



# HAYWARD® FILTRATION

**AUTOMATIC  
SELF-CLEANING  
&  
FABRICATED  
PIPELINE  
STRAINERS**



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Very compact, low-profile design strainers that work in either a vertical or horizontal installation. Available with two types of standard covers and can be adapted to almost any system. Recommended for pump protection.



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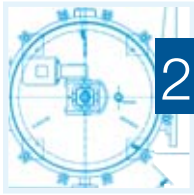
Describes the design of these special strainers and the applications that they are used in.



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# HAYWARD FILTRATION



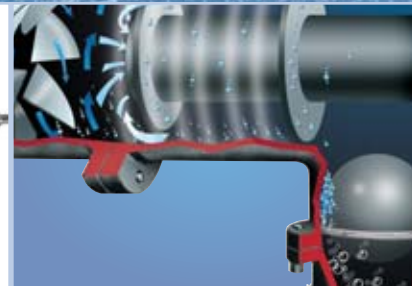
*Thousand of different types of HAYWARD® Filter Bags are available.*



*HAYFLOW™ Filter Element...the next generation of filtration.*



*MAXILINE™ Multi-Bag Filter Housing with QIC LOCK cover for fast filter media change out.*



*WRIGHT-AUSTIN™ Separators remove 99% of moisture and particulate matter from air, gas and steam lines.*

In 1923 Hayward began manufacturing specialty metal valves and industrial flow control products in a small shop in Brooklyn, NY. Since then Hayward Filtration has evolved through strategic acquisitions and technological advances into a global organization supplying solutions to customers' filtration, straining and separation problems around the world. Hayward Filtration has seven manufacturing facilities on four continents, 26 wholly owned subsidiaries and an independent distribution network that today serves customers in over 45 countries.

HAYWARD® Pipeline Strainers are manufactured in an ISO 9001:2000 certified facility in Elizabeth, New Jersey. They are used by industrial and commercial customers to protect their process piping equipment by removing debris from the liquid that flows through pipelines. Products include automatic self-cleaning strainers as well as manual, duplex, simplex and Y strainers. Both cast and fabricated type strainers are made in standard configurations to meet the needs of most applications.

For unique, complex, or specialized applications Hayward's Engineering Group can work with customers to design a strainer to meet the exact requirements of the application with no compromises. Strainers are manufactured in sizes from a tiny 1/2" up to a huge 48" pipeline size.

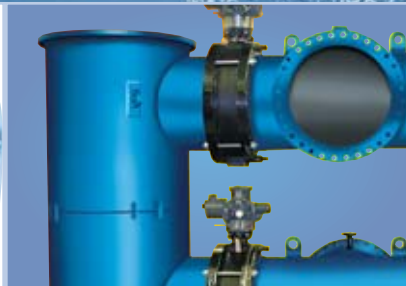
Beginning in the 1980's Hayward began to expand its cast basket strainer product offering with the addition of Y strainers through the acquisition of the Y Strainer Division of the Leslie Corporation in 1981. Gordon Engineering, a manufacturer and designer of fabricated strainers, was acquired in 1985. Automatic-self cleaning strainers were added to Hayward's product line with the acquisition of the Fluid Handling Division of Zurn Industries in 1986.

In 1994 Hayward entered the filtration market with a specialized line of industrial and commercial filtration products. In 1996 the Filtration Division of American Felt

# INTRODUCTION



*Cast iron simplex strainer*



*This duplex strainer for a 36" pipeline illustrates Hayward's custom fabrication capabilities*



*Stainless steel bag filters in both single and double length sizes*



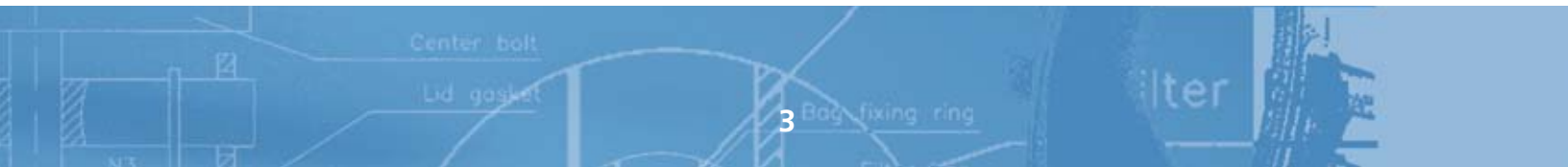
*Gas/liquid separators remove moisture and particulate matter from compressed air, gas or steam lines*

and Filter was acquired adding bag filters and filter media to the product offering. Loeffler Filter-Technique, headquartered in Nettersheim, Germany was acquired in 1998. This greatly increased Hayward's product offering and expanded global sales. In 1999 GAF® Filter Systems was acquired further enlarging the product offering and increasing worldwide sales. Hayward Filtration is now one of the largest manufacturers of bag filtration systems in the world. In 2000 the Loeffler and GAF Filter System product lines were combined under the Hayward name.

Hayward Filtration also manufactures the WRIGHT-AUSTIN™ brand of gas/liquid separators. These separators remove moisture and particulate matter from air, gas and steam lines thus protecting expensive equipment such as turbines. The Wright-Austin Company, established in 1894, was acquired by Hayward in 1996. Hayward Filtration's gas/liquid separator customers can

take advantage of the company's over 100 years experience in separation applications.

Hayward Filtration's greatest achievement over the years has been the development and implementation of a single global product line manufactured worldwide in multiple locations to a common design standard yet in compliance with local code requirements. This manufacturing flexibility lets customers worldwide choose the pipeline strainer, bag filter or gas/liquid separator that meets their exact requirements without compromise. Local Hayward Filtration Sales and Technical Support Specialists are always available to review the needs of an application with the customer and recommend specific solutions. This local support extends from initial purchase, to installation, through start up and beyond.





# HAYWARD FILTRATION

## Professional

## Service

## Satisfaction



ASME Sec. IX certified welders insure the integrity of all HAYWARD® fabricated strainers.



High-speed CNC machining equipment is used to insure conformance to specifications and to maintain the tight tolerances required by Hayward and our customers.



A custom horizontal Model 90 Simplex Strainer ready for shipment to a customer. The strainer has a davit assembly to make cover removal for access to the strainer basket a one person operation.



Component parts are machined to tight tolerance with advanced machining equipment.

# MANUFACTURING CAPABILITIES

## Experience



Skilled workers using the latest technology increase productivity to make HAYWARD fabricated strainers a cost effective choice.



A Model 90 Simplex Strainer during manufacture in Hayward's advanced welding shop.



Automatic Self-Cleaning Strainer during the initial assembly phase of construction. All strainers, no matter how large or complex, are tested three ways... for proper operation, conformance to all specifications, and then they undergo a complete pressure test.



Automatic Self-Cleaning Strainer during a final machining operation. Hayward has the latest equipment so that fabrication operations can be done in house. This insures the integrity of the process, reduces the final cost, and improves lead times.



This large, advanced design plasma cutting machine is just one example of the investment Hayward has made in equipment needed to fabricate almost any type of strainer.

## Nothing Too Big, Too Small or Too Special

When unwanted solid material has to be removed from flowing fluids in order to protect equipment, a HAYWARD® Strainer is the answer. Not only does the strainer protect equipment, it improves productivity by reducing maintenance and down-time.

While Hayward offers the world's most complete line of cast strainers, sometimes, because of space limitations, the need for a special alloy, unique piping connection, cover opening system or size, a custom strainer is required. In these cases, a cast strainer will just not work because often it is not easy or possible to modify the cast metal unit. Hayward solves these application problems by fabricating pipeline strainers to meet the requirements of any straining application.

Fabricated strainers, because they are manufactured one at a time, can be made to fit the exact requirements of the application. There are no trade offs. You get the perfect strainer for your application...you never have to pay for more strainer than you need...or settle for a strainer that won't quite do the job you want it to.

Often it is not necessary to go to the time and trouble to design a strainer from scratch. Hayward has several simplex, duplex, and tee type designs of fabricated strainers. Very often one of these basic designs can be used "as is" or slightly modified with a different cover or piping connection to fit the application.

When a standard design fabricated strainer, even with modifications, will not meet the applications requirements, Hayward's Custom Fabricated Strainer Design Team will work with your engineers to create a unique strainer that will. We have over 75 years experience designing and building fabricated pipeline strainers. Your application might not be as unique as you think. Over the years we've seen thousands of different applications and can often offer a solution to your straining application problem right from our database of special strainer designs.

If you have already created the design parameters of the strainer you need, Hayward is the company to manufacture it for you. We can review the design and suggest changes to improve performance or reduce costs. Our large manufacturing facility with the most up to date equipment and skilled personnel allows Hayward to deliver what others can only promise. With our manufacturing capabilities and investment in equipment, all but the most specialized fabrication work can be done in-house - reducing costs and expediting delivery of your finished strainer.

Getting involved with small shops or manufacturers that contract most of the work out to others will end up costing you time and money and even then the finished product may not be exactly to specification. What happens then? At Hayward our ISO 9001:2000 Quality Assurance Certification insures that the finished product will be exactly as you designed it and that it will perform to specification.



24" Model 2596  
self-cleaning  
strainer.



# SIMPLEX STRAINER MODEL 90

The HAYWARD® Model 90 Fabricated Simplex Strainer has been designed for manufacturing flexibility. It can be made for pipeline sizes from 1" to 48" in carbon steel or stainless steel although other materials can be specified. Three different ratings of flange connections are commonly available: ANSI Class 150, 300, and 600. Higher pressures are also available. The strainer features an in-line design that adapts to most applications.

Two different types of covers are available. The simplest type is the bolted cover which is simple and cost effective and works well in applications where basket changing is infrequent. A davit assembly can also be specified for larger strainers with heavy covers. This makes it possible for a single person to remove the cover of the strainer.

If the strainer will be opened frequently for basket cleaning, a bolted cover can be less effective because of the time needed to remove and then tighten the bolts. For these applications Hayward offers a special, hinged, quick opening cover that is secured by swing bolts. This type of quick opening cover can even be adapted for higher

pressure applications. For medium size strainers, 8" to 16", a bolted slide hinge cover is available. This permits a single operator to open the cover. Hayward can also design and manufacture special covers to meet any applications requirements.

Hayward has designed a special, unique strainer basket for the Model 90 Fabricated Strainer. The basket has a slant top design which improves the flow through the strainer and results in significantly lower pressure drops than would otherwise be the case. The slant top design results in a more compact basket which weighs less than an ordinary basket and makes it possible for a single person to remove it from the strainer housing. A real labor saving feature when it becomes time to clean or change out the basket. Strainer baskets for the Model 90 are made of stainless steel, although almost any type of material can be specified. Basket perforations from 1/32" up to 1" are available and mesh linings in sizes from 20 to 400 mesh for fine straining applications can be specified.

The Model 90 Fabricated Simplex Strainer will meet the requirements of most simplex strainer applications. It is



*8" Model 90 carbon steel with bolted cover.*

## Basket & Screen Effective Area

Strainer Model	Pipe Size in.	Perforation Size - in.	Nominal Area of Pipe (sq in)	Gross Screen Area (sq in)	Free Area (sq in)	Ratio Free Area to Pipe Area
90	2	5/32	3.35	78	49	14.60
90	3	5/32	7.39	94	59	8.00
90	4	5/32	12.73	151	95	7.46
90	5	5/32	20.00	204	128	6.40
90	6	5/32	28.90	283	178	6.16
90	8	5/32	50.02	478	301	6.02
90	10	5/32	78.85	691	435	5.52
90	12	5/32	111.93	942	593	5.30
90	14	5/32	135.28	1320	832	6.15
90	16	5/32	176.71	1659	1045	5.91
90	18	5/32	223.68	1979	1247	5.57
90	20	5/32	277.95	2513	1583	5.70
90	24*	5/32	402.00	4071	2565	6.38

\*Contact Hayward for larger sizes. Dimensions are for reference only.



*Special Model 90 strainer with offset nozzles, quick open cover, and flanged drain.*

also easy to customize the strainer to meet special application requirements.

Some common, easy-to-fabricate modifications are rotated nozzles, offset nozzles, and horizontal-vertical flow. Rotated inlet and outlet nozzles such as a right angle design can eliminate the requirement for an elbow in the downstream piping. Offset nozzles, lowering or raising either the inlet or outlet nozzle, can often eliminate serious alignment and support problems. The horizontal-vertical design with the flow exiting the strainer at a 90 degree angle can simplify the installation of a strainer in an already existing piping system.

Fabricated simplex strainers can also be designed with a backflush/ backwash option. In these designs a piping connection with an on/off backflush valve is fabricated at the strainer bottom and has a connection to the bottom of the strainer basket. When solids accumulate in the bottom of the basket, the backflush valve is opened and the differential pressure between the operating pressure and the backflush system removes the solids without shutting the system down. Backflushing is often supplemented by a back washing operation.

Backwashing is done by having fluid flow, under pressure, in the reverse direction into an empty strainer. This flow reversal backwashes the basket and removes the residual dirt. Backwashing is often regarded as a second step, used to remove dirt not removed by backflushing.

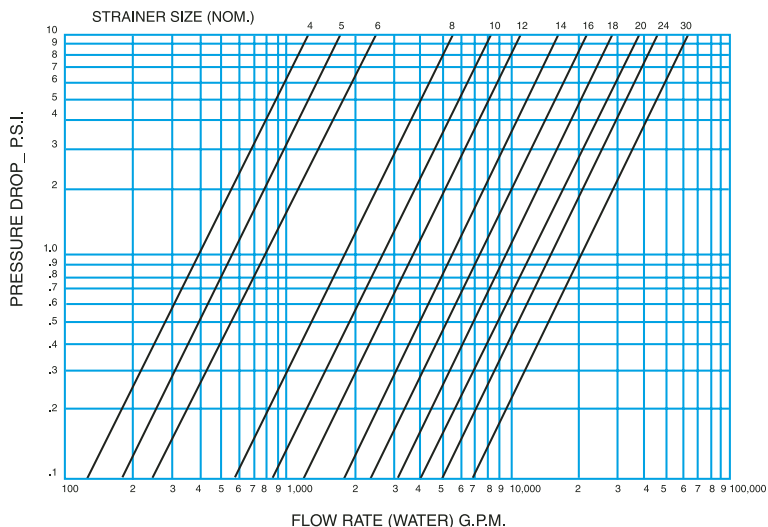
Steam jacketing is another option available for fabricated strainers. Steam jacketing is used to maintain critical fluid temperatures through the strainer. High temperatures are often required to process and transport highly viscous fluids. This modification is designed so that there is no impact on the function or normal maintenance of the strainer. Steam jacketing is available in carbon steel and type 316 stainless steel for service up to 450F.

