TITAN FLOW CONTROL, INC.

SIMPLEX BASKET STRAINER ❖ RF FLANGED & THREADED

ANSI CLASS 150/300 ❖ CARBON AND STAINLESS STEEL

MODELS:

BS 35-CS
(CARBON STEEL - THREADED - 150/300)

BS 35F-CS
(CARBON STEEL - RF FLANGED - 150)

BS 35-SS
(STAINLESS STEEL - THREADED - 150/300)

BS 35F-SS
(STAINLESS STEEL - RF FLANGED - 150)

• *Quick-opening cover designs are available. Quick-opening, two bolt cover option is rated at 150 psi.*

SIZE RANGE:
THREADED: 3/8" ~ 3"
FLANGED: 1" ~ 8"

FEATURES

◇ **HIGH QUALITY CONSTRUCTION**
THE SERIES BS35 BASKET STRAINER IS AVAILABLE IN CARBON OR STAINLESS STEEL WITH EITHER THREADED OR FLANGED (RF) END CONNECTIONS. IT FEATURES A MACHINED GROOVE THAT ENCAPSULATES THE COVER GASKET AND AIDS IN PREVENTING GASKET BLOW-OUTS.

◇ **MINIMAL PRESSURE LOSS**
PRESSURE LOSS IS MINIMIZED BY PROVIDING AN OVER-THE-TOP FLOW PATH AND LARGE STRAINING AREA. THE STRAINING CAPACITY IS A MINIMUM OF SIX TIMES THAT OF THE CROSS SECTIONAL AREA OF THE CONNECTING PIPE.

◇ **LARGE STRAINING CAPACITY**
WITH ITS LARGE BODY AND SIZEABLE STRAINING ELEMENT, THE SERIES BS35 BASKET STRAINER CAN STORE LARGE AMOUNTS OF DEBRIS - THUS MAXIMIZING TIME BETWEEN SERVICING. IT ALSO FEATURES A MACHINED SEAT WITH O-RING THAT ENABLES FINE FILTRATIONS - DOWN TO 40 MICRONS.

◇ **NUMEROUS STRAINING ELEMENT OPTIONS**
STRAINING ELEMENTS ARE AVAILABLE IN A VARIETY OF PERFORATIONS, MESHES, AND MATERIALS. SPECIAL DESIGNS ARE ALSO AVAILABLE INCLUDING MAGNETIC, WEDGE WIRE, DRILLED PERFORATIONS, AND PLEATED STRAINING ELEMENTS. THE STANDARD MATERIAL FOR STRAINING ELEMENTS IS TYPE 304 STAINLESS STEEL.

◇ **SELF-CLEANING OPTION**
UTILIZING A MODIFIED STRAINING ELEMENT, THE BOTTOM DRAIN CAN BE FITTED WITH A TITAN FCI BALL VALVE TO ALLOW FOR THE AUTOMATIC CLEANING OR FLUSHING OF THE STRAINING ELEMENT WHILE KEEPING THE PIPELINE IN SERVICE.

TECHNICAL

PRESSURE/ TEMPERATURE RATING CS - ASTM A216 GR.WCB - CLASS 150
WOG (Non-shock): 285 PSI @ 100 °F
PRESSURE/ TEMPERATURE RATING SS - ASTM A351 GR. CF8M - CLASS 150
WOG (Non-shock): 275 PSI @ 100 °F
PRESSURE/ TEMPERATURE RATING CS - ASTM A216 GR.WCB - CLASS 300
WOG (Non-shock): 740 PSI @ 100 °F
PRESSURE/ TEMPERATURE RATING SS - ASTM A351 GR. CF8M - CLASS 300
WOG (Non-shock): 720 PSI @ 100 °F

APPLICATIONS

MARKETS: WATER & WASTEWATER, PULP & PAPER, CHEMICAL & PETROCHEMICAL, PETROLEUM, OIL & GAS, TRANSPORTATION, MARINE INDUSTRY, AND FOOD INDUSTRY

GENERAL APPLICATION: SIMPLEX BASKET STRAINERS ARE INSTALLED INTO A PIPELINE SYSTEM TO REMOVE UNWANTED DEBRIS FROM THE PIPELINE FLOW. BASKET STRAINERS ARE COMMONLY USED IN HORIZONTAL PIPELINES WHERE DEBRIS LOADING IS HIGH AND THE COLLECTION OF SOLIDS IS REQUIRED. STRAINING IS ACCOMPLISHED VIA A PERFORATED OR MESH LINED STRAINING ELEMENT, INTERNAL TO THE BASKET STRAINER. IN GENERAL, THE SIZE OF THE PERFORATION OR MESH SHOULD BE SLIGHTLY SMALLER THAN THE SMALLEST DEBRIS PARTICLE TO BE REMOVED. IT IS IMPORTANT TO NOTE THAT THE CORRECT SIZE OF A BASKET STRAINER IS DETERMINED BY ITS JOB FUNCTION, NOT BY THE SIZE OF THE PIPELINE.

