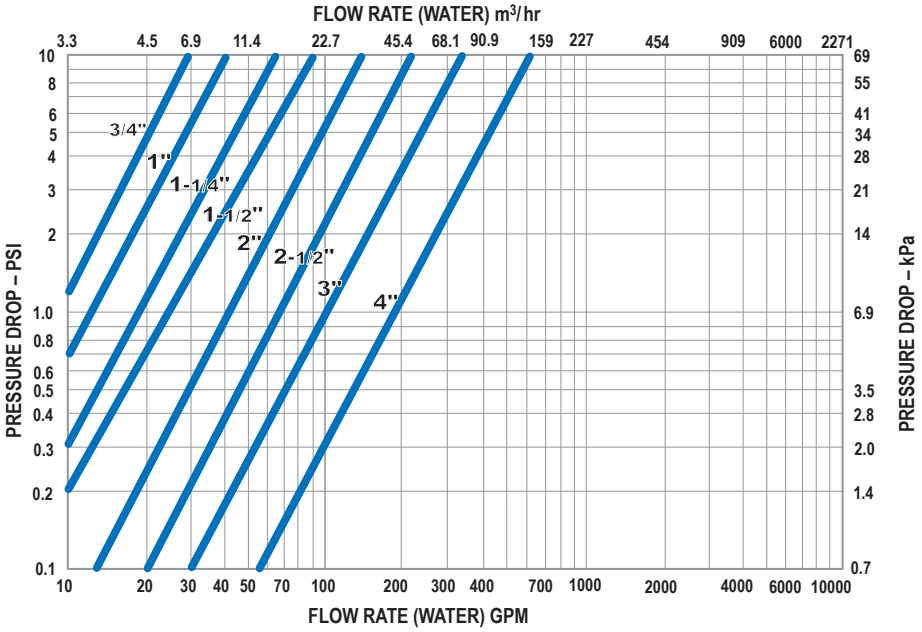
STEP 5

Determine your material & porting type requirements from the selection chart.

MODEL 53BTX SELECTION CHART				
Size	**Body & Cartridge Material**	**End Connections**	**Seat / Seal**	**Diverter Balls**
3/4", 1", 1-1/4", 1-1/2", 2", 2-1/2"	Iron	Threaded	TFE/Buna-N*	Stainless Steel
3/4", 1", 1-1/4", 1-1/2", 2"	Carbon Steel	Threaded	TFE/Buna-N*	Stainless Steel
3/4", 1", 1-1/4", 1-1/2", 2"	Stainless Steel	Threaded	TFE/FKM	Stainless Steel
1", 1-1/2", 2", 2-1/2", 3", 4"	Iron	Flanged 125#	TFE/Buna-N*	Stainless Steel
1", 1-1/2", 2", 2-1/2", 3", 4"	Carbon Steel	Flanged 150#	TFE/Buna-N*	Stainless Steel
1", 1-1/2", 2", 2-1/2", 3", 4"	Stainless Steel	Flanged 150#	TFE/FKM	Stainless Steel

PARTS & ACCESSORIES:
EATON DUPLEX BASKET STRAINERS
MODEL 53BTX & 50

SPECIFICATIONS: MODEL 53BTX (3/4” TO 4”)



SELECTION CHART

Size	Body & Cartridge Material	End Connections	Seat / Seal	Diverter Balls
3/4", 1", 1-1/4", 1-1/2", 2", 2-1/2"	Iron	Threaded	TFE/Buna-N*	Stainless Steel
3/4", 1", 1-1/4", 1-1/2", 2"	Carbon Steel	Threaded	TFE/Buna-N*	Stainless Steel
3/4", 1", 1-1/4", 1-1/2", 2"	Stainless Steel	Threaded	TFE/FKM	Stainless Steel
1", 1-1/2", 2", 2-1/2", 3", 4"	Iron	Flanged 125#	TFE/Buna-N*	Stainless Steel
1", 1-1/2", 2", 2-1/2", 3", 4"	Carbon Steel	Flanged 150#	TFE/Buna-N*	Stainless Steel
1", 1-1/2", 2", 2-1/2", 3", 4"	Stainless Steel	Flanged 150#	TFE/FKM	Stainless Steel

FKM standard for SSTL, optional for iron, bronze and carbon steel.