Hayward can design and fabricate Model 90 strainers to ASME section VIII and ANSI B31.1, .3, .4, .7, and .8 codes. Hayward welders are qualified to ASME Sec. IX.

**Contact us today to discuss your special fabricated simplex strainer requirements.**



*24" Model 90 low profile carbon steel fabricated strainer*

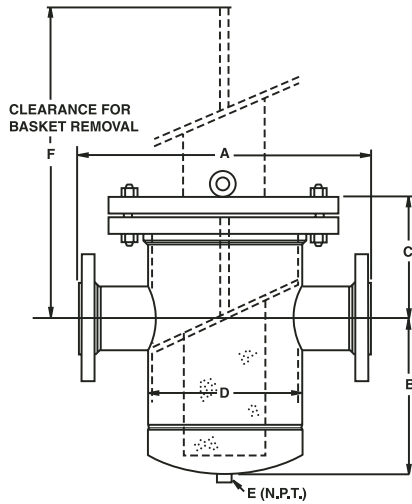


# SIMPLEX STRAINER MODEL 90

- Sizes from 4" to 24" - As Standard
- Available in Carbon Steel - Stainless Steel
- Flanged ANSI Class 150 and 300 - As Standard
- Flanged Class 600 and higher - Available on request

- Two cover types available: quick opening hinged & bolted blind.
- Davit assembly optional
- Basket material: stainless steel, 1/32" to 1/2" perforation diameter. 20 to 400 mesh linings also available.

## Bolted Cover

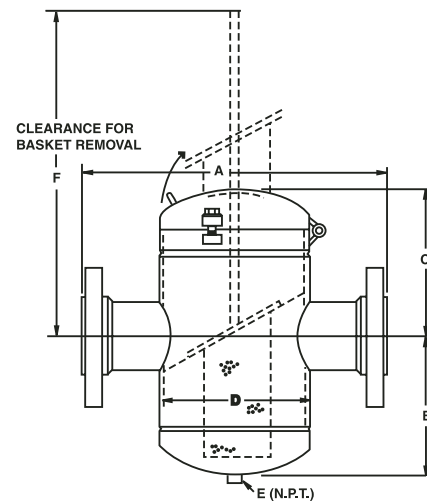


Nom Size	Dimensions								Net Weight (lb)			
	A		B	C		D	E	F	Class 150		Class 300	
	Class 150	Class 300		Class 150	Class 300				Cover	Unit	Cover	Unit
4	16	16	14	8½	9½	8¾	1	21	45	147	81	219
5	16	17½	15	9½	11	10¾	1	22	45	153	81	237
6	20	21	17	9½	11	10¾	1	24	70	203	127	328
8	22	23	21	11	12½	12¾	1½	28	110	281	184	407
10	32	33	25	13	14½	16	1½	33	170	450	307	710
12	35	36	28	14½	16	18	1½	39	209	644	390	1024
14	37	38	33	15¾	17½	20	2	45	272	951	492	1397
16	42	43	36	18¼	20	24	2	49	411	1409	754	2011
18	42	43	39	18¼	20	24	2	53	411	1486	754	2127
20	43	44½	44	21¾	24	30	2	59	411	1553	754	2231
24	48	49¾	60	21¾	24	30	2	78	681	2291	1403	3497

Dimensions are in inches

These dimensions are for reference only. For installation purposes, request certified drawings.

## Quick-Opening Hinged Cover



Nom Size	Dimensions						Net Weight (lb)				
	A		B	C	D	E	F	Class 150		Class 300	
	Class 150	Class 300		Class 150/300				Cover **	Unit	Cover **	Unit
4	16	16	14	9½	8¾	1	21	9	122	9	158
5	16	17½	15	11¼	10¾	1	22	9	128	9	176
6	20	21	17	11¼	10¾	1	24	12	168	12	236
8	22	23	21	13	12¾	1½	28	15	226	15	278
10	32	33	25	15¾	16	1½	33	30	360	30	483
12	35	36	28	17¾	18	1½	39	37	535	37	734
14	37	38	33	19¾	20	2	45	46	804	46	1030
16	42	43	36	23¼	24	2	49	68	1188	68	1437
18	42	43	39	23¼	24	2	53	68	1255	68	1553
20	43	44½	44	27¾	30	2	59	71	1322	71	1656
24	48	49¾	60	27¾	30	2	78	88	1860	88	2344

Dimensions are in inches

\*\* Force required to lift cover in lb.

These dimensions are for reference only. For installation purposes, request certified drawings.

Contact Hayward for larger sizes.

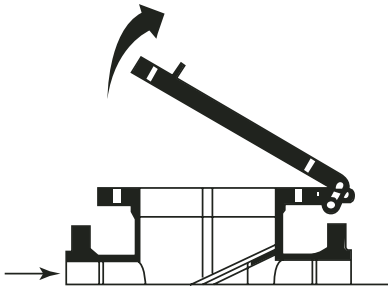


# SIMPLEX STRAINER MODEL 90

## COVER OPENING OPTIONS:

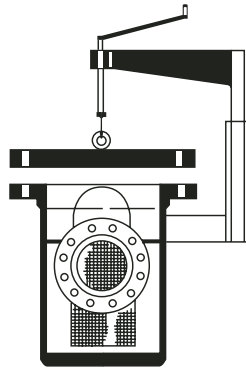
Maintenance problems can result if proper consideration is not given to the process involved in removing and replacing strainer access covers. This is particularly true in sizes larger than 8" where the cover weight can easily exceed 150 pounds, in which case additional personnel and equipment may be required. The Hayward designs listed below were developed to eliminate the problems associated with this process.

### Standard Hinged



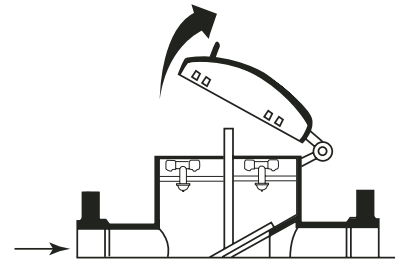
The quick opening hinged cover is available on most fabricated strainers. It has the added advantage of swing bolts, and is particularly helpful if the access is on the vertical or bottom.

### Integral Davit



The cover lift davit can reduce any cover lift process to a one man operation.

### Bolted Slide Hinge

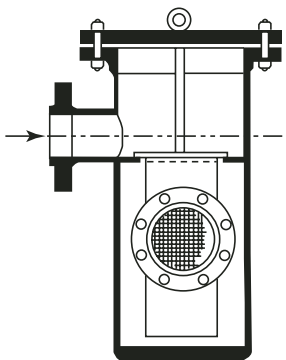


The slide hinge in medium size ranges (8"-16") permits a single operator to engage the hinge and open the cover.

## NOZZLE PLACEMENT OPTIONS:

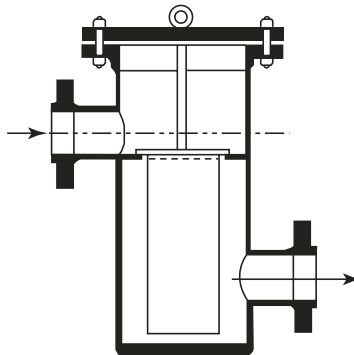
Fabricated strainers are available with a multitude of nozzle design options to adapt them to existing or contemplated piping schemes.

### Rotated Nozzles



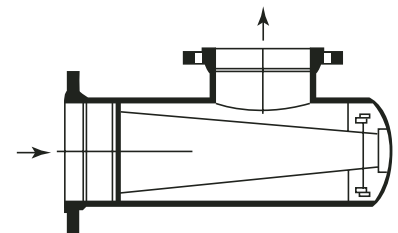
Right angle design can eliminate the requirement for an elbow in the downstream piping.

### Offset Nozzle



By lowering or raising either nozzle, serious alignment and support problems can be avoided.

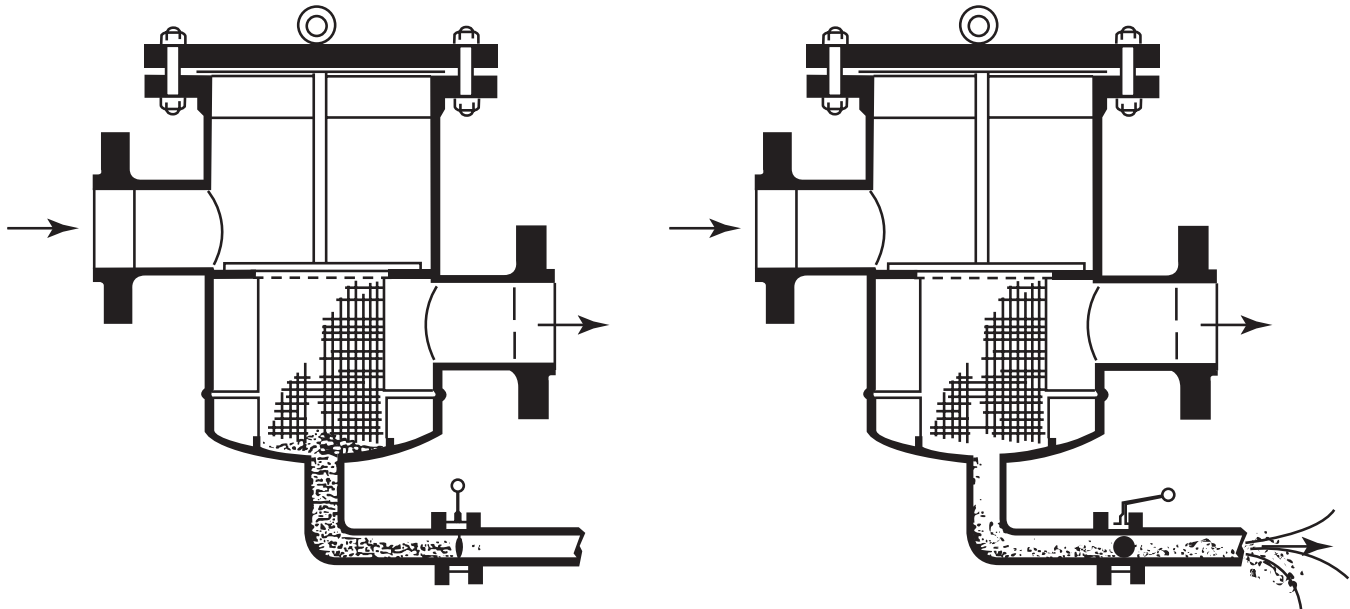
### Horizontal-Vertical



The above right angle design is especially appropriate for existing piping, and is typical of the many modifications that are possible.

## BACKFLUSH/BACKWASH OPTION:

Custom Fabricated simplex and duplex strainers are available with this important option.



(A) Valve closed - dirt accumulated

(B) Valve open - dirt removed thru backwash piping.

In many systems, particularly where solids are heavy and well defined, dirt accumulates as shown above (A). When the backflush valve is open, (B), the differential pressure between the operating pressure and the backflush system removes the dirt, all without shutting the system down. This simple process is referred to as backflushing.

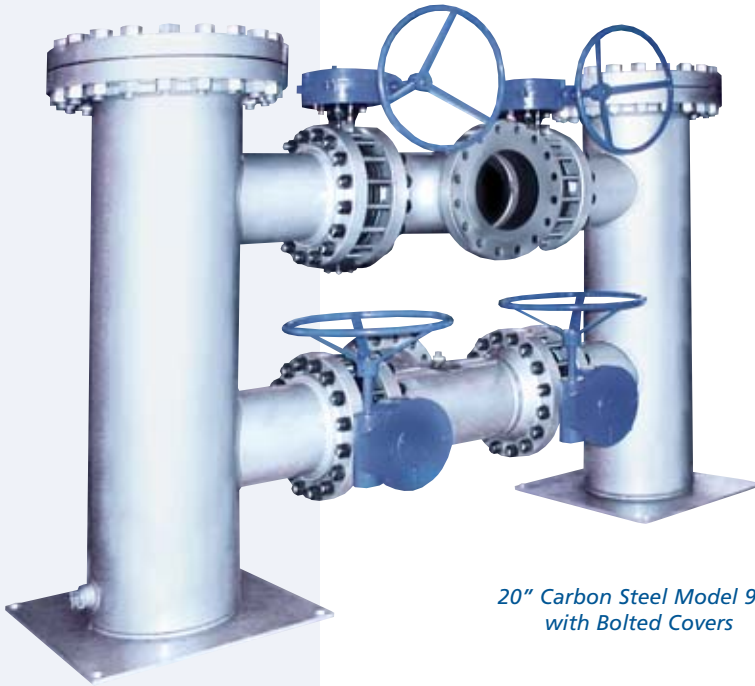
Backwashing occurs when backflushing is supplemented by fluid flowing, under pressure, in the reverse direction into an empty strainer. This flow reversal backwashes the element and removes the residual dirt. Backwashing is often regarded as a second step, used to remove dirt not removed by backflushing.

## STEAM JACKET OPTION:

Custom Fabricated simplex basket and tee strainers in all sizes are also available with this option. This modification is designed to have no impact on the function or normal maintenance.

Steam jacketing is available in carbon steel and 316SS for service up to 450°F. Steam jacketing is used to maintain critical fluid temperatures through the strainer. High temperatures are often required to process and transport high viscous fluids.

# DUPLEX STRAINERS



*20" Carbon Steel Model 950  
with Bolted Covers*

Duplex strainers are used when the system flow cannot be shut down for basket cleaning or change out. A duplex type basket strainer can operate continuously and the pipeline never has to be shut down.

Both the Model 900 and 950 Fabricated Duplex Strainers feature two strainer basket housings with a valve flow diverter assembly connecting them. When the basket in one housing becomes full, flow is switched to the other using the butterfly valve assembly. The first basket is then removed, cleaned or replaced, and is ready for use again.

The Model 900 is available in carbon or stainless steel in sizes from 1" to 48" and comes with either 150# or 300# flanged connections. The inlet and outlet of the strainer are in the same plane.

The Model 950 is available in carbon or stainless steel in sizes from 1" to 48" with either 150# or 300# flanged connections. The Model 950 has an offset inlet and outlet, with the inlet located above the outlet

Two different types of covers are available for both the Model 900 and 950. The simplest type is the bolted cover which is cost effective and works well in applications where basket changing is infrequent. A davit assembly can also be specified for larger strainers with heavy covers. This makes it possible for a single person to remove the cover of the strainer.

