EATON DUPLEX BASKET STRAINERS

Excellent for Applications Where Pipelines Cannot be Shut Down for Basket Changeout

A duplex or double basket strainer can operate continuously and never has to be shut down for cleaning. This type of basket strainer has two separate strainer basket chambers, not just one like a simplex strainer. These chambers are put into service independently. When one basket chamber becomes full, the flow is switched to the other one. The strainer basket is then removed from the out-of-service chamber, cleaned and replaced, ready for use again.

For over 75 years, hundreds of thousands of Eaton Duplex Strainers have been installed all over the world to remove unwanted material from every conceivable kind of industrial fluid.

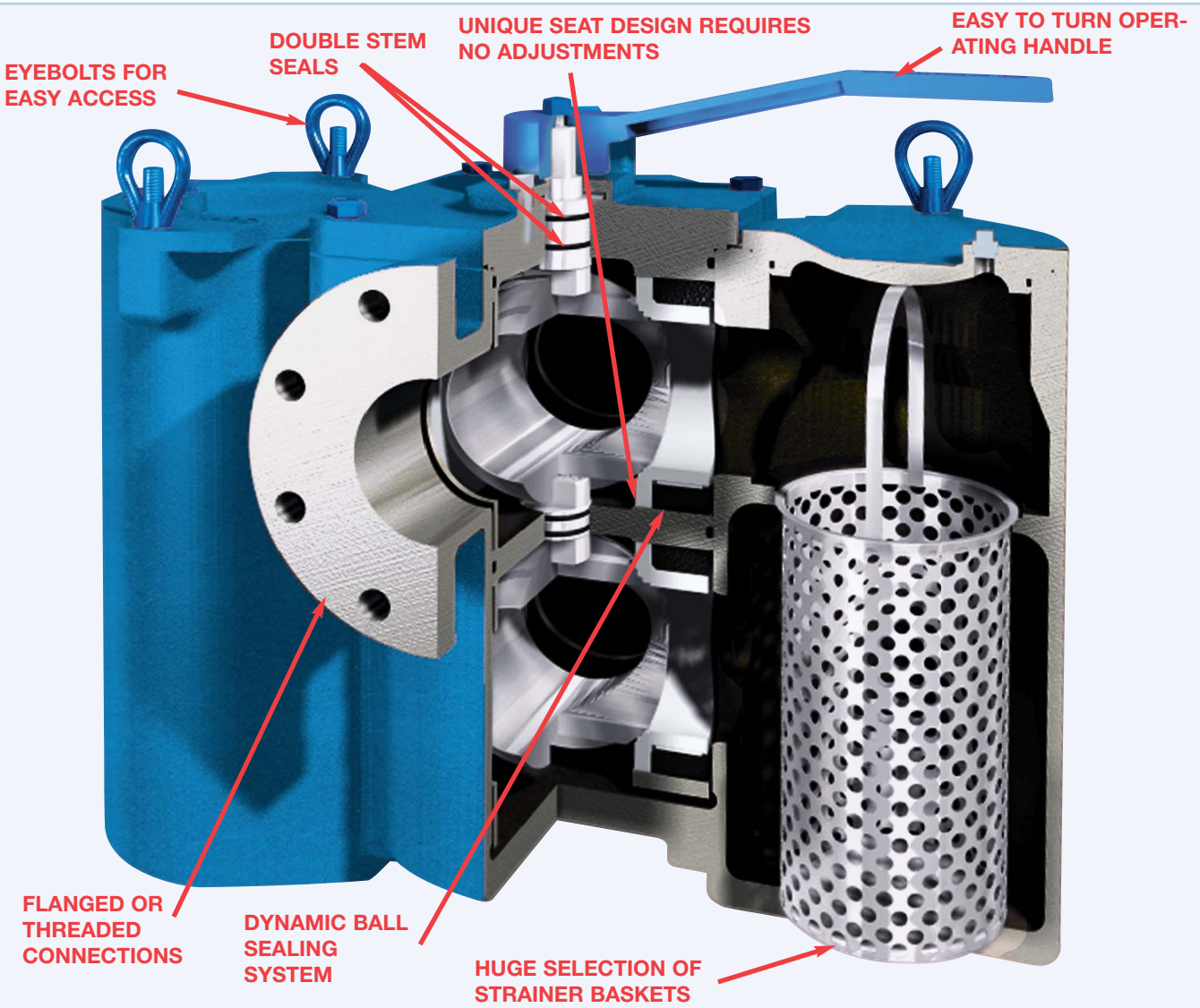
Examples of where duplex strainers are used: in continuously running lubrication systems where the flow of oil cannot be stopped, cooling lines in places like power plants where the cooling water must always run, industrial heating and power systems where the fuel lines must never be stopped. Many chemical operations must run continuously and a duplex strainer in the line provides assurance that auxiliary equipment will not plug and stop functioning.