PRESSURE RATING

Size	Rating
3/4”, 1”, 1-1/4”, 1-1/2”, 2”, 2-1/2”, 3”, 4”	200 psi @ 100°F

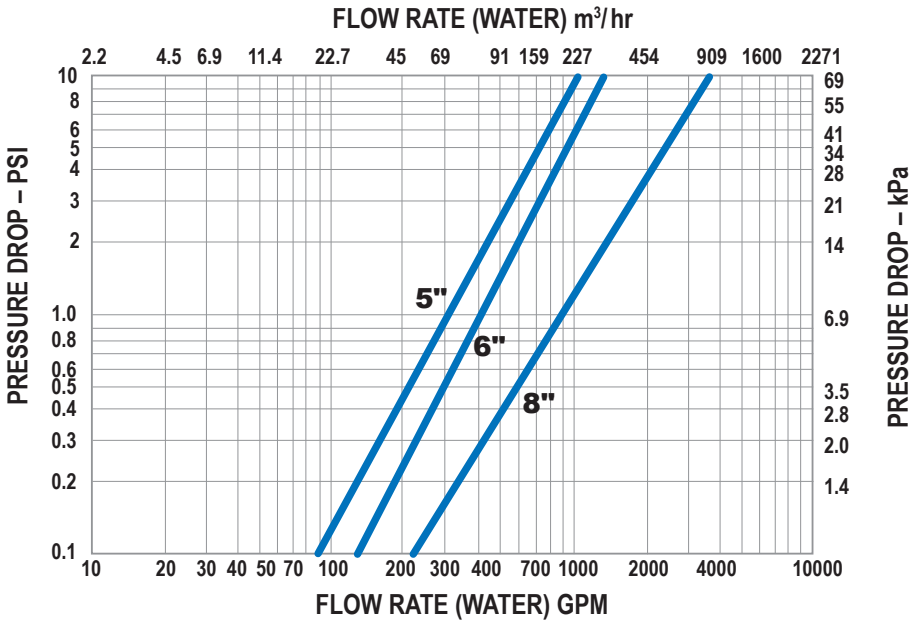
MODEL NUMBERING CODE

Model #	Port Size	Flange Class	Pipe Connection	Body & Cartridge Material	Elastomer Material	Basket (Perf or Mesh)	
						Code	Baskets
ST053	007 (3/4") 010 (1") 012 (1-1/4") 015 (1-1/2") 020 (2") 025* (2-1/2") 030 (3") 040 (4")	A (125#) Cast Iron B (150#) Steel & Stainless	F (Flat Face Flange) Cast Iron R (Raised Face Flange) Steel & Stainless T (Threaded)	22A (Stainless/Stainless) 33TS (Steel/Steel) 46TS (Cast Iron/Ductile Iron)	- B (Buna) - V (FKM)	-P033 -P045 -P062 -P125 -P156 -P250 -P375 -P500	**PERF:** 1/32” 3/64” 1/16” 1/8” 5/32” 1/4” 3/8” 1/2”
						-M020 -M040 -M060 -M080 -M100 -M150 -M200 -M325 -M400	**MESH:** 20 40 60 80 100 150 200 325 400

EXAMPLE:
2”, Iron, Threaded Ports, Buna Elastomers, 40 Mesh Baskets
Part # ST053020AT46TS-B-M040

*Only available in Cast Iron

SPECIFICATIONS: MODEL 50 (5”, 6”, 8”)



SELECTION CHART				
Size	**Body Material**	**Plug Material**	**End Connections**	**Seals**
5", 6", 8"	Iron	Bronze	Flanged 125#	Buna-N
6", 8"	Carbon Steel	Bronze	Flanged 150#	Buna-N
6", 8"	Stainless Steel	Stainless Steel	Flanged 150#	FKM

RATING	
Size	**Rating**
5"	200 psi @ 100°F
6"	200 psi @ 100°F
8"	150 psi @ 100°F

DIN flanges available in 6” only.