If the strainer will be opened frequently for basket cleaning, a bolted cover can be less effective because of the time needed to remove and then tighten the bolts. For these applications Hayward offers a special, hinged quick opening cover that is secured by swing bolts. This type of quick opening cover can even be adapted for higher pressure applications. For medium size strainers, 8" to 16", a bolted slide hinge cover is available. This permits a single operator to engage the hinge and open the cover.

Hayward has designed a special, unique strainer basket for the Model 900 Fabricated Strainer. The basket has a slant top design which improves the flow through the strainer and results in significantly lower pressure drops than would otherwise be the case. The slant top design results in a more compact basket which weighs less than an ordinary basket and makes it possible for a single person to remove it from the strainer housing. This is a real labor saving feature when it becomes time to clean or change out the basket. The basket for the Model 950 has a traditional, flat top design.

Strainer baskets for the Model 900 and 950 are made of stainless steel, although almost any type of material can be specified. Basket perforations from 1/32" up to 1/2" are available and mesh linings in sizes from 20 to 400 mesh for fine straining applications can be specified.



*Model 950 Fabricated Duplex  
Strainer designed for unique applica-  
tion requirements.*



# MODELS 900 & 950

## Typical Basket & Screen Effective Area

Strainer Model	Pipe Size in.	Perforation Size - in.	Nominal Area of Pipe (sq in)	Gross Screen Area (sq in)	Free Area (sq in)	Ratio Free Area to Pipe Area
900/950	2	5/32	3.35	78	49	1460
900/950	3	5/32	7.39	94	59	8.00
900/950	4	5/32	12.73	151	95	7.46
900/950	5	5/32	20.00	204	128	6.40
900/950	6	5/32	28.90	283	178	6.16
900/950	8	5/32	50.02	478	301	6.02
900/950	10	5/32	78.85	691	435	5.52
900/950	12	5/32	111.93	942	593	5.30
900/950	14	5/32	135.28	1320	832	6.15
900/950	16	5/32	176.71	1659	1045	5.91
900/950	18	5/32	223.68	1979	1247	5.57
900/950	20	5/32	277.95	2513	1583	5.70
900/950	24*	5/32	402.00	4071	2565	6.38

\*Contact Hayward for larger sizes

Model 900 and 950 Fabricated Duplex Strainers will meet the requirements of most duplex strainer applications. It is also easy to customize the strainers to meet special application requirements. Often it is thought that a custom designed duplex strainer is required for an application. Then on examination of the Model 900 or 950 it is found that a few simple modifications of the basic design results in a strainer that fits the application perfectly and at significant cost savings over a custom design.

Fabricated duplex strainers can also be designed with a backflush/ backwash option. In these designs a piping connection, with an on/off backflush valve is fabricated at the strainer bottom and has a connection to the bottom of the strainer basket. When solids accumulate in the bottom of the basket the backflush valve is opened and the differential pressure between the operating pressure and the backflush system removes the solids without shutting the system down. Backflushing is often supplemented by a backwashing operation.

Backwashing is done by having fluid flow, under pressure, in the reverse direction into an empty strainer. This flow reversal back washes the basket and removes the residual dirt. Backwashing is often regarded as a second step, used to remove dirt not removed by backflushing.

Steam jacketing is another option available for fabricated strainers. Steam jacketing is used to maintain

critical fluid temperatures through the strainer. High temperatures are often required to process and transport highly viscous fluids. This modification is designed and effected without any impact on the function or normal maintenance of the strainer. Steam jacketing is available in carbon steel and type 316 stainless steel for service up to 450F.

Hayward can design and fabricate Model 900/950 strainers to ASME section VIII and ANSI B31.1 codes.

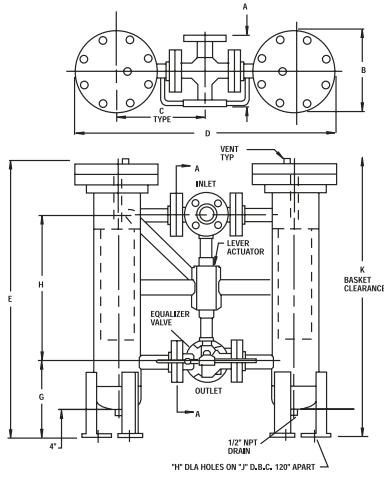
**Contact us today to discuss your special fabricated duplex strainer requirements**



36" Fabricated Carbon Steel Model 950

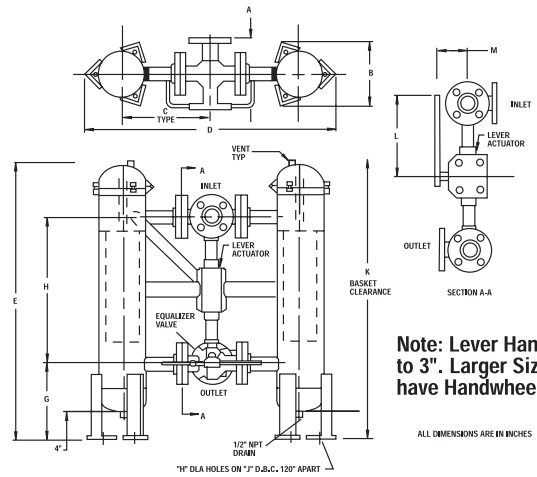
# DUPLEX STRAINERS

## MODEL 950 DUPLEX STRAINERS



Note: Lever Handle to 3". Larger Sizes have Handwheels.

ALL DIMENSIONS ARE IN INCHES



Note: Lever Handle to 3". Larger Sizes have Handwheels.

ALL DIMENSIONS ARE IN INCHES

### MODEL 950 150# with Bolted Cover

Size	A	B	C	D	E	F	G	H	J	K	L	M
1½"	8¼	11	13	36	38	21	11	5/8	6 5/8	60	15	6¼
2"	8 11/16	11	13¼	36 5/8	39	22	11	5/8	6 5/8	61	18	6¼
3"	10¼	11	14	38	43½	26½	11	5/8	6 5/8	67	31	6¼
4"	13	13½	17½	48½	47 1/8	24½	12	5/8	8 5/8	75	12	7½
6"	16	16	22	60	57¼	32	13	5/8	10¾	92	12	8
8"	21¼	21	25 5/8	72¼	73½	44	15	5/8	14	128	15	8½

### MODEL 950 300# with Bolted Cover

Size	A	B	C	D	E	F	G	H	J	K	L	M
1½"	8 5/8	12½	13¼	38	38½	21	11	5/8	6 5/8	60	15	6¼
2"	9 7/8	12½	13 5/8	38 5/8	39½	22	11	5/8	6 5/8	61	18	6¼
3"	11 7/8	12½	14 5/8	40¾	44	26½	11	5/8	6 5/8	67	31	6¼
4"	13 9/8	15	17 7/8	50¾	48	24½	12	5/8	8 5/8	76	12	7½
6"	18 1/8	17½	22 5/8	62¾	58	32	13	5/8	10¾	93	12	8
8"	22¼	23	26¼	75½	74¾	44	15	5/8	14	129	15	8½

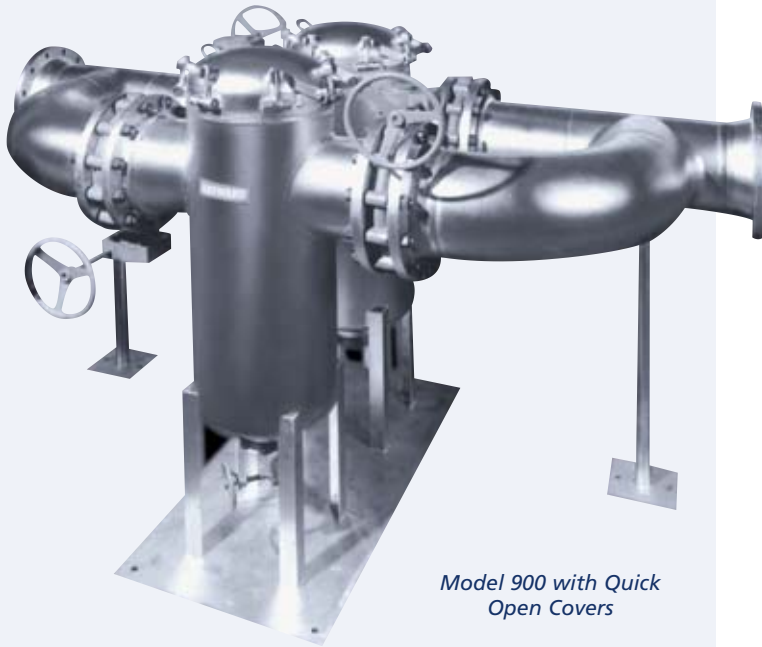
### MODEL 950 150# with Quick Open Cover

Size	A	B	C	D	E	F	G	H	J	K	L	M
1½"	8¼	9½	13	36	39	21	11	5/8	6 5/8	61	15	6¼
2"	8 11/16	9½	13¼	36 5/8	40	22	11	5/8	6 5/8	62	18	6¼
3"	10¼	9½	14	38	44½	26½	11	5/8	6 5/8	68	31	6¼
4"	13	10½	17½	48	49	24½	12	5/8	8 5/8	76	12	7½
6"	16	13	22	57	60	32	13	5/8	10¾	95	12	8
8"	21¼	13½	25 5/8	70	77	44	15	5/8	14	132	15	8½

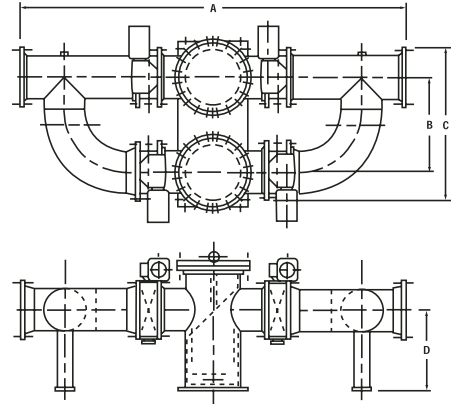
Consult Hayward for larger sizes. Dimensions are for reference only.

# MODELS 900 & 950

## MODEL 900 WITH BOLTED COVER



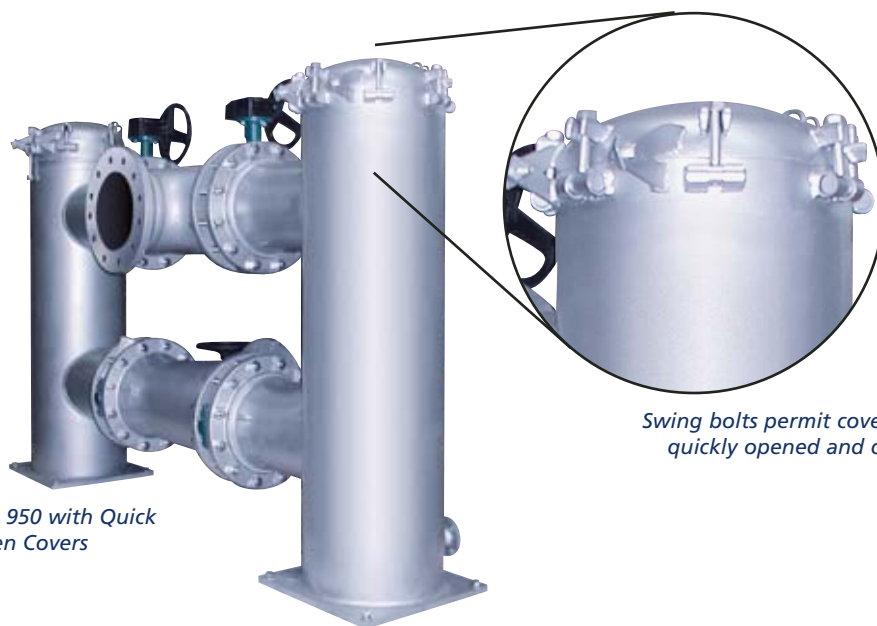
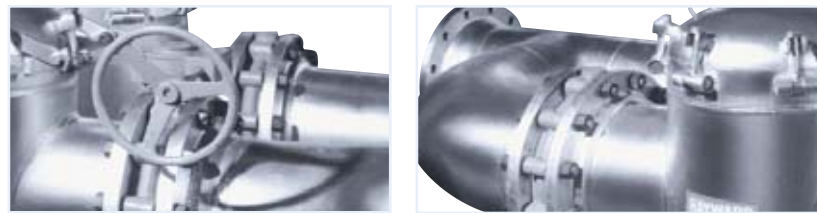
Model 900 with Quick Open Covers



## MODEL 900 with Bolted Cover

Size	A	B	C	D
6"	63 $\frac{3}{4}$	22 $\frac{3}{4}$	35 $\frac{1}{2}$	23
8"	75 $\frac{3}{4}$	22 $\frac{3}{4}$	35 $\frac{1}{2}$	27
10"	91	24	40	31
12"	107 $\frac{1}{2}$	27	45	39
14"	118 $\frac{1}{8}$	29	49	39
16"	131 $\frac{1}{8}$	29	53	42
18"	139 $\frac{1}{4}$	30	54	42
20"	154 $\frac{1}{4}$	35	65	48
24"	169 $\frac{1}{4}$	35	65	53

Consult Hayward for larger sizes. Dimensions are for reference only.



12" Model 950 with Quick Open Covers

Swing bolts permit covers to be quickly opened and closed



# TEE-TYPE STRAINERS



Model 91 with quick open cover.



Model 91 with bolted cover.

The Model 91 Fabricated Tee Strainer is available in carbon steel or stainless steel with ANSI Class 150, 300, or 600 flanges or butt weld piping connections. Sizes are available for pipelines from 2" up to 48". This type of tee strainer is typically used for pump protection or other low solids applications.

Hayward's Model 91 Tee Strainer offers several advantages over other strainer designs. The strainer is very compact, important in applications where space is restricted. Unlike most other strainers the Model 91 can be used in both vertical or horizontal installations. A real time saving feature of the Model 91 Tee Strainer is that the strainer screen can be cleaned without draining the strainer vessel.

In many applications the most important feature of the Model 91 is its very low pressure drop as compared to other types of strainers. The combination of a convoluted strainer screen

and unrestricted flow path results in very low pressure losses. This low pressure drop makes it ideal for applications such as condensate and boiler feed pump suction where water quality is good and pressure drop is critical.