The most important design component of a duplex strainer is the method by which flow is diverted between the two strainer basket chambers. There are several cost efficient and reliable Eaton strainer designs available depending on the physical size of the strainer.

Smaller sizes, up to 4″, utilize a patented diverter cartridge to switch the flow from one chamber to another. This cartridge completely shuts off the flow to the out-of-service chamber – making it easy to service the basket.

Eaton duplex strainers in 5″, 6″, and 8″ sizes use a tapered plug to switch the flow. This simple, time-tested design has few parts and requires little maintenance.

For larger size duplex strainers, there are two different designs. Duplex strainers in sizes 10″ to 18″ have a butterfly valve flow



Cutaway view of Model 53BTX duplex strainer illustrates all major components – and gives a clear indication of the simplicity of the system.

diverter assembly which results in a very compact unit for strainers of this size. Strainers up to 36″ in size have a special hand-wheel-operated sliding gate mechanism and a multi-basket design.

No matter what the design, Eaton Duplex Basket Strainers have been engineered to perform to specification year in and year out, in the most demanding industrial and commercial applications. If your application is unique and one of our standard duplex strainers won't work, contact us. We can work with you to custom design and fabricated one that will. Over the past 75 years we have engineered duplex basket strainers for just about every conceivable application….why look anywhere else?

Model 53BTX ball-type strainer, in sizes from 3/4″ to 4″, uses a dynamic ball sealing system which keeps the out-of-service strainer basket chamber from filling with fluid while the basket is being changed. A unique diverter cartridge is easy to remove for service.

The Model 50 duplex strainer is for 5″, 6″ and 8″ pipelines where the process cannot be shut down for basket change out. A tapered plug is used to divert flow from one basket to the other.

Duplex all-plastic basket strainers are ideal for service where corrosion or contamination of the process fluid could be a problem. Plus… these strainers do not have to be painted or coated to survive a difficult environment.
Available in sizes up to 4″.

For higher flow rates that require a duplex strainer, the large-size Model 50 switches flow between baskets with a built-in butterfly valve. This design is also compact and can be important when space is at a premium. Available in 10″ to 18″ sizes.

For handling very large volumes of water, and for quick and easy basket change out, the Model 570 includes 4 baskets per chamber. Flow is switched by a sliding gate mechanism operated by a hand wheel. Available in sizes from 8″ to 36″.

MODEL 53BTX BALL TYPE DUPLEX BASKET STRAINER

Sizes 3/4″ to 4″ • Iron, Bronze, Carbon Steel or Stainless Steel • Threaded or Flanged

Easy Basket Changeout

Patented diverter cartridge assures leak-tight isolation of basket chamber during cleaning.

No more rushing to finish the job before the out-of-service chamber overflows. And...with no overflow, there's no cleanup.

Features

- Dynamic ball sealing system for long life… patent pending
- Easy-to-operate lever handle… no gear box required
- Unique seat and seal design requires no adjustments
- Reinforced polymer seats for longer service life
- Foot pads for rock solid installation
- Double-stem O-rings for positive sealing
- Easy-to-access body vent valve
- Both side and bottom drain plugs on each basket well
- Piston seal strainer basket cover
- Easy access for diverter cartridge removal
- Optional steam jacket construction

No-Hassle Strainer Basket Servicing

Eaton duplex strainers remove dirt and debris from pipelines and protect sensitive system components. The Model 53BTX, features a design that makes strainer basket servicing a no-hassle operation. No more ″race against the clock″ during basket servicing to get the job done before the basket chamber overflows with fluid. The Model 53BTX keeps the chamber dry during service. This gives you time to clean or replace the strainer basket without ever having to worry about leakage and overflow. And…without overflow, there's no need to clean up after servicing the strainer basket. The Model 53BTX is simply a better way to work.

A Better Duplex Strainer Design

A unique flow diverter valve cartridge in the Model 53BTX isolates the two strainer basket chambers and prevents fluid bypass. An easy-to-turn handle operates the cartridge and diverts the system flow from one chamber to the other—the flow in the pipeline is never shut off.

When a strainer basket needs to be cleaned, the lever handle is turned to take it out of service and to divert the flow through the other chamber. The position of the handle clearly indicates at all times which chamber is in service.

No special tools are needed to access the strainer basket for cleaning. The chamber is first drained and then the cover is lifted and swung clear of the chamber opening. The dynamic diverter cartridge seals prevent fluid bypass into the out-of-service chamber—making for easy, hassle-free strainer basket servicing.