The above data represents common market and service applications. No representation or guarantee, expressed or implied, is given due to the numerous variations of concentrations, temperatures and flow conditions that may occur during actual service.

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TITAN FLOW CONTROL, Inc.

SIMPLEX BASKET STRAINER

Threaded Ends (150/300 lb) — Raised Face Flanged Ends (150 lb)

BS 35-CS (Carbon Steel) — **BS 35F-CS** (Carbon Steel)

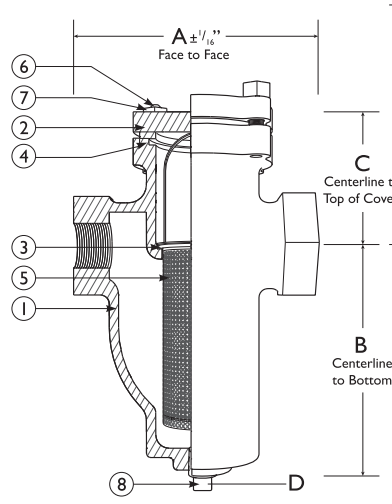
BS 35-SS (Stainless Steel) — **BS 35F-SS** (Stainless Steel)

ANSI Class 150/300 lb

BILL OF MATERIALS [1]

No.	PART	BS 35-CS & BS 35F-CS [2]	BS 35-SS & BS 35F-SS
1	Body	Carbon Steel A216 Gr. WCB	Stainless Steel A351 Gr. CF8M Type 316
2	Cover	Carbon Steel A216 Gr. WCB	Stainless Steel A351 Gr. CF8M Type 316
3	O-Ring (Basket) [3]	Buna-N	Viton
4	Gasket (Cover) [3][4][6]	Spiral Wound Stainless Steel Non-Asbestos	
5	Straining Element [3]	Type 304 Stainless Steel (Other materials are available)	
6	Studs	Alloy Steel A193-B7	Stainless Steel 18-8 Series 300
7	Nuts	Carbon Steel A194-2H	Stainless Steel 18-8 Series 300
8	Bottom Drain Plug	Carbon Steel	Stainless Steel

1. Equivalent or better materials may be substituted at the manufacturer's discretion.
2. Carbon Steel bodies are epoxy painted.
3. Denotes recommended spare parts.
4. Gasket is for the 4 bolt cover option, which is standard. If quick open cover is specified, the O-ring material for the cover is Buna-N on BS35-CS & BS35F-CS or Viton on BS35-SS & BS35F-SS.
5. Bolted cover is standard (3/8" - 8"). Quick-open cover 3/8"- 3" is 2 bolt style. Quick-open cover 4"- 8" is clamp style.
6. Carbon Fiber Compressed gasket may be substituted at the manufacturer's discretion.



1.5" BS 35 Threaded

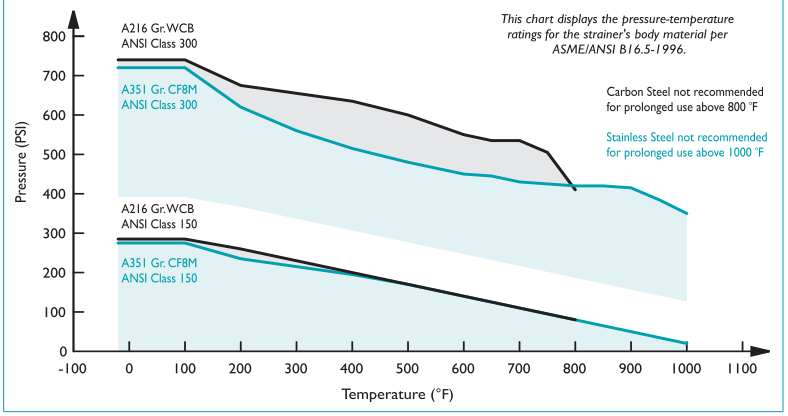
- *Illustration displays threaded end connection unit only. Table below contains dimensions for both threaded and flanged type units. Threaded Sizes: 3/8" ~ 3" Flanged Sizes: 1" ~ 8"*
- *Quick-opening cover designs are available. Quick-opening cover for 3/8" - 3" is a two bolt cover rated at 150 psi. Quick-opening cover for 4" - 8" is a clamp style cover, rated at 200 psi. Four bolt cover is shown and is standard.*
- *Bottom drain is furnished with plug.*