Two different types of covers are available for the Model 91. The simplest type is the bolted cover which is cost effective and works well in applications where basket changing is infrequent. A davit assembly can also be specified for larger strainers with heavy covers. This makes it possible for a single person to remove the cover of the strainer.

If the strainer will be opened frequently for basket cleaning, a bolted cover is less effective because of the time needed to remove and then tighten the bolts. For these applications, Hayward offers a special, hinged, quick-opening cover that is secured by swing bolts. This type of quick-opening cover can even be adapted for higher pressure applications

## Basket & Screen Effective Area

Strainer Model	Pipe Size in.	Perforation Size - in.	Nominal Area of Pipe (sq in)	Gross Screen Area (sq in)	Free Area (sq in)	Ratio Free Area to Pipe Area
91	2	5/32	3.35	23	14.26	4.26
91	3	5/32	7.39	41	25.42	3.44
91	4	5/32	12.73	58	35.96	2.82
91	5	5/32	20.00	82	50.84	2.54
91	6	5/32	28.90	105	65.10	2.25
91	8	5/32	50.02	167	103.54	2.07
91	10	5/32	78.85	234	145.08	1.84
91	12	5/32	111.93	322	199.64	1.78
91	14	5/32	135.28	419	259.78	1.92
91	16	5/32	176.71	511	316.82	1.72
91	18	5/32	223.68	639	398.18	1.77
91	20	5/32	277.95	781	484.22	1.74
91	24	5/32	402.00	1057	655.34	1.63

\*Contact Hayward for larger sizes

# MODEL 91

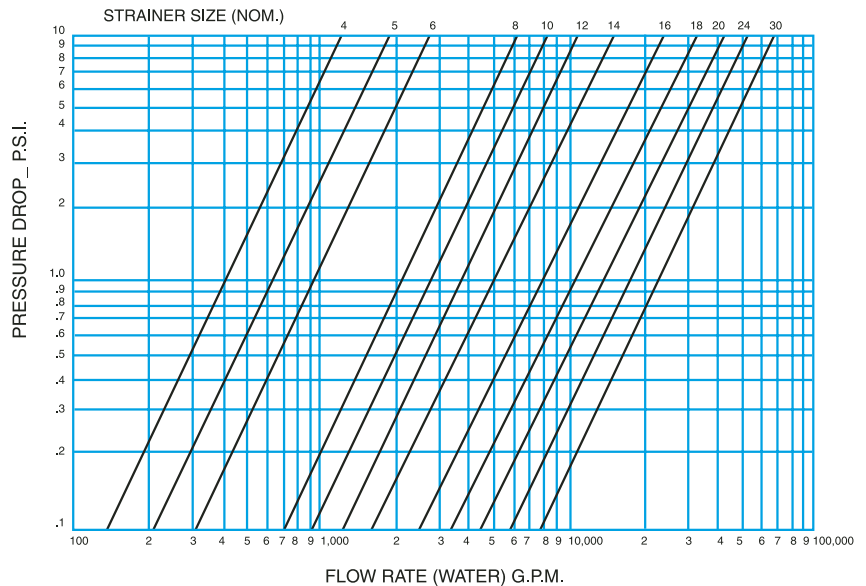
Strainer screens for the Model 91 are made of stainless steel – although almost any type of material can be specified. Screen perforations from 1/16" up to 1/2" are available and mesh linings in sizes from 20 to 60 mesh for fine straining applications can be specified. The unique convoluted design of the strainer screen doubles the screen area and completely changes the dirt accumulation pattern on the screen. This makes more effective use of the screen's straining area and increases the time between screen cleanings.

In larger sizes, because of greater screen area, the Model 91 can be an economical and functionally better choice than the traditional Y strainer.

The Model 91 Fabricated Tee Strainer will meet the requirements of most tee strainer applications. For those that it doesn't it is also easy to customize the strainer to meet special application requirements. The strainer can be designed to meet very tight dimensional restrictions. The Model 91 can also be adapted for straight through or right angle flow, making it ideal for retrofit situations in which strainers were initially omitted.

Steam jacketing is another option available for fabricated tee strainers. Steam jacketing is used to maintain critical fluid temperatures through the strainer. High temperatures are often required to process and transport highly viscous fluids. This modification is designed and effected without any impact on the function or normal maintenance of the strainer. Steam jacketing is available in either carbon steel or Type 316 stainless steel for services of up to 450F.

Hayward can design and fabricate Model 91 strainers to ASME section VIII and ANSI B31.1 codes.



*Quick opening spin off cover with davit.*



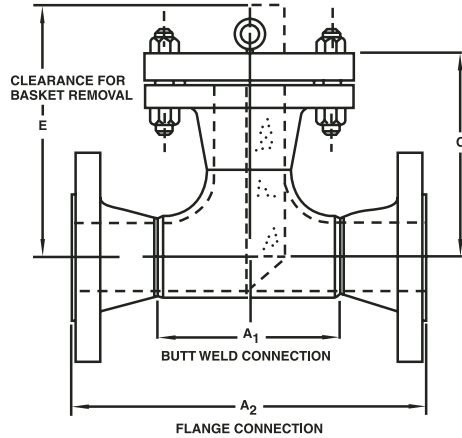
*Model 91 with hinged cover.*

- Sizes from 2" to 24" - As Standard
- Larger Sizes up to 48" - Available on request
- Available in Carbon Steel - Stainless Steel
- Flanged ANSI Class 150 and 300 - As Standard
- Flanged Class 600 - Available on request

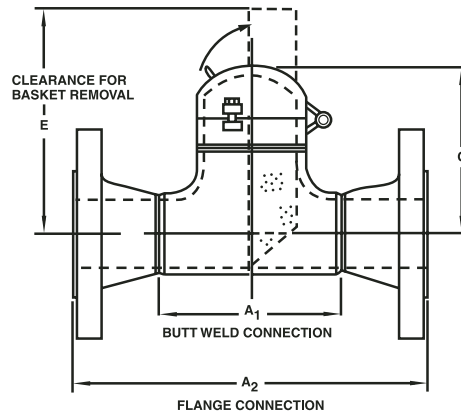
Advantages include:

- Compact design
- Vertical or horizontal installation
- Basket can be cleaned without draining
- Convolutioned element design doubles the screen area and completely changes dirt accumulation pattern.

## Bolted Cover



## Quick-Opening Hinged Cover



Nom Size	Dimensions									Net Weight (lb.)			
	Butt Weld Connections				Flanged Connections				E	Class 150		Class 300	
	Class 150		Class 300		Class 150		Class 300			Cover	Unit	Cover	Unit
	A <sub>1</sub>	C	A <sub>1</sub>	C	A <sub>2</sub>	C	A <sub>2</sub>	C					
2	5	5 1/4	5	6 1/8	10	5 3/4	10 1/2	6 1/8	13	4	25	8	38
3	6 3/4	7 1/8	6 3/4	7 7/8	12 1/4	7 1/8	13	7 7/8	14	9	50	16	69
4	8 1/4	8 1/8	8 1/4	8 3/4	14 1/4	8 1/8	15	8 3/4	16	17	75	27	115
5	9 3/4	9 3/8	9 3/4	10 1/8	16 3/4	9 3/8	17 1/2	10 1/8	19	20	80	35	151
6	11 1/4	10 1/8	11 1/4	11	18 1/4	10 1/8	19	11	22	26	110	50	206
8	14	12 1/8	14	13	22	12 1/8	22 3/4	13	25	45	185	81	336
10	17	13 3/4	17	15	25	13 3/4	26 1/4	15	29	70	324	127	491
12	20	15 3/4	20	17 1/8	29	15 3/4	30 1/4	17 1/8	31	110	410	184	730
14	22	17 3/8	22	18 3/4	32	17 3/8	33 1/4	18 3/4	38	131	615	236	966
16	24	18 1/2	24	20	34	18 1/2	35 1/2	20	41	170	776	307	1264
18	27	20 3/8	27	22 1/8	38	20 3/8	39 1/2	22 1/8	46	209	920	390	1587
20	30	22 3/8	30	23 7/8	41 3/8	22 3/8	42 3/4	23 7/8	51	272	1180	492	1980
24	34	24 7/8	34	26 3/8	46	24 7/8	47 1/4	26 3/8	56	411	2190	594	2722

Dimensions are in inches  
These dimensions are for reference only. For installation purposes, request certified drawings.

Nom Size	Dimensions									Net Weight (lb.)			
	Butt Weld Connections				Flanged Connections				E	Class 150		Class 300	
	Class 150		Class 300		Class 150		Class 300			Cover**	Unit	Cover**	Unit
	A <sub>1</sub>	C	A <sub>1</sub>	C	A <sub>2</sub>	C	A <sub>2</sub>	C					
2*	-	-	-	-	-	-	-	-	-	-	-	-	-
3*	-	-	-	-	-	-	-	-	-	-	-	-	-
4*	-	-	-	-	-	-	-	-	-	-	-	-	-
5*	-	-	-	-	-	-	-	-	-	-	-	-	-
6	11 1/4	9 1/4	11 1/4	9 1/4	18 1/4	9 1/4	19	9 1/4	22	5	108	5	142
8	14	11 1/8	14	11 1/8	22	11 1/8	22 3/4	11 1/8	25	9	156	9	208
10	17	13 1/2	17	13 1/2	25	13 1/2	26 1/4	13 1/2	29	12	231	12	330
12	20	15 5/8	20	15 5/8	29	15 5/8	30 1/4	15 5/8	31	15	342	15	458
14	22	17 1/8	22	17 1/8	32	17 1/8	33 1/4	17 1/8	38	20	435	20	610
16	24	18 3/8	24	18 3/8	34	18 3/8	35 1/2	18 3/8	41	26	540	26	781
18	27	21 1/8	27	21 1/8	38	21 1/8	39 1/2	21 1/8	46	32	660	32	990
20	30	23 3/8	30	23 3/8	41 3/8	23 3/8	42 3/4	23 3/8	51	40	806	40	1222
24	34	27 1/8	34	27 1/8	46	27 1/8	47 1/4	27 1/8	56	58	1085	58	1755

Dimensions are in inches  
These dimensions are for reference only. For installation purposes, request certified drawings. \*\* Force required to lift cover in lb.

Contact Hayward for larger sizes



# AUTOMATIC SELF-CLEANING STRAINERS

The Hayward automatic self-cleaning strainer is a motorized strainer designed for the continuous removal of entrained solids from liquids in pipeline systems.

It has successfully performed in industrial, process, water, wastewater, power, paper and municipal applications for over 30 years.

With an automated control system monitoring the strainer operation, cleaning is accomplished by an integral backwash system. A small portion of the screen element is isolated and cleaned by reverse flow. The remaining screen area continues to strain – providing uninterrupted flow. With this efficient design, only a small amount of the liquid being strained is used to carry away the debris from the strainer.

All HAYWARD® Automatic Self-Cleaning Strainers feature the idL™ shaft seal that positively prevents leakage from the backwash shaft at the top of the strainer. This unique quad seal replaces older, leak prone packing material. With the idL seal the exterior of the strainer stays dry and clean in service, there's never any bothersome external leakage or weeping of the process media down the sides of the strainer.

Hayward offers two different Models of Automatic Self-Cleaning Strainers, the Model 596 and the Model 2596. They are available in sizes of 2" through 20" in cast construction and 6" through 60" in fabricated construction. Design and construction of these units are in accordance with ANSI and ASME Section VIII, Division 1. A wide range of screen designs are offered from 1/8" perf to 400 mesh, depending on line size and application.

## APPLICATIONS

Hayward's automatic self-cleaning strainers are commonly used on water service where the disposal of debris and backwash water is not a problem. Continuous flow is assured and protection is provided for nozzles, pumps, valves, heat exchangers and other process equipment.

These high quality strainers can also successfully handle other fluids such as white water, black liquor, starch, fuel and lubricating oil, caustic solutions and cooking oils. A determining factor in these cases is the recycling of the backwash fluid. HAYWARD automatic self-cleaning strainers will significantly reduce maintenance costs and provide uninterrupted flow. They are a particularly worthwhile investment where solids loading is high or upset conditions occur. Frequent cleaning and servicing of manual strainers is costly and, if not properly done, serious disruptions to the entire piping system can occur. Also, they are an ideal solution for maintenance problems where the strainer is in an inaccessible or remote location. Automatic strainers can easily replace duplex basket strainers.



36" Model 596 strainer



10" Model 2596 strainer

# AUTOMATIC SELF-CLEANING STRAINERS



8" Model 596 strainer

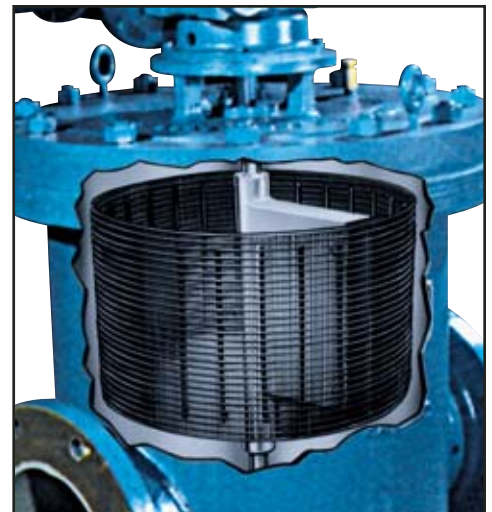
## OPERATION

The debris laden dirty fluid enters the strainer's large bottom chamber where the line velocity is reduced. Flow continues upward, passing radially through the "sealed" screen element. Unwanted material is trapped on the inside of the screen. The flow is uninterrupted and the strained clean fluid continues its path into the correctly proportioned outer annulus of the strainer body and exits through the outlet nozzle.

Backwash cleaning is accomplished by utilizing the pressure differential between line pressure and atmosphere. A hollow, full flow backwash arm extending the full length of the screen element rotates slowly inside of the screen and is piped to atmosphere. The port shoe is in close proximity to the screen, and its opening is equivalent to the "debris collector" sections created by the convolutions and/or the vertical collector bars in the element.

When cleaning is required the automatic backwash valve opens the system to atmosphere, causing a high velocity reverse flow across the isolated section of the screen. Dirt and debris are flushed from this segment of the screen into the backwash arm and out of the strainer via the backwash piping. During the backwashing cycle the main flow is uninterrupted and continues to be strained in the normal manner. A manual throttling valve is recommended after the control valve. Thus, backwash flow can be regulated and balanced for optimum performance and reduction of water loss.