MODEL NUMBERING CODE

Model #	Port Size	Pipe Connection	Body Code	Diverter	Elastomer Material	Basket (Perf or Mesh) Code	Basket (Perf or Mesh) Baskets
ST050	0500* (5") 0600 (6") 0800 (8")	F (Flat Face Flange) * R (Raised Face Flange) [2]	2 (Stainless Steel w/ 150# Flanges) 3 (Carbon Steel w/ 150# Flanges) 4 (Cast Iron w/ 125# Flanges)	1C (Bronze) [1] 2C (Stainless Steel) [2]	- B (Buna) - V (FKM) - T (PTFE) - E (EPDM)		**PERF:**
						-P033	1/32”
						-P045	3/64”
						-P062	1/16”
						-P125	1/8”
						-P156	5/32”
						-P250	1/4”
						-P375	3/8”
						-P500	1/2”
							MESH:
						-M020	20
						-M040	40
						-M060	60
						-M080	80
						-M100	100
						-M150	150
						-M200	200
						-M325	325
						-M400	400

EXAMPLE:
6”, Stainless Steel, Flanged Ports, FKM Elastomers, 1/4” Perforated Baskets
Part # ST0500600F22C-V-P250

* Only available in Cast Iron

1 Cast Iron or Steel strainers only

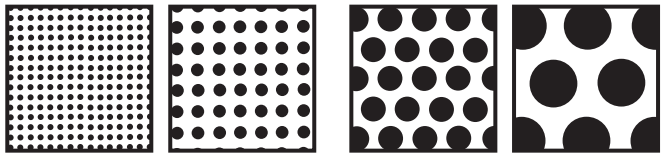
2 Steel or Stainless Steel only

PARTS & ACCESSORIES:
EATON DUPLEX BASKET STRAINERS
MODEL 53BTX & 50

BASKET DATA

Pattern Examples (ACTUAL SIZE):

STRAIGHT HOLES: STAGGERED HOLES:



1/32” 1/16” 1/8” 1/4”

Basket Design

Designed to be both effective and durable, the basket is the heart of an Eaton strainer. Eaton supplies baskets for duplex strainers in standard and heavy-duty designs. Standard design baskets meet the needs of most applications. Eaton recommends the heavy duty design in cases when straining an extremely high viscosity material or experiencing a high solids load.

Eaton baskets are available in 316 stainless steel. A wide range of perforations and mesh provides removal of solids from 1/2” down to as low as 40 microns.

Basket Construction

Each style basket includes a perforated sheet induction welded to a rigid top ring and solid bottom cap. Special attention to the welds along the perforated sheet seam, prevent the possible bypass of solids and maintain the basket’s strength. A handle, welded to the I.D. of the top ring, facilitates 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 inside the top ring and bottom cap.

Perforated Sheet - Specification

Eaton baskets utilize perforated sheets because of their greater inherent strength and resistance to stress cracking. The percentage of open area of a screen generally dictates the internal pressure drop experienced across it. The objective is to select a perforation with the best balance of open area, hole arrangement, and sheet thickness.

Perforated Sheet - Open Area

Perforated sheets can have an open area from 15% to 75%. In general, the larger the open area of perforated sheet, the thinner the sheet thickness must be. Holes punched closer together increase the perforated open area; the solid portion between holes distorts and becomes weak. 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 have between 28% to 63% 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 either in a straight line or in a staggered pattern. Eaton baskets have a staggered pattern that increases the open area, provides extra strength, and creates less pressure drop.

Perforations

Eaton baskets are available in 1/32”, 3/64”, 1/16”, 1/8”, 5/32”, 1/4”, 3/8”, and 1/2” perforations and in mesh sizes 20, 40, 60, 80, 100, 200, 325, and 400. However, for general service there is one perforation for each size and type of strainer. Unless specified, this standard perforation is the size furnished with the strainer.

Openings

Standard wire mesh liners for Eaton baskets are available from 20 to 400 mesh. For any size mesh, there are 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

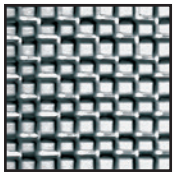
The open area of wire mesh is a function of both the weave and the wire diameter. Eaton uses a plain square weave in most cases because its straight-through flow path creates the least pressure drop. The mesh is reinforced with a perforated metal backing possessing greater than a 60% open area. This combination affords the greatest degree of strength, yet offers a lower pressure drop than other types of wire mesh. Eaton can supply baskets with open areas from 14% to 46%.

BASKET DATA CONT'D

Wire Mesh Specifications

Eaton strainers are available with woven wire mesh screens. Wire mesh provides smaller openings for very fine straining applications down to 40 microns. Eaton baskets use monofilament mesh possessing equal wire size and wire count in both directions to produce square openings.