DIMENSIONS AND PERFORMANCE DATA [1]

Size		3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8
	mm	10	15	20	25	32	40	50	65	80	100	150	200
A_1 DIMENSION FACE TO FACE (THREADED)	in	4.562	4.562	4.562	5.312	6.312	6.312	8.25	11.25	11.25	n/a	n/a	n/a
	mm	116	116	116	135	161	161	210	286	286	n/a	n/a	n/a
A_2 DIMENSION FACE TO FACE (FLANGED)	in	n/a	n/a	n/a	5.687	n/a	7.00	9.00	10.375	11.75	15.00	20.25	27.375
	mm	n/a	n/a	n/a	145	n/a	178	229	264	299	381	515	696
B_1 DIMENSION CTR. LINE TO BOTTOM (THREADED)	in	4.00	4.00	4.00	4.687	6.50	6.50	7.875	8.75	11.375	n/a	n/a	n/a
	mm	102	102	102	120	166	166	201	223	289	n/a	n/a	n/a
B_2 DIMENSION CTR. LINE TO BOTTOM (FLANGED)	in	n/a	n/a	n/a	4.687	n/a	6.50	8.00	8.75	11.50	13.75	20.00	24.24
	mm	n/a	n/a	n/a	120	n/a	166	204	223	293	350	508	616
C_1 DIMENSION CTR. LINE TO TOP (THREADED)	in	2.50	2.50	2.50	2.75	3.00	3.00	3.625	4.00	4.50	n/a	n/a	n/a
	mm	64	64	64	70	77	77	93	102	115	n/a	n/a	n/a
C_2 DIMENSION CTR. LINE TO TOP (FLANGED)	in	n/a	n/a	n/a	3.00	n/a	3.00	3.75	4.00	4.75	6.18	7.88	10.55
	mm	n/a	n/a	n/a	77	n/a	77	96	102	121	157	201	268
D DIMENSION NPT BLOW-OFF (BOTH)	in	3/8	3/8	3/8	3/8	1/2	1/2	3/4	1	1	2	2	2
	mm	10	10	10	10	15	15	20	25	25	50	50	50
E DIMENSION SCREEN REMOVAL (BOTH)	in	4.812	4.812	4.812	5.875	8.125	8.125	10.125	11.875	14.812	19.875	29.125	37.125
	mm	123	123	123	150	207	207	258	302	377	505	740	943
ASSEMBLED WEIGHT THREADED (APPROXIMATE)	lb	6.0	6.0	5.5	8.0	16.0	16.0	25.5	49.0	51.0	n/a	n/a	n/a
	kg	2.7	2.7	2.5	3.6	7.3	7.3	11.6	22.2	23.1	n/a	n/a	n/a
ASSEMBLED WEIGHT FLANGED (APPROXIMATE)	lb	n/a	n/a	n/a	11.0	n/a	19.5	31.5	44.5	65.5	142.0	266.0	518.0
	kg	n/a	n/a	n/a	5.0	n/a	8.8	14.3	20.2	29.7	64.4	120.5	234.7
Flow Coefficient	C_V	14	14	14	23	42	42	70	90	140	290	780	1600

1. Dimensions, weights, and flow coefficients are provided for reference only. When required, always request certified drawings. • *Threaded Sizes: 3/8" ~ 3"* • *Flanged Sizes: 1" ~ 8"*

PRESSURE - TEMPERATURE RATINGS



PRESSURE - TEMPERATURE RATING [1]

ANSI CLASS 150	A216 Gr.WCB [2]	A351 Gr. CF8M [2]
WOG (Non-shock)	285 PSI @ 100 °F	275 PSI @ 100 °F
ANSI CLASS 300	**A216 Gr.WCB [2]**	**A351 Gr. CF8M [2]**
WOG (Non-shock)	740 PSI @ 100 °F	720 PSI @ 100 °F

1. Threaded units are dual rated ANSI Class150/300. Flanged units are rated at ANSI Class 150.
2. Pressure and Temperature ratings are considerably lower for units installed with the optional quick-opening covers. Please consult factory for further information.