An automatic control system consisting of an electrical panel, actuated valves and a differential pressure switch operates the strainer. The cleaning cycle is set to activate on a timed cycle with a differential pressure override to protect against system upset conditions. The control system will automatically close the backwash valve after the screen element is properly cleaned. The unit can also be operated manually or in the continuous backwash mode. See modes of operation on page 29 for additional information.



Cutaway of Model 596 shows backwash arm and strainer element.

## TYPICAL APPLICATIONS

Automatic self-cleaning strainers are used in nearly every industry to strain fresh, brackish or salt intake water for plant services such as cooling, process, fire protection, etc. They allow water to be recycled within the plant, reducing costs.

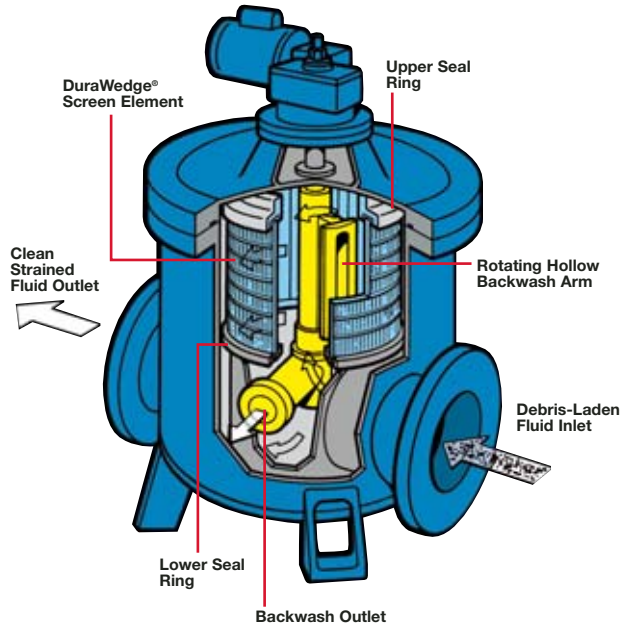
**Process Industry:** Protect heat exchangers, pumps, valves, and water spray nozzles.

**Power Industry:** Protect heat exchangers, pump seal water, and traveling screen wash water.

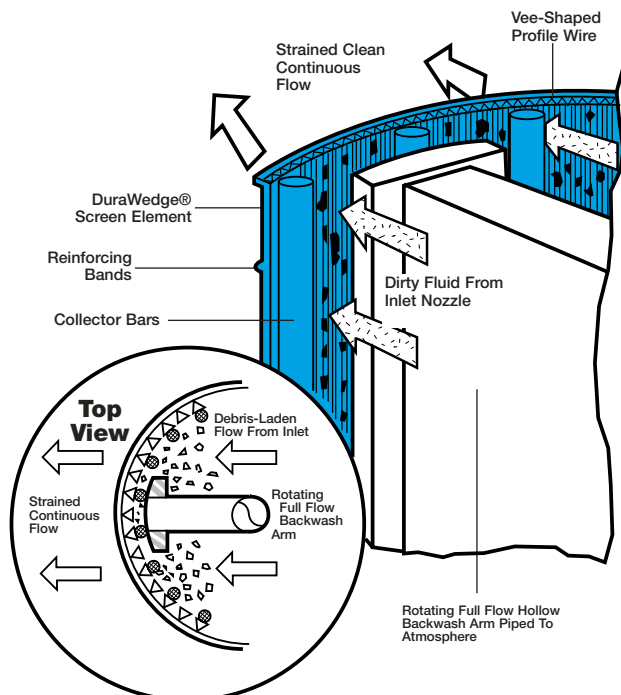
**Pulp and Paper:** Removing fibers from white water filtrate to prevent clogging of nozzles. Separate bark and chips for recycling.

**Sewage/Waste and Water:** Straining secondary effluent prior to discharge, and also providing clean plant service water.

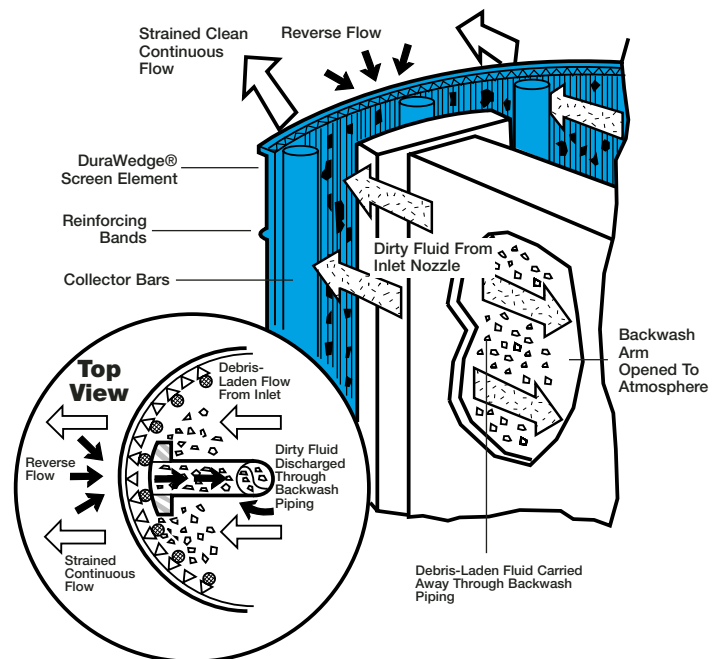
**Primary Metal Industry:** Provide clean water for quenching, descaling, and blast furnace cooling.



## Straining Cycle



## Backwashing Cycle





# AUTOMATIC STRAINERS

## Model 596 Cast Strainers

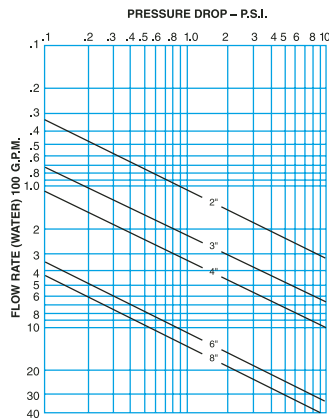
### Sizes 2" Thru 8"

#### Application Limits

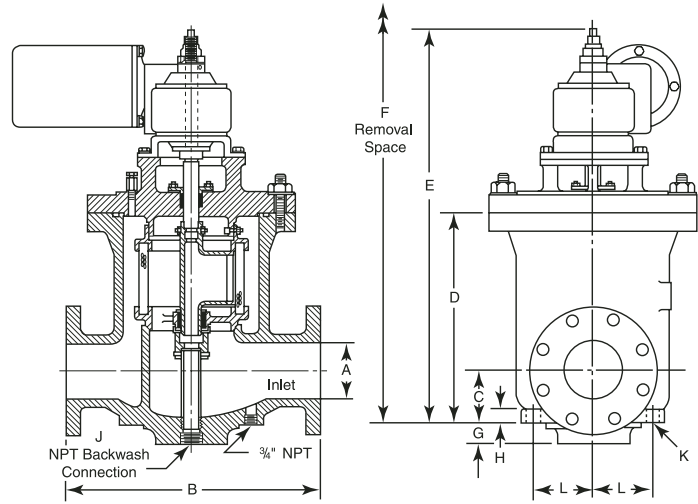
Cast Iron Class 125 Flange (-20° to 150°F) 150 psi  
 Cast Steel Class 150 Flange (-20° to 100°F) 150 psi  
 Cast Steel Class 300 Flange (-20° to 150°F) 300 psi  
 Based on ratings of ANSI and ASME, Section VIII, Div. 1.  
 Lower pressure ratings at higher temperatures.

#### Optional Features

- Stainless steel, copper nickel, monel, aluminum bronze and other materials of construction.
- ASME Section VIII, Div. 1. code stamp available.
- Flanged, screwed or socket weld backwash connections (steel unit only).



Pressure drop data indicates results to be expected with clean water, under normal flows, with standard straining media and in clean strainer.



A	Approximate Dimensions (in)		Approximate Weight (lb)													
	B	B	150#	300#	C	D	E	F	G	H	J	K	L	Dry	Wet	Cover
2"	17½	18½	37½	15½	28	37	13½	1	1	¾	43½	285	320	125		
3"	17½	18½	37½	15½	28	37	13½	1	1	¾	43½	285	320	125		
4"	17½	18½	37½	147½	28	37	13½	1	1	¾	43½	290	325	125		
6"	28	287½	6½	22½	39	50	17½	1¼	1½	1½	7½	1,200	1,375	430		
8"	26	27	6½	22½	39	50	17½	1¼	1½	1½	7½	1,200	1,375	430		

Dimensions are for reference only. For installation purposes, request certified drawings

### Sizes 10" Thru 20"

#### Application Limits

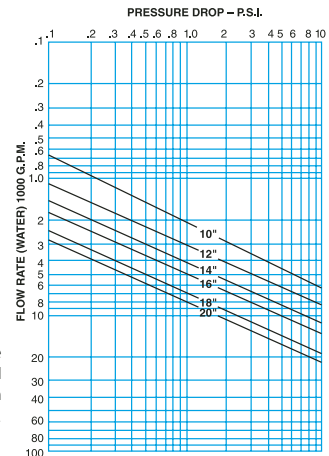
Ductile Iron Class 125 Flange (-20° to 150°F) 150 psi  
 Cast Steel Class 300 Flange (-20° to 150°F) 300 psi

#### Application Limit 20" Size

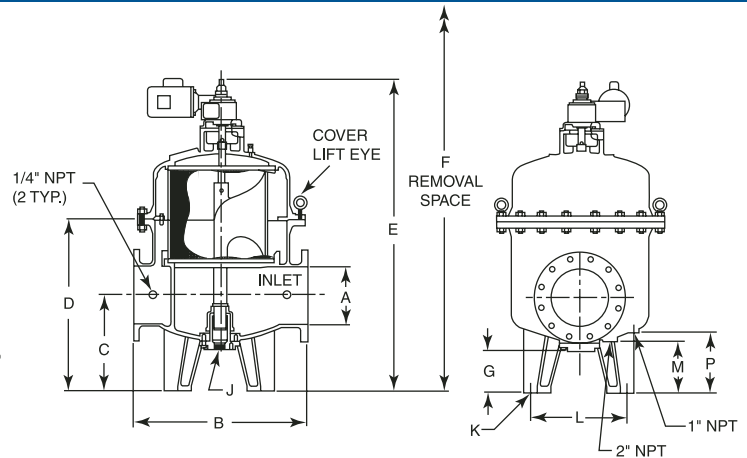
Ductile Iron Class 125 Flange (-20° to 150°F) 150 psi  
 Based on ratings of ANSI and ASME Section VIII, Div. 1.  
 Lower pressure ratings at higher temperatures

#### Optional Features

- Stainless steel, copper nickel, monel, aluminum bronze and other materials of construction.
- ASME Section VIII, Div. 1. code stamp available.
- Flanged, screwed or socket weld backwash connections (steel unit only).



Pressure drop data indicates results to be expected with clean water, under normal flows, with standard straining media and in clean strainer.



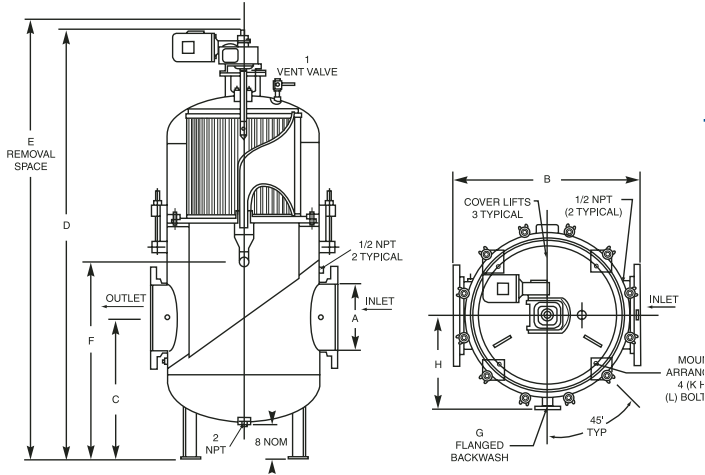
A	Approximate Dimensions (in)										Approximate Weight (lb)			
	B	C	D	E	F	G	J	K	M	P	L	Dry	Wet	Cover
10"	38¼	19¾	35¾	64¾	90	89½	2	7/8	10½	12½	24½	1,840	2,615	705
12"	36¼	19¾	35¾	64¾	90	89½	2	7/8	10½	12½	24½	1,880	2,675	705
14"	44	22½	42½	76½	112	89½	2	7/8	10½	13½	29½	2,810	4,360	1,050
16"	44	22½	42½	76½	112	89½	2	7/8	10½	13½	29½	2,850	4,400	1,050
18"	53	26	52½	92¾	135	10¼	3	1½	12¾	15½	35½	4,325	7,100	1,660
20"	50	26	52½	92¾	135	10¼	3	1½	12¾	15½	35½	4,275	7,050	1,660

Dimensions are for reference only. For installation purposes, request certified drawings

Specific descriptions and construction details illustrated may vary slightly from equipment furnished. We reserve the right to revise or discontinue equipment or design features without notice. We recommend that you review performance and application data with us prior to final design.