Plain Square Weave



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

Mesh Liners Available

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

Basket Effective Area

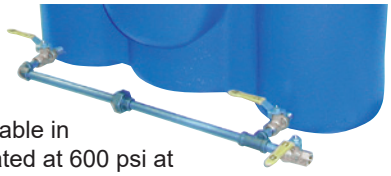
Strainer Model	Pipe Size	Perforation Size	Nominal Area Of Pipe (Sq In)	Gross Screen Area (Sq In)	Free Area (Sq In)	Ratio Free Area To Pipe Area
53BTX	3/4	1/32	0.53	19.8	5.5	10.4
53BTX	1	1/32	0.86	19.8	5.5	6.4
53BTX	1 1/4	1/8	1.49	45.0	22.0	14.4
53BTX	1 1/2	1/8	2.03	45.0	22.0	10.6
53BTX	2	1/8	3.35	65.0	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
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

OPTIONS

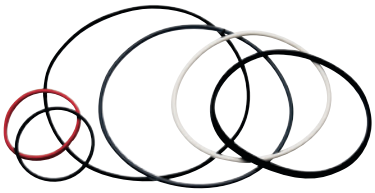
Magnetic Inserts

In some applications, particularly where fluids are involved in machining processes, microscopic iron or steel particles may be present. These could pass through even the finest mesh screen. Magnetic inserts in the strainer basket catch these particles before they can pass through the mesh lining. Guaranteed to retain their magnetism indefinitely, the powerful Alnico magnets, completely encased and sealed in a 1/8" thick, type 316 stainless steel shell, prevent contamination or corrosion. Each magnet's capacity is 1300 gauss.

Drain Valves



These ball type valves, used to drain the strainer housing, are available in brass or stainless steel, rated at 600 psi at 100 °F with either 1/4" or 1/2" NPT connections.



Elastomer Seals

If the standard seals on a pipeline strainer are not suitable for a specific application, Eaton offers a variety of special seals that include EPDM, FKM, Buna-N, and TFE-encapsulated.

Differential Pressure Gauge

This gauge shows the pressure differential across the strainer and helps determine when to change out the strainer basket. It has a 0 - 30 psid pressure range and features a 3-1/2" gauge face. Rated at 3000 psi, it comes with a 1/4" NPT connection in either brass or stainless steel.

Heavy-Duty Strainer Baskets

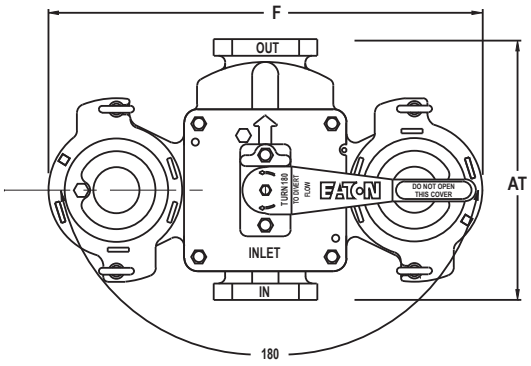
For very demanding applications, heavy-duty construction baskets are extremely rugged and stand up to the most abusive conditions. Heavy duty strainer baskets have a metal banding spot welded at top and middle to provide extra support for difficult applications.

PARTS & ACCESSORIES:
EATON DUPLEX BASKET STRAINERS
MODEL 53BTX & 50

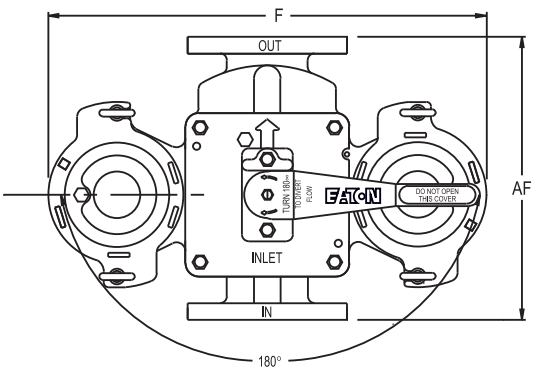
DIMENSIONS - 53BTX (3/4” TO 4”)

These dimensions are average and not for construction purposes. Certified prints on request.