A Better Flow Diverter Cartridge

The heart of the Model 53BTX is the unique flow diverter cartridge that features a patent pending, highly dynamic sealing system on the diverter balls that ensures exceptionally long seat life and positive sealing. This design works so well that there is no need for manual internal

Selection Table

Size	Body & Cartridge Material	Connection	Seat/Seal	Diverter Balls	Rating Standard (Metric)
3/4″, 1″, 1-1/4″, 1-1/2″, 2″, 2-1/2″	Iron	Threaded	TFE/ Buna N*	Stainless Steel	125# ANSI 200 PSIG @ 150F (PN16 13.8 bar @66C)
1″, 1-1/2″, 2″, 2-1/2″, 3″, 4″		Flanged			
3/4″, 1″, 1-1/4″, 1-1/2″, 2″, 2-1/2″	Bronze Carbon Steel Stainless Steel	Threaded**			150# ANSI 200 PSIG @ 150F (PN16 13.8 bar @66C)
1″, 1-1/2″, 2″, 2-1/2″, 3″, 4″		Flanged			

*Viton® standard for SSTL, optional for iron, bronze and carbon steel. DIN flanges and BSP threads available.
**2-1/2″ threaded not available in carbon or stainless steel.

1″ stainless steel Model 53BTX with flanged connection

or external ball support adjustments—and the low operating torque means the strainer can be operated with an easy-turn lever handle. A gear box is not needed.

A double sealing system on both the upper and lower stems guards against any possible leakage. Special reinforced polymer seats are used for extended service life.

Should cartridge service become necessary, it's easy to accomplish. Just remove four bolts and the cartridge comes right out through the top of the strainer. There's no need to take the strainer completely apart or to remove it from the line.

Better for All Applications

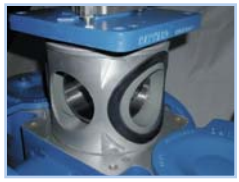
The compact, low profile Model 53BTX fits into spaces ordinary strainers might not, yet it still uses full-size strainer baskets with a low pressure drop performance.

And, there's a strainer basket for every application. The standard basket is made of Type 316 stainless steel; however, if required, Monel, Brass or Hastelloy C materials are available. Baskets with openings from 3/4″ down to 45 microns are offered: choose the best size for your application—with no compromises.

For easy basket servicing there are two drain plugs, not just one, on each strainer basket chamber. Additionally, there is an easy-to-access vent valve on top of the strainer body.

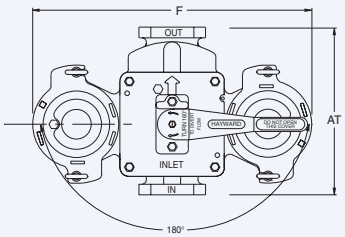
Finally, standard foot mounting pads insure a rock solid installation no matter where the strainer is installed.

Available options for the Model 53BTX include differential pressure gauges, with or without switches, and magnetic separators installed in the strainer basket for removing fine ferrous particulate matter from the process media.

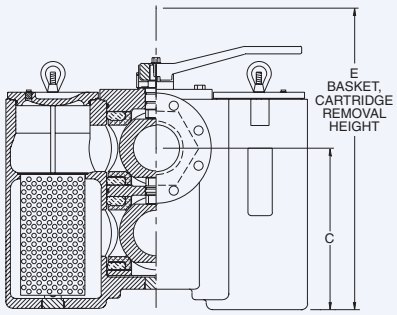


Should the diverter valve require service, it slides right out the top of the strainer body. A minimum of parts, easily replaced, makes service a snap. Exploded view shows simplicity of design.

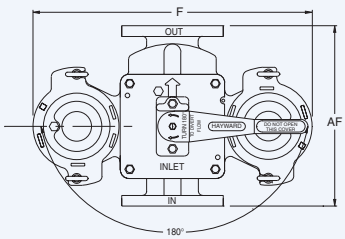
Technical Details



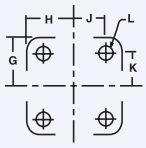
Top View Threaded Model



Front View Flanged and Threaded Models



Top View Flanged Model



Foot Pad Layout

Dimensions and weights are for reference only. Contact us for certified drawings.

Dimensions (in / mm)

Pipe Size	AF	AT	C	E	F	G	H	J	K	L	Weight – Iron Flanged lb / kg	Weight – Iron Threaded lb / kg	Weight – Bronze Flanged lb / kg	Weight – Bronze Threaded lb / kg	Weight – Carbon & SS Flanged lb / kg	Weight – Carbon & SS Threaded lb / kg
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	—	46 / 21	—	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	52 / 24	46 / 21	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	—	100 / 45	—	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	113 / 51	100 / 45	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	209 / 95	197 / 90	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	229 / 104	197 / 90	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	—	357 / 162	—	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	—	487 / 221	—	432 / 196	—

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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 or screens. For mesh-lined baskets or screens 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 C_V factor formula at right.
2. Take the pressure loss figure obtained in (1) and recalculate it using the appropriate correction factor from the following table.