# TECHNICAL INFORMATION

## Model 2596 Fabricated Carbon Steel and Stainless Steel



Approximate Dimensions (in)											Approximate Weight (lb)		
A	B	C	D	E	F	G	H	K	L		Dry	Wet	Cover
10"	38	30	88	90	40	2	16	3/4	22.13		1,200	2,400	650
12"	42	30	88	90	40	2	18	3/4	26.13		1,300	2,700	700
14"	44	32	101	103	46	2	22	7/8	32.13		2,000	4,400	850
16"	44	33	101	103	46	2	22	7/8	32.13		2,050	4,450	850
18"	50	36	117	120	48	3	23	7/8	34.13		3,500	8,300	1,280
20"	54	37	120	123	50	3	25	7/8	38.13		3,700	10,000	1,480
24"	54	39	124	127	54	3	25	7/8	38.13		3,830	10,160	1,480
30"	64	51	147	151	76	3	30	7/8	48.13		5,000	13,400	2,000

Note: K= Diameter Bolt Hole (4) Required 90° Apart, L= Diameter Bolt Circle  
 Dimensions are for reference only. For installation purposes, request certified drawings

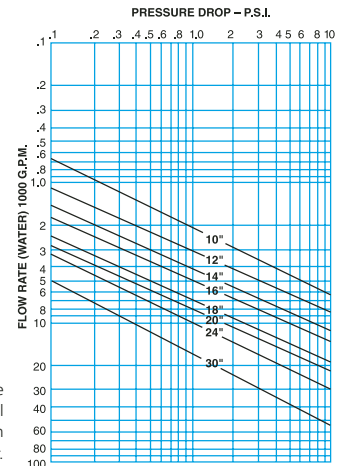
### Sizes 10" Thru 30"

#### APPLICATION LIMITS

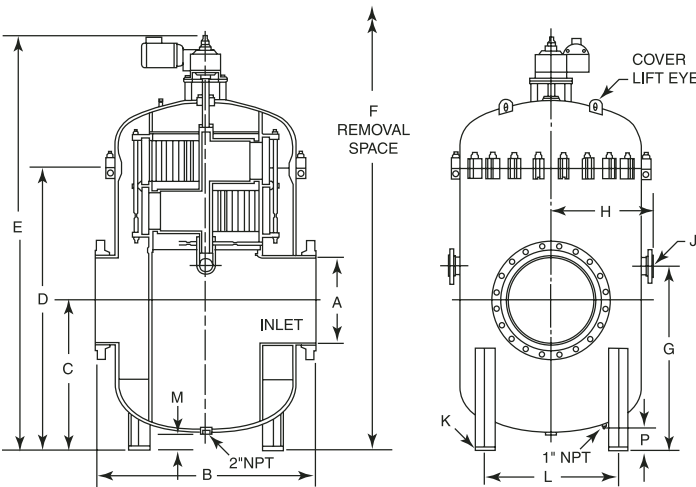
Fabricated strainers are designed within the limits of the customer's specifications and design criteria along with any applicable code requirement. i.e. ASME Section VII Div. 1.

#### OPTIONAL FEATURES

- Stainless steel, copper nickel, monel, aluminum bronze and other materials of construction.
- ASME Section VIII, Div. 1. code stamp available.
- Flanged, screwed or socket weld backwash connections (steel unit only).



Pressure drop data indicates results to be expected with clean water, under normal flows, with standard straining media and in clean strainer.



Approximate Dimensions (in)														Approximate Weight (lb)		
A	B	C	D	E	F	G	H	J	K	L	M	P		Dry	Wet	Cover
36"	90	60	103 3/4	148 5/8	182	72 3/4	40	6	1 3/8	66	8	14		14,000	29,530	4,500
48"	109 1/4	62 3/4	122	177	227	80	48 3/4	8	1 1/2	90	8	13		24,000	53,000	8,000

Note: J=Backwash Outlet Flange Size, K= Diameter Bolt Hole (4) Required 90° Apart, L= Diameter Bolt Circle  
 Dimensions are for reference only. For installation purposes, request certified drawings

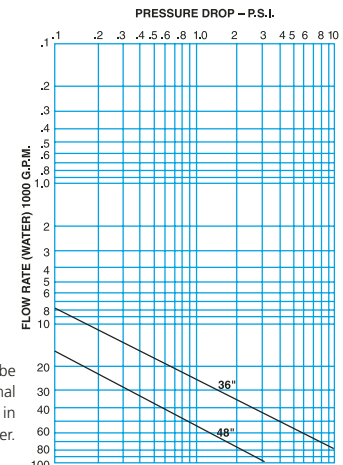
### Sizes 36" Thru 48"

#### APPLICATION LIMITS

Fabricated strainers are designed within the limits of the customer's specifications and design criteria along with any applicable code requirement. i.e. ASME Section VII Div. 1.

#### OPTIONAL FEATURES

- Stainless steel, copper nickel, monel, aluminum bronze and other materials of construction.
- ASME Section VIII, Div. 1. code stamp available.
- Flanged, screwed or socket weld backwash connections (steel unit only).



Pressure drop data indicates results to be expected with clean water, under normal flows, with standard straining media and in clean strainer.

Specific descriptions and construction details illustrated may vary slightly from equipment furnished. We reserve the right to revise or discontinue equipment or design features without notice. We recommend that you review performance and application data with us prior to final design.

# LOW-DIFFERENTIAL PRESSURE

The Hayward Model 596LDP, in 6" through 30" sizes has been specifically designed for systems with line pressures less than 20 psi.

## DESIGN AND OPERATION

The Model 596LDP configuration is similar to the standard self-cleaning strainer. However, it incorporates an external flushing arm which is attached to the same shaft and motor that drives the regular backwash arm. The two components rotate synchronously.

The external backwash flushing arm directs a high velocity flow of liquid directly onto the back side of the straining element, dislodging the debris, which then flows out the backwash outlet. The action is a "push-pull" effect since the backwash arm is open to atmosphere.

The external backwash fluid should be at a minimum 20 psi greater than the system operating pressure. This backwash fluid can be city water, plant service water or a side stream taken from the pressure side of the strainer line. In remote locations, a small booster pump will do the job.

The automatic control system monitors the operation of the strainer. The cleaning cycle is set to activate on a timed cycle with a differential pressure override to protect against system upset conditions. See modes of operation on page 29 for additional information.

The external backwash inlet valve is opened at the same time as the backwash outlet valve, initiating the backwash cycle. Only a small amount of external backwash fluid is required. This is an extremely effective method of dislodging dirt from the screen element. Continuous flow is maintained at all times.



*A Model LDP installed in a piping system*

## APPLICATIONS

- Irrigation water where low head pressure is commonly encountered.
- Fire protections/general service water from ponds and lakes.
- Cooling water for commercial buildings on suction side of pumps.
- Secondary effluent in treatment plants for spray nozzles and service water.
- Intake cooling water for power plants and industrial plants from rivers, bays, etc. where head variations occur.



# AUTOMATIC STRAINER

## FEATURES

### QUALITY OF CONSTRUCTION

Designed and constructed in general accordance with ANSI and ASME Section VIII, Division 1. Code Stamp is available.

### MATERIALS OF CONSTRUCTION

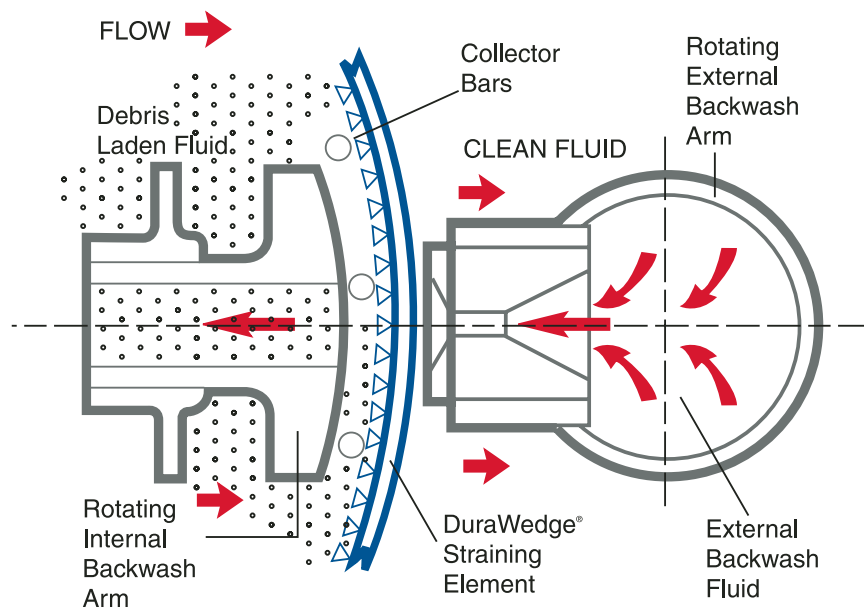
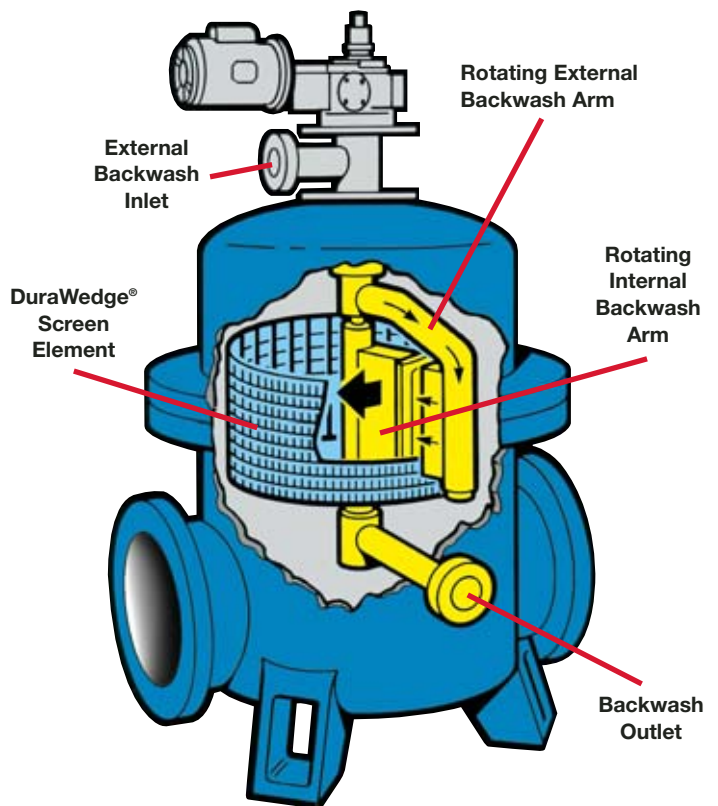
Cast iron in 6" and 8", 10" and larger in fabricated carbon or stainless steel. Flanged connections, ANSI 125# or 150#. Other materials available.

### COMPACT DESIGN

Incorporates unitized modular design feature. Motor, gear reducer, cover and complete internal operating mechanism lift off as a unit for ease of inspection and maintenance. This greatly simplifies maintenance and reduces cost compared to other automatic strainer designs.

Previously, self-cleaning strainers had to be located where line pressures were above 20 psi. Now, with the HAYWARD® Strain-O-Matic 596LDP, they can be utilized with line pressure below 20 psi and can be placed in more convenient locations – even on the suction side of a pump. Thus, pumping equipment is also protected from damage by entrained debris.

**Consult Hayward for other low system pressure options.**



### Top View of External Backwash Flow

High velocity external backwash is directed across the screen. Dirt, fibers, and debris are dislodged and carried into the backwash arm and flushed away through the backwash outlet.

# SCREEN ELEMENTS



## DuraWedge® Element

DuraWedge® is a non-clogging, rugged stainless steel straining element constructed from vee-shaped profile wire. Available only from Hayward.

### Features

- Two point contact straining from the “smooth” side prevents plugging or packing of debris and particles.
- Effective dislodging of dirt, debris and fibers from the element during backwash. This is accomplished by the increased velocity of the reverse flow (during backwash) from the “open side” of the vee.
- Fiber stapling is reduced because of smooth surfaces and the design contour of the profile wire.
- Vertical collector bars form spaces to accumulate debris and dirt, preventing snow plowing of materials by the rotating backwash arm and port shoe.
- No bypass. Elements are sealed.
- Longer service life. All-welded design with circumferential reinforcing bands provides structural integrity.

## STANDARD OPENINGS

### DuraWedge Element

Model 596 - All Sizes - 1/16, 1/32, 0.015”

Model 2596 - 10” to 16” - 1/8”, 1/16”, 1/32”, 0.015”, 0.009”

Model 2596 - 18” to 24” - 3/16”, 1/8”, 1/16”, 1/32”, 0.015”, 0.009”



## Convolute Element

This is a sturdy, economical stainless steel element for general service use. It is ideal in applications where leaves, twigs and large amounts of miscellaneous debris are encountered.

The generous spaces created by the convolutions provide an area for the debris to collect. “Packing” does not occur due to the gradual contoured shape of the convolutions.

During backwashing the debris is easily dislodged and carried away through the backwash arm and out of the strainer.

### Features

- Circumferential reinforcing bands for added resistance to pressure and flexing ensures long service life.
- Cartridge design for easy removal and cleaning.
- Convolute sections are individually isolated by the port shoe during backwash for increased cleaning efficiency.
- No snow plowing. Convolute profile provides collection spaces for debris.
- Extended area design offered only by Hayward
- No bypass
- Sinterbonded mesh available - A Hayward exclusive.

## STANDARD OPENINGS

### Convolute Perf Element

Model 596 - All Sizes - 1/8”, 1/16, 1/32

Model 2596 - 10” to 16” - 1/8”, 1/16, 1/32

Model 2596 - 18” to 24” - 5/32”, 1/8”, 1/16”

### Convolute Mesh Element

Model 596 - All Sizes - 40 mesh (0.015”), 60 mesh (0.009”), 80 mesh (0.007”)

Model 2596 - All Sizes - 40 mesh (0.015”), 60 mesh (0.009”), 80 mesh (0.007”)

**Note:** Screen element selection is important. A smaller than required opening will reduce the efficiency of the system. Please contact Hayward for prompt expert assistance to ensure proper element/strainer selection.

# SELF-CLEANING STRAINER COMPONENTS

## Features:

### Quality Construction

HAYWARD® Automatic Self-Cleaning Strainers are designed and constructed in general accordance with ANSI and ASME Section VIII, Division 1. A Code Stamp is available. Seismic qualification is also available.

### idL™ Seal

Hayward's unique idL shaft seal replaces older style packing and prevents troublesome leakage. This special quad seal means that the strainer always stays dry and clean in service with no process media leaking down the sides of the strainer.

### Ease of Maintenance

Unitized modular assembly – the motor, gear reducer, cover and complete internal operating mechanism lift off as a unit, making all components easily accessible. This greatly simplifies maintenance and reduces costs.

### Low Backwash Fluid Requirements

Due to the efficient hydraulic design of the backwash system.

### Material of Construction

Cast 2" through 20" in iron, ductile iron, carbon and stainless steel, Ni-resist, aluminum bronze. Fabricated 6" through 60" in carbon steel, stainless steel, Monel, and copper nickel.

### Choice of Screen Elements

To suit the particular service – Dura-Wedge, Perforated or Mesh elements.

### Minimal Power Consumption

1/3 HP drive motor in 2" through 8" Model 596, 1/4 HP in 10" through 16" Model 2596. 1/3 HP in 18" through 24", 1/2 HP in 30", 1 HP in 36" to 42", and 2 HP in 48" through 60".