STANDARD STRAINING ELEMENTS

Size	Liquid	Open Area	Steam	Open Area
3/8" ~ 2"	1/16 (.0625)	41%	1/32 (.033)	28%
2 1/2" ~ 4"	1/16 (.0625)	41%	3/64 (.045)	36%
5" ~ 8"	1/8 (.125)	40%	3/64 (.045)	36%

REFERENCED STANDARDS & CODES

Code	Description	Code	Description
ASME/ANSI B16.5	Pipe Flanges and Flanged Fittings	ASME/ANSI B16.11	Forged Steel Fittings, Socket-Welding and Threaded

Titan FCI makes every effort to ensure the information presented on our literature accurately reflects exact product specifications. However, as product changes occur, there may be short-term differences between actual product specifications and the information contained within our literature. Titan FCI reserves the right to make design and specification changes to improve our products without prior notification. When required, request certified drawings.

TITAN FLOW CONTROL, INC.

INSTALLATION, OPERATION, AND MAINTENANCE

PREFACE:

This manual contains information concerning the installation, operation, and maintenance of Titan Flow Control (Titan FCI) Simplex Basket Strainers. To ensure efficient and safe operation of Titan FCI Simplex Basket Strainers, the instructions in this manual should be thoroughly read and understood. This manual is general in nature and is not meant to take the place of an on-site, process engineer or pipe fitter. As such, Titan FCI recommends that only experienced, skilled personnel be allowed to install and maintain Titan FCI Simplex Basket Strainers. Please retain this manual in a location where it is readily available for reference.

GENERAL INFORMATION:

A Basket Strainer is installed into a pipeline system to remove unwanted debris from the pipeline flow. In comparison to WYE Strainers, Basket Strainers are commonly used in pipelines where debris loading is high and the collection of solids is required. Basket Strainers can be installed in a series to provide more effective filtration of unwanted debris. Straining of the pipeline flow is accomplished via a perforated or mesh lined basket, internal to the strainer. In general, the size of the basket perforation should be slightly smaller than the smallest debris particle to be removed. If the basket perforation is undersized, the basket may require excessive cleaning. Consequently, if the basket perforation is oversized, unwanted debris may be permitted to flow through the pipeline, possibly damaging downstream equipment. The correct size of Basket Strainer is determined by its job function, not by the size of the pipeline.

Prior to selection of a Titan FCI Basket Strainer, the following factors must be determined:

- Material construction requirements of the Basket Strainer.
- Design and working pressure/temperature requirements.
- Operating conditions (throttling, pressure drop, condensation, flow reversal, operation frequency, etc.).
- Service media type (liquid, gas, abrasive, corrosive, dirty, etc).
- Pipeline Media Flow-rate and Viscosity.
- Debris Size to be removed and debris loading of the pipeline.
- Ability to interrupt flow for servicing and cleaning
- Clean Start-up Pressure of the Pipeline.
- Space availability for installation.

Please contact a Titan Design Engineer to assist in the determination of these requirements prior to selection and purchase.

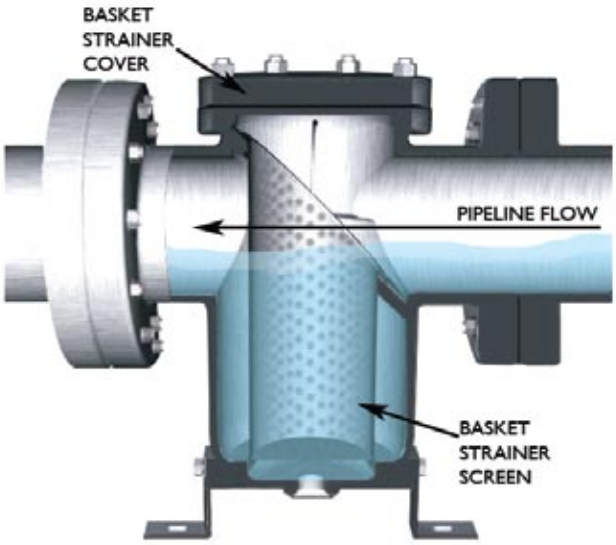


Figure 1: Simplifed Illustration of Installed Basket Strainer with Bolted Cover

UNPACKING AND INSPECTION:

Upon receipt of product, it is important to follow these unpacking and inspection procedures.