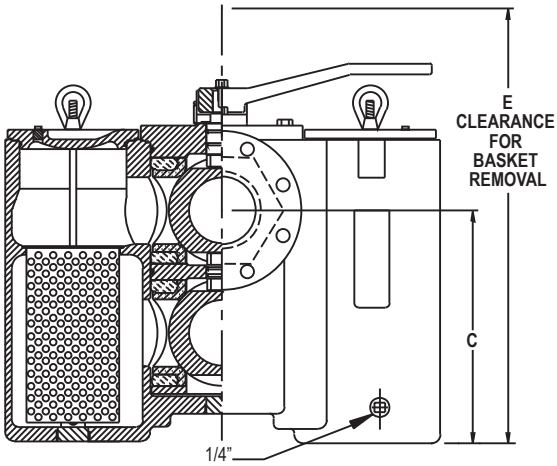
TOP VIEW THREADED MODEL



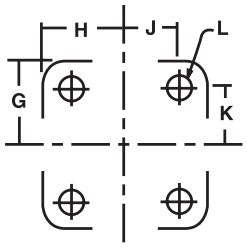
TOP VIEW FLANGED MODEL



FRONT VIEW FLANGED AND THREADED MODELS



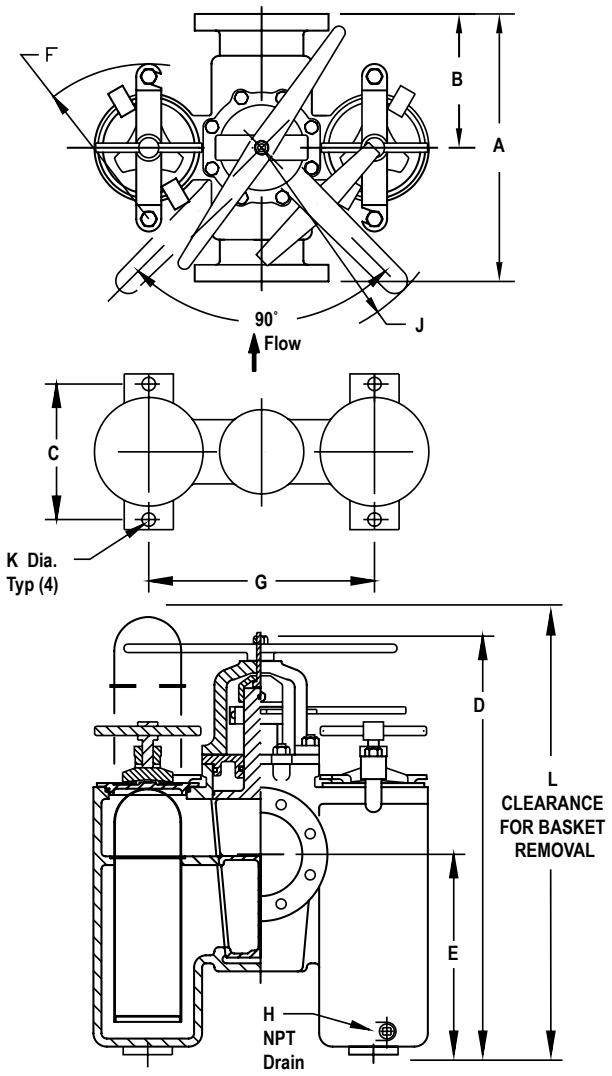
FOOT PAD LAYOUT



Pipe Size	DIMENSIONS - in (mm)										WEIGHT - lb (kg)			
											IRON		CARBON & SS	
	AF	AT	C	E	F	G	H	J	K	L	FLANGED	THREADED	FLANGED	THREADED
3/4	—	5.50 (140)	5.00 (127)	13.38 (340)	10.50 (268)	3.25 (83)	2.13 (54)	1.63 (41)	2.75 (70)	3/8	—	37 (17)	—	41 (19)
1	6.88 (175)	5.50 (140)	5.00 (127)	13.38 (340)	10.50 (268)	3.25 (83)	2.13 (54)	1.63 (41)	2.75 (70)	3/8	42 (19)	37 (17)	47 (21)	41 (19)
1 1/4	6.88 (175)	7.50 (190)	6.81 (173)	17.00 (432)	13.25 (330)	3.25 (83)	2.13 (54)	1.63 (41)	2.75 (70)	3/8	—	80 (36)	—	89 (40)
1 1/2	9.38 (238)	7.50 (190)	6.81 (173)	17.00 (432)	13.25 (330)	3.25 (83)	2.13 (54)	1.63 (41)	2.75 (70)	3/8	90 (41)	80 (36)	100 (45)	89 (40)
2	10.63 (270)	10.00 (254)	8.38 (213)	21.75 (552)	17.38 (441)	4.69 (119)	2.50 (64)	1.81 (46)	4.00 (102)	5/8	167 (76)	157 (71)	185 (84)	174 (79)
2 1/2	10.75 (273)	10.00 (254)	8.38 (213)	21.75 (552)	17.37 (441)	4.69 (119)	2.50 (64)	1.81 (46)	4.00 (102)	5/8	183 (83)	157 (71)	203 (92)	—
3	13.50 (343)	—	8.88 (226)	26.50 (673)	22.75 (578)	4.69 (119)	2.50 (64)	1.81 (46)	4.00 (102)	5/8	285 (129)	—	432 (196)	—
4	16.00 (406)	—	13.25 (337)	33.00 (838)	24.75 (629)	5.19 (132)	3.94 (100)	3.25 (83)	4.50 (114)	5/8	389 (177)	—	432 (196)	—

DIMENSIONS - MODEL 50 (5”, 6”, 8”)

These dimensions are average and not for construction purposes. Certified prints on request.



DIMENSIONS - in (mm)												WEIGHT - lb (kg)		
Pipe Size	A	B	C	D	E	F	G	H	J	K	L	Cast Iron	Carbon Steel	Stainless Steel
5	18.38 (467)	9.00 (229)	9.75 (248)	33.25 (845)	14.75 (375)	10.25 (260)	17.19 (437)	3/8 —	19.75 (502)	0.56 (14)	41.00 (1041)	403 (183)	— —	— —
6	22.00 (559)	12.88 (327)	12.50 (318)	36.25 (921)	19.50 (495)	11.75 (298)	20.75 (527)	3/8 —	19.75 (502)	0.63 (16)	42.00 (1067)	500 (227)	580 (263)	615 (279)