### No Dirty Fluid Bypass

"Sealed End" cartridge screen element seat in close tolerance machined retained rings.

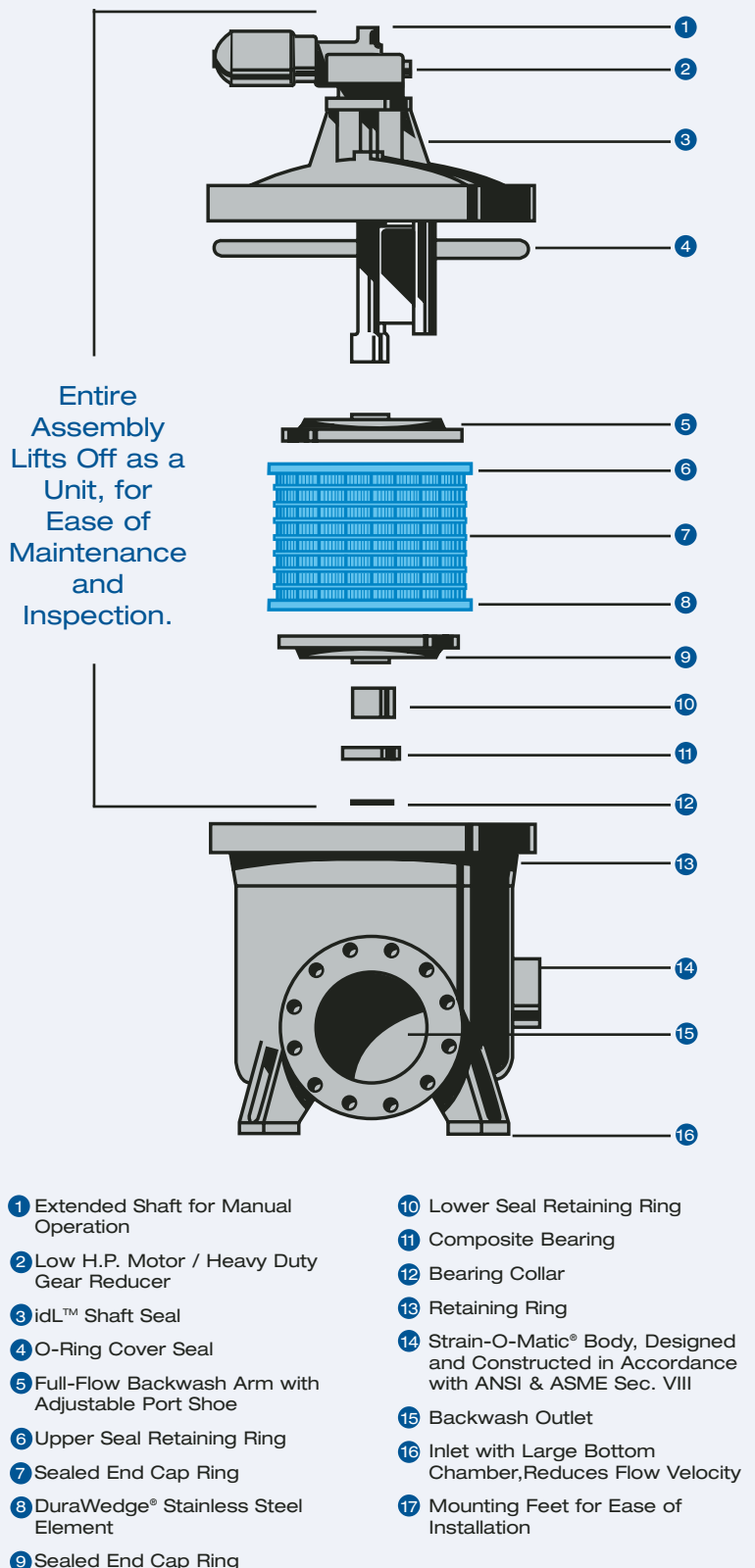
### Tight, Simple Cover Seat

O-ring design permits resealing without time-consuming gasket replacements and adjustment.

### Manual Operation if Required

Utilizing extended shaft.

## Typical Model 596



# APPLICATION CONSIDERATIONS

## Straining Elements

Hayward offers three kinds of straining elements: convoluted perforated plates, convoluted sinter-bonded mesh and DuraWedge™.

For coarse straining applications, such as raw water intakes from lakes, ponds and streams, the convoluted perforated elements will perform well and offer the most economical unit pricing.

On other applications, where pre-screening of the fluid has already been performed, but finer filtering of the fluids is desired, then the sinter-bonded mesh element may be selected.

On applications where fibrous materials will be encountered in the fluid being strained, then a DuraWedge® element may help to minimize the impact of the fibers stapling to the screen.

Standard available opening sizes are shown on page 26. The rule of thumb in determining the opening size is to be 1/2 of whatever opening is being protected.

## Debris

Cleaning of the straining element is accomplished by utilizing the pressure differential between line pressure and atmosphere. When the backwash valve is opened to atmosphere during the cleaning cycle, a portion of the strained fluid reverses flow back across the section of element being cleaned, lifts off the debris, and ejects the debris out of the strainer.

Sticky or greasy debris are more difficult to backwash and may require longer backwash cycle durations. Sand, dirt and pipe scale should backwash easily. The quantity of debris coming into the strainer can also be a problem. Insure that the volume of the suspended solids does not exceed 200 ppm or 0.02 percent. If the application requires heavier loading than this, consult Hayward.

## Backwash Requirements

The quantity of fluid required to clean a straining element is dependent upon the type and quantity of debris. Under normal conditions, approximately 5 percent of the line flow will be used for cleaning of the straining element during the cleaning cycle. The loss of fluid through the backwash can be minimized by adding a manual throttling valve downstream of the automated valve.

## Pressure and Temperature

- Model 596 Cast Iron and Model 2596 Ductile Iron are rated at 150 psi @ 150 F.
- Fabricated Units are rated at 150 psi @ 150 F, however other ratings are available, consult Hayward.
- For the Models 596 and 2596 the minimum operating pressure is 20 PSIG.
- For 596LDP Models the minimum operating pressure is 5 -10 PSIG depending on the application.



24" Model 2596 strainer.



# CONTROL SYSTEMS

## Design and Operation

Hayward® Automatic Control Systems (ACS) are specifically designed to monitor and operate the backwash cleaning system of Hayward Automatic Strainers. They are simple to operate, reliable and easily maintained. The design allows field adjustments to suit the demands of the service conditions, ensuring effective cleaning with a minimum use of backwash fluid.



Three basic systems, ACS-1, ACS-2 and ACS-3 are available.

Optional designs to meet specific requirements with special wiring arrangements, panel boxes (NEMA 7, 9), control valves, and air actuation among others, can be furnished.

## ACS-1 Standard Control System Components

This system features a NEMA 4 rated (water and dust tight) panel box complete with adjustable timer, differential pressure override, 10 amp control relay for backwash valve activation, display lights to indicate Power On – Backwash Valve Open – and High Differential Pressure. A selector switch is also included to manually control the backwash valve functions of Off or On-Auto. The panel also has contact terminals for a motor starter and an external alarm connection. The panel requires 110 VAC input and is CSA approved, UL approval is available as an option. The panel has a differential pressure switch and an electrically-actuated ball valve that controls the backwash function. With Model 596LPD for low pressure systems, an electrically-operated butterfly valve is included to control the external source of cleaning water.

## ACS-2 Standard Control System Components

This system has all of the features of the ACS-1 and includes a motor starter in addition to the other standard equipment.

## ACS-3 Standard Control System Components

This system has all of the features of the ACS-2 system and includes a 460V/120V dual voltage transformer.

## Motors

An electric motor and gear box are furnished as part of the strainer. The standard TEFC motor is 120/220V, Single phase 60Hz, or 230/460V Three Phase 60 Hz, at customer option. Other motors are available.

## Modes of Operation

By operating the selector switch, the controls can be easily switched to either of two modes: automatic intermittent or continuous backwashing.

The automatic intermittent mode is adjustable by setting the timer in the panel that controls the frequency of backwashing and the “open” time of the backwash valve. The settings will depend on the individual installation. Predicting average times is difficult because conditions vary. Experience will dictate the optimal settings. Field adjustments should be made to suit the application.

The differential pressure switch must also be set. Two PSID above the clean reading is the setting recommended. This switch will compensate for sudden high loadings by overriding the time cycle and initiating backwash should the differential pressure rise above the programmed setting. A secondary delay timer will continue the cleaning for 60 seconds beyond that point. The time delay can be varied from 1 to 150 seconds.

The continuous backwashing mode is positive, efficient and practical where the backwashing fluid can be recycled to its source. It is also desirable, and sometimes necessary, to use this mode when very high solid loadings are encountered.

This mode is initiated by placing the backwash switch on the panel in the “on” position. Manual operation of the system can be controlled with this switch, opening or closing the backwash valve as desired. Returning it to “auto” will restore the intermittent cycling as set.

In both the automatic intermittent and continuous backwashing modes the backwash arm continuously rotates at a low 2 -4 RPM.

## Differential Pressure Switch

A diaphragm-type differential pressure switch is a standard component in all Control Systems. It provides protection for the strainer and element, initiating backwash should a high differential pressure occur between timed cleaning intervals.

## Backwash Valve

Electrically actuated (115 VAC/60 Hz) ball valves are also standard in the Control Systems. Materials of construction are suitable for water service. Other materials, valve types and pneumatic actuation are optional.

## Backwash Valve Sizes

Strainer Size	2", 3", 4"	6", 8"	10 thru 20"	24", 30"	36", 42"	48"
Valve Size	1"	1½"	3"	4"	6"	8"

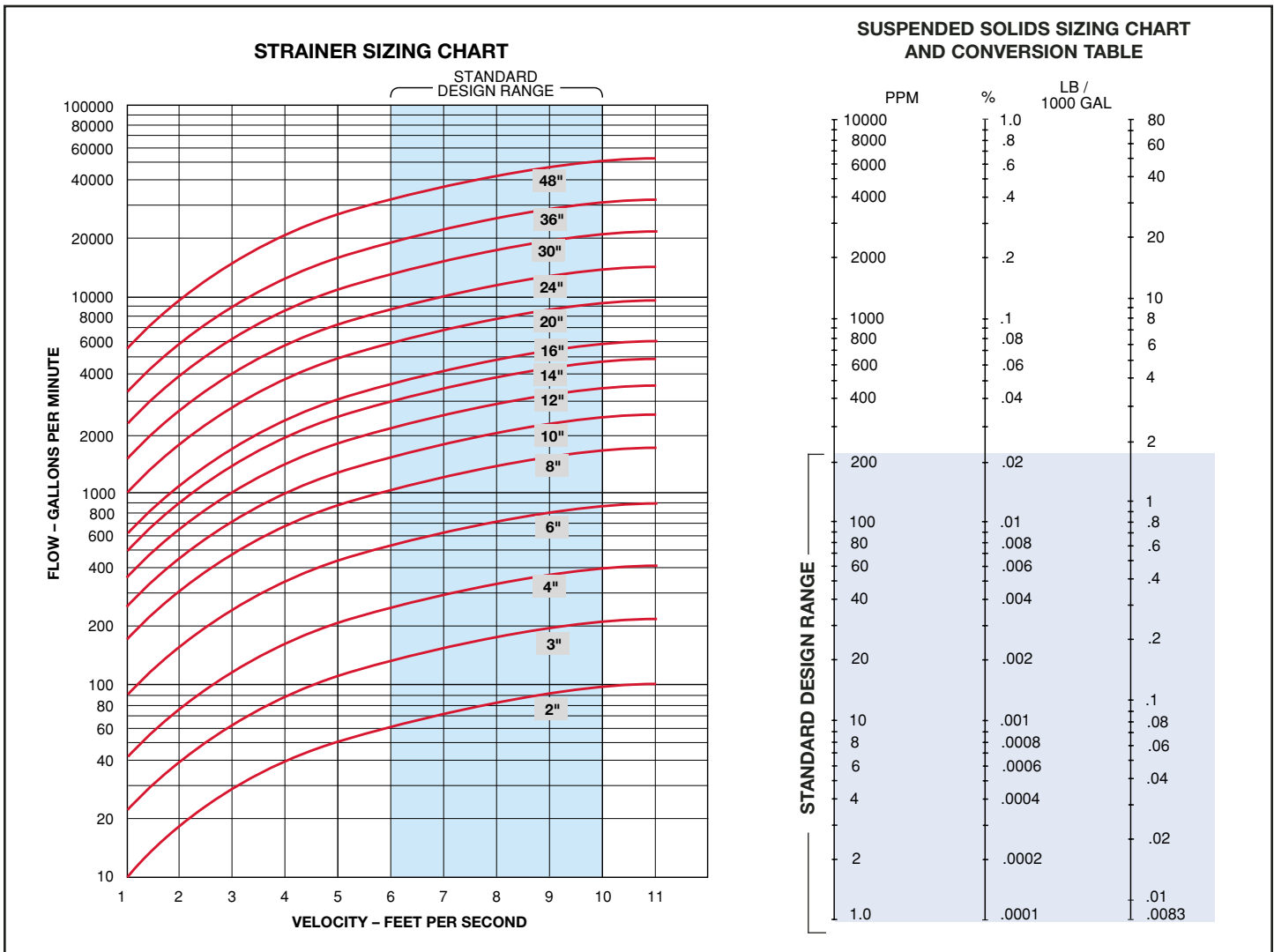
# AUTOMATIC STRAINER SIZING

## Basic Guidelines

1. Insure that the pipeline flow velocity falls within the standard design range of the strainer.
2. Select the correct screen and opening size, don't make smaller than necessary.
3. The quantity, type and nature of debris to be removed are considered.
4. The strainer meets the design pressure and temperature requirements of the pipeline.
5. Backwash line should discharge to atmosphere in close proximity to the strainer.

## Standard Design Parameters

1. Self-cleaning strainers have a design flow range where the unit will best perform its two main functions, straining and self-cleaning.
2. Inlet flow velocity to the strainer should be in the 6 to 10 feet per minute range. There may be applications where the operating flow will fall outside the normal design range. When this occurs, please contact Hayward for recommendations.
3. Minimum operating pressure is 20 PSI for standard units, 5-10 PSI for LDP units depending on the application.
4. Suspended solids should not exceed 200 PPM or 0.02% of volume. For heavier loadings consult Hayward.