Correction Factors for Mesh-Lined Baskets

First – Multiply the pressure drop for water shown in charts 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.)

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)	0	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

Strainer Basket Opening Equivalents

Mesh	Inches	Millimeters	Microns
400	0.0015	0.0381	38
300	0.0018	0.0457	45
250	0.0024	0.0609	60
200	0.0027	0.0686	68
150	0.0041	0.1041	104
100	0.0065	0.1651	165
80	0.007	0.1778	177
60	0.009	0.2286	228
40	0.015	0.8636	380
20	0.034	0.8636	862

Perf	Inches	Millimeters	Microns
1/32	0.033	0.838	838
3/64	0.045	1.143	1143
1/16	0.070	1.778	1776
3/32	0.094	2.387	2387
1/8	0.125	3.175	3175
5/32	0.150	3.810	3810
3/16	0.1875	4.762	4762
1/4	0.250	6.350	6350
3/8	0.375	9.525	9525
1/2	0.500	12.700	12700

Pressure Loss Calculation Using C_V Factor

Metric Units

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

ΔP = Pressure Drop in kPa
Q = Flow in M^3/hr
C_V = Flow Coefficient

Standard Units

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

ΔP = Pressure Drop in psi
Q = Flow in gpm
C_V = Flow Coefficient

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

For example, a 1" Model 72 simplex strainer with a perforated basket has a C_V factor of 22.5. In water service with a 30 gpm flow rate, it will have a 1.7 psi pressure drop $(30 \div 22.5)^2 = 1.7$. For mesh-lined baskets and/or fluids with a viscosity greater than water, multiply the pressure drop by the correction factors in the chart "Correction Factors for mesh-lined baskets."

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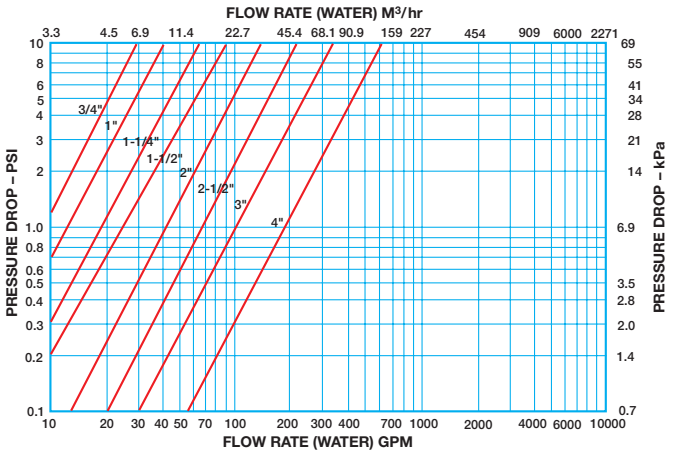
Model 53BTX & 50 Pressure Drop Curves

Pressure Drop vs Flow Rate

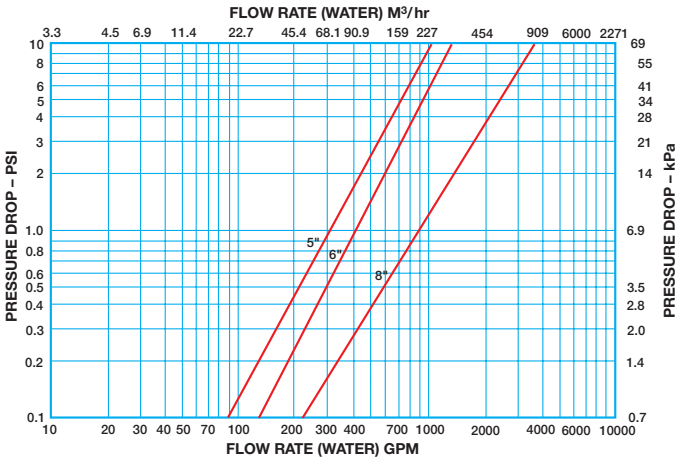
These curves are for clean baskets, without mesh liners—and with water flowing through the strainer.

For mesh-lined baskets and/or for other fluids, you must first compute a correction factor. See Page 29 for full details.

Model 53BTX Duplex – 3/4" Through 4"



Model 50 Duplex – 5" Through 8"



Model 50 Multi-Basket Duplex – 10" Through 18"