All Titan FCI Basket Strainers are shipped in specialized shipping containers designed to prevent damage during transportation. If external damage to the shipping container is evident upon receipt of product, please request that a representative of the shipping carrier be present before unpacking the product.

- Carefully open the shipping container, following any instructions that may be marked on the container. Remove all packing material surrounding the Basket Strainer and carefully lift it from the container. It is recommend to keep the shipping container and all packing material for reuse in storage or reshipment.

CAUTION:

For large or heavy Basket Strainers, the appropriate material handling equipment must be used to prevent injury and possible damage to the Basket Strainer.

UNPACKING AND INSPECTION: Continued...

- Visually inspect the Basket Strainer for any signs of damage including scratches, loose parts, broken parts or any other physical damage that may have occurred during shipment. If damage is observed, immediately file a claim with the shipping carrier. Basket Strainers that are damaged during transportation are the responsibility of the customer. For information regarding Titan FCI's warranty policy, please refer to the last page of this document.

- Before installation, the Basket Strainer's cover should be removed and inspected internally for any loose or foreign materials that may have become trapped in the screen during transportation. After inspection, ensure sealing surfaces are clean and replace the gasket and cover. Make sure the gasket is seated correctly before tightening the cover bolts.

- If the Basket Strainer is not required to be installed immediately, it should be stored indoors in a clean, dry, consistent temperature environment. It is also recommended to utilize the original shipping container and packing materials to properly store the Basket Strainer. If long term storage is required, a desiccant may be necessary. This would be based upon the local, environmental storage conditions. Please consult a Titan FCI Design Engineer to assist in this determination.

- When ready to install, remove any preservatives with solvent dampened cloths. Remove any loose material and protective packing material.

INSTALLATION:

Pre-Installation Checklist

- Ensure Working conditions (pressure and temperature) are within the specified capacity of the product being installed. Please refer to the certified Engineering drawings to assist in determining these values.

- Make sure that the construction material of the Strainer is chemically compatible with the media flowing in the pipeline.

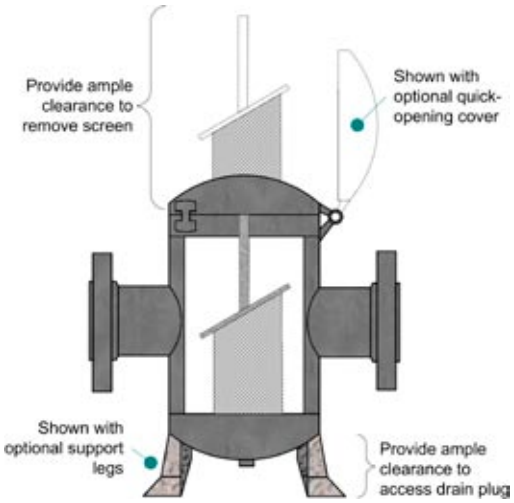


Figure 2: Basket Strainer (Fabricated Design)

Pre-Installation Checklist continued...

- Inspect the Basket Strainer's flange ends and the pipeline's mating flanges to ensure gasket surfaces are free of defects. The pipeline should also be checked for proper alignment. Titan FCI Basket Strainers should never be utilized to realign an existing piping system.

- Ensure that the pipeline's mating flanges are the same type as the Basket Strainer being installed. Raised face flange ends cannot be mated to flat face flange ends.

- Ensure that the pipeline set-up allows a horizontal installation of the Basket Strainer; Titan Simplex Basket Strainers can only be installed in horizontal pipelines.

- If pipeline strain is a concern when installing larger Basket Strainers (6" and above), a concrete or steel pad should be used to provide additional support. Larger Basket Strainers can also be fitted with legs to assist in reducing strain on the pipeline.

- If the Basket Strainer is to be located on the discharge side of a pump, then a safety release valve must be installed between the Basket Strainer and the pump.

INSTALLATION: Continued...

Installation Procedure

Step 1:
Titan Basket Strainers must be positioned in the pipeline ahead of the equipment requiring protection