# AUTOMATIC STRAINER SAMPLE SPEC

## Design

1. The Automatic self-cleaning Strainer shall be a Hayward Strain-O-Matic® Model 596 or 2596.

### 2. Strainer Design Parameters:

Strainer Inlet Size \_\_\_\_\_ in.

Flow Rate \_\_\_\_\_ GPM

Working Pressure \_\_\_\_\_ PSI (Min. 20 PSI)

Design Pressure \_\_\_\_\_ PSI

Design Temperature \_\_\_\_\_ °F

Max. Allowable Pressure Drop \_\_\_\_\_ PSID

Solids Loading \_\_\_\_\_ PPM

Design shall be in general accordance with ANSI and ASME Sec. VIII Division 1.

3. For ease of maintenance the strainer shall be designed so the entire operating assembly, motor, gear reducer, cover, backwash arm assembly, bearing housing and element lift from the strainer body as a complete unit.

4. For backwashing efficiency the entire open area of the backwash port opening shall be in close proximity to the full length of the screen section being backwashed. Additionally, the entire backwash arm shall have a full-flow opening throughout the entire passage to the backwash piping. The backwash arm shall not contact or scrape the screen at any point.

## Screen Element

1. Media Design parameters (check one):

Type:

DuraWedge™ media (vee-shaped profile wire)

Convoluted

Convoluted Sinterbonded

Opening Size:

Inches \_\_\_\_\_, Mesh Equivalent \_\_\_\_\_, Microns \_\_\_\_\_

2. The element shall be a one-piece cartridge design for ease of removal and cleaning.

3. The element shall have stainless steel “cap rings” at both ends to prevent bypass of dirty fluid. Reinforcing circumferential bands shall also be provided for structural strength.

## Materials of Construction

The strainer body shall be (iron, carbon steel, stainless steel, bronze) and shall be appropriate for the service conditions.

All components shall be of ASTM designed materials suitable for the service conditions and consistent with good engineering practice.

## Control System

The system shall be capable of automatically controlling and monitoring the strainer's operation.

The system shall have the following components.

The motor shall be a low HP TEFC single-phase 110/220V or three-phase 230/460V with a gear reducer to drive the backwash shaft.

A NEMA 4 control panel shall be furnished with three indicator lights (Power On, Backwash valve Open and High differential Pressure); a 3-position selector switch (Off-On-Auto) to control the backwashing cycle; and contacts for external alarm. (Motor starter and/or transformer are optional as specified).

A diaphragm-type differential pressure switch is to be provided that shall be capable of initiating backwashing at a set differential pressure.

An electrically actuated ball valve shall be provided to control the backwash flow.

## Low Differential Pressure Model

For line pressures below 20 PSI or for suction service, specify Strain-O-Matic Strainer Model 596LDP (Low Differential Pressure) design.

# AUTOMATIC STRAINER APPLICATION WORKSHEET

## Self-Cleaning Strainers

### GENERAL

SERVICE APPLICATION: \_\_\_\_\_

MARKET CODE: (CHECK ONE)

INDUSTRIAL       MUNICIPAL       POWER       PETROLEUM

LIQUID TO BE STRAINED: \_\_\_\_\_

SPECIFIC GRAVITY \_\_\_\_\_, VISCOSITY (CPS/SSU) \_\_\_\_\_, TEMP. (°F) \_\_\_\_\_

### FLOW CONDITIONS

FLOW (GPM): \_\_\_\_\_, MAXIMUM \_\_\_\_\_, MINIMUM \_\_\_\_\_, VEL (FT./SEC) \_\_\_\_\_

OPERATING PRESSURE (PSI): \_\_\_\_\_, NORMAL \_\_\_\_\_, DESIGN \_\_\_\_\_, MINIMUM \_\_\_\_\_

OPERATING TEMPERATURE (°F): \_\_\_\_\_, NORMAL \_\_\_\_\_, DESIGN \_\_\_\_\_, MINIMUM \_\_\_\_\_

MAX. ALLOWABLE PRESS. DROP (PSI) CLEAN \_\_\_\_\_, DIRTY \_\_\_\_\_

### CONTAMINANT

SOLIDS TO BE REMOVED: \_\_\_\_\_,  HARD       SOFT       STICKY       FIBROUS

SOLIDS CONCENTRATION: \_\_\_\_\_ PPM, \_\_\_\_\_ %WT, \_\_\_\_\_ % VOLUME

PARTICLE SIZE: \_\_\_\_\_ MICRONS OR \_\_\_\_\_ INCHES

ELEMENT:       PERFORATED       MESH       DURAWEDGE® ELEMENT

### STRAINER CONSTRUCTION

MODEL 2596:       CAST DUCTILE       FAB STEEL       FAB STAINLESS

MODEL 596:       CAST IRON       CAST STEEL       CAST STAINLESS

CAST BRONZE       FAB STEEL       FAB STAINLESS.

PIPELINE SIZE (INCHES): \_\_\_\_\_

END CONNECTIONS:       FLANGED       125#       150#       OTHER \_\_\_\_\_

### MOTOR

FRAME:       TEFC       TENV       OTHER \_\_\_\_\_

POWER SUPPLY:       120V, 1 PH, 60 HZ       230/460 V, 3 PH, 60 HZ,       OTHER \_\_\_\_\_

SPECIAL COMMENTS: \_\_\_\_\_

### CONTROL PACKAGE

TYPE:       ACS-1       ACS-2       ACS-3

SPECIAL REQUIREMENTS OR OPTIONS: \_\_\_\_\_

### SUBMITTALS (CHECK IF REQUIRED)

APPROVAL PRINTS       CERTIFIED PRINTS,       CHEMICAL/PHYSICAL CERTIFICATIONS

HYDRO TEST REPORTS,       OTHER \_\_\_\_\_

OTHER SPECIFICATIONS/REQUIREMENTS: \_\_\_\_\_



# FABRICATED STRAINER APPLICATION WORKSHEET

## Simplex, Duplex and Y Strainers

**LIQUID TO BE STRAINED** \_\_\_\_\_

SPECIFIC GRAVITY \_\_\_\_\_, VISCOSITY (CPS/SSU), \_\_\_\_\_ TEMP. (°F) \_\_\_\_\_

### FLOW CONDITIONS

FLOW (GPM): \_\_\_\_\_, MAXIMUM \_\_\_\_\_, MINIMUM \_\_\_\_\_, VEL (FT./SEC) \_\_\_\_\_

STEAM OR GAS FLOW: \_\_\_\_\_, STD CU FT/MIN (SCFM) \_\_\_\_\_, OR LB/HR \_\_\_\_\_,

(GIVE MINIMUM WORKING PRESSURE FOR GAS APPLICATIONS)

OPERATING PRESSURE (PSI): \_\_\_\_\_, NORMAL \_\_\_\_\_, DESIGN \_\_\_\_\_, MINIMUM \_\_\_\_\_

OPERATING TEMPERATURE (°F): \_\_\_\_\_, NORMAL \_\_\_\_\_, DESIGN \_\_\_\_\_, MINIMUM \_\_\_\_\_

MAX. ALLOWABLE PRESSURE DROP: CLEAN \_\_\_\_\_ PSI, DIRTY \_\_\_\_\_ PSI

CAN FLOW BASKET BE INTERRUPTED TO CLEAN STRAINER BASKET?  YES  NO

### CONTAMINANT

SOLIDS TO BE REMOVED: \_\_\_\_\_, ARE THEY?  HARD  SOFT  STICKY  FIBROUS

SOLIDS CONCENTRATION: \_\_\_\_\_ PPM, \_\_\_\_\_ %WT, \_\_\_\_\_ % VOLUME

PARTICLE SIZE: \_\_\_\_\_ MICRONS OR \_\_\_\_\_ INCHES

MESH OR PERFORATION \_\_\_\_\_

### STRAINER CONSTRUCTION

BODY COVER:  STAINLESS STEEL  CARBON STEEL  OTHER SPECIFY \_\_\_\_\_

PIPE SIZE (INCHES): \_\_\_\_\_

END CONNECTIONS:  THREADED  SOCKET WELD  BUTT WELD  FLANGED

ANSI  150 LB  300LB  600LB  OTHER \_\_\_\_\_

O-RING MATERIAL:  VITON®  BUNA-N  OTHER \_\_\_\_\_

### SPECIAL FEATURES REQUIRED

DIFFERENTIAL PRESSURE GAUGE  SWITCH  DRAIN VALVE  VENT VALVE

PAINTING \_\_\_\_\_ COATING \_\_\_\_\_

BOLTED COVERS  QUICK OPENING

SUPPORT LEGS: \_\_\_\_\_

### SUBMITTALS (CHECK IF REQUIRED)

APPROVAL PRINTS  CERTIFIED PRINTS,  CHEMICAL/PHYSICAL CERTIFICATIONS

HYDRO TEST REPORTS,  COMPLIANCE CERTIFICATIONS  SHOCK/VIBRATION TEST

**OTHER SPECIFICATIONS/REQUIREMENTS:** \_\_\_\_\_

The data contained in this publication are correct to the best of our knowledge. However, we do not assume any liability for the accuracy or completeness of such data. The final determination of suitability of product information, use intended, manners of that is, or infringement of patents, is the responsibility of the user.

# TECHNICAL DATA

## FLOW CONVERSION FACTORS

M <sup>3</sup> /hr = 3.671 I.G.M.
I.G.P.M. = 41.14 Barrels/Day
T.P.H. = 3.74 I.G.M.
I.G.P.M. = 1.2 U.S. G.P.M.
I.G.P.M. = 4.54 Liters/Min
LITER/MIN = 0.22 I.G.P.M.
U.S. G.P.M. = 0.833 I.G.P.M.
Barrel = 35 Imp. Gallons
Barrel = 42 U.S.Gallons

## FLOW VELOCITY CONVERSION FACTORS

$$\text{Velocity in Ft/Sec} = \frac{\text{GPM} \times 0.4085}{\text{ID}^2 \text{ in Inches}}$$

## VOLUME CONVERSION FACTORS

To Obtain: Multiply By:	U.S. Gallon	Imperial Gallon	U.S. Pint	U.S.Pound Water	U.S. Cubic Foot	U.S. Cubic Inch	Liter	Cubic Meter
U.S. Gallon	1	0.833	8.0	8.337	0.13368	231.0	3.78533	0.003785
Imperial Gallon	1.2009	1	9.60752	10.0	0.16054	277.42	4.54596	0.004546
U.S. Pint	0.125	0.1041	1	1.042	0.01671	28.875	0.473168	0.000473
U.S. Pound Water	0.11995	0.1	0.9596	1	0.016035	27.708	0.45405	0.00454
U.S. Cubic Foot	7.48052	6.22888	59.8442	62.365	1	1728.0	28.31702	0.028317
U.S. Cubic Inch	0.004329	0.00361	0.034632	0.03609	0.0005787	1	0.016387	0.0000164
Liter	0.2641779	0.2199756	2.113423	2.202	0.0353154	61.02509	1	0.001000
Cubic Meter	264.170	219.969	2113.34	2202	35.31446	61023.38	999.972	1

To convert from one unit to another, locate the starting unit in the left hand column. Multiply by the factor shown horizontally to the right under the desired unit.

## PRESSURE CONVERSION FACTORS

To Obtain: Multiply By:	Pound Sq. In.	Pound Sq. Ft.	Atmosphere	Kilogram Sq. Cm.	Inch Water	Foot Water	Inch Mercury	mm Mercury	Bar
Pounds/Sq. In	1	144.0	0.068046	0.070307	27.7276	2.3106	2.0360	51.7150	0.06895
Pounds/Sq. Ft.	0.0069545	1	0.000473	0.000488	0.1926	0.01605	0.014139	0.35913	0.000479
Atmosphere	14.696	2116.22	1	1.0332	407.484	33.9570	29.921	760.0	1.01325
Kilogram/Sq. Cm.	14.2233	2048.16	0.96784	1	394.27	32.864	28.959	735.558	0.9807
Inch Water	0.03607	5.194	0.002454	0.00254	1	0.08333	0.0734	1.865	0.00249
Foot Water	0.43278	62.3205	0.029449	0.03043	12.0	1	0.8811	22.381	0.02984
Inch Mercury	0.49115	70.726	0.033421	0.03453	13.617	1.1349	1	25.40	0.03386
mm Mercury	0.019337	2.7845	0.0013158	0.0013595	0.5361	0.04468	0.03937	1	0.001333
Bar	14.5038	2088.55	0.98692	1.0197	33.51	402.1	29.53	750.0	1

To convert from one unit to another, locate the starting unit in the left hand column. Multiply by the factor shown horizontally to the right under the desired unit.

**VISCOSITY  
EQUIVALENTS**

SSU (Saybolt seconds Universal)	Centipoise	Engler Degrees 20°C	Redwood Standard
30	1	—	—
50	5	2	44
100	20	3.5	88
200	40	16	175
300	65	30	263
400	85	43	350
500	105	57	440
600	130	72	525
700	150	90	615
800	175	115	700
900	195	132	790
1000	210	150	880
2000	425	350	1750
3000	625	540	2600
4000	860	740	3500
5000	1050	930	4550
6000	1300	1120	5250
7000	1500	1320	6150
8000	1700	1510	7300
9000	1920	—	—
10000	2150	—	—

**STRAINER BASKET OPENING EQUIVALENTS**

Mesh	Inches	Millimeters	Microns	Perf	Inches	Millimeters	Microns
400	0.0015	0.0381	38	1/32	0.033	0.838	838
300	0.0018	0.0457	45	3/64	0.045	1.143	1143
250	0.0024	0.0609	60	1/16	0.070	1.778	1776
200	0.0027	0.0686	68	3/32	0.094	2.387	2387
150	0.0041	0.1041	104	1/8	0.125	3.175	3175
100	0.0065	0.1651	165	5/32	0.150	3.810	3810
80	0.007	0.1778	177	3/16	0.1875	4.762	4762
60	0.009	0.2286	228	1/4	0.250	6.350	6350
40	0.015	0.8636	380	3/8	0.375	9.525	9525
20	0.034	0.8636	862	1/2	0.500	12.700	12700

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Hayward provides the most complete range of standard cast pipeline strainers for coarse filtration available from any manufacturer. These include Simplex, Duplex and Y Type Strainers in Iron, Bronze, Carbon Steel and Stainless Steel. For ultra-pure or highly corrosive applications, strainers of all plastic construction are available. Pipeline strainers range in sizes from 1/2" to 36".

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