8	25.00 (635)	14.00 (356)	17.00 (432)	50.63 (1286)	23.06 (586)	— —	30.75 (781)	1/2 —	28.00 (711)	0.94 (24)	56.00 (1422)	1500 (682)	1610 (732)	1670 (759)

PRESSURE DROP CALCULATIONS

Pressure drops for Eaton strainers are shown on each product page. The curves are based on the flow of water through clean, perforated baskets. For mesh-lined baskets and/or for fluids other than water, use the correction factors listed on this page. To accurately calculate the pressure loss for filters and strainers in a pipeline, proceed as follows:

1 First calculate pressure loss using Cv factor formula at right.

2 Take the pressure loss figure obtained in (1) and recalculate it using the appropriate correction factor from Table 2 on page 2.

CORRECTION FACTORS FOR MESH-LINED BASKETS

First – Multiply the pressure drop for water shown in the section charts on pages 4-5 by the specific gravity of the liquid.

Second – Multiply the corrected pressure drop figure by the following correction factors for more viscous liquids. (Water has a viscosity of 30 SSU.)

C_V FACTORS*	
Size	Value
3/4"	13
1"	13
1-1/4"	18
1-1/2"	25
2"	42
2-1/2"	65
3"	110
4"	175
5"	300
6"	420
8"	900

* For water with clean, perforated basket

PRESSURE LOSS CALCULATION USING CV FACTOR

METRIC UNITS:

$$\Delta P = \left[\frac{Q}{C_V}\right]^2 (133.6)$$

ΔP = Pressure Drop in kPa

Q = Flow in m3/h

CV = Flow Coefficient

STANDARD UNITS:

$$\Delta P = \left[\frac{Q}{C_V}\right]^2$$

ΔP = Pressure Drop in psi

Q = Flow in gpm

CV = Flow Coefficient

The pressure loss across a strainer can be calculated using the system's flow rate and the Cv factor for that strainer.

For example, a 5" Model 50 duplex strainer with a perforated basket has a Cv factor of 300. In water service with a 300 gpm flow rate, it will have a 1.0 psi pressure drop (300 ÷ 300)2 = 1.0. For mesh-lined baskets and/or fluids with a viscosity greater than water, multiply the pressure drop by the correction factors in Table 2 on page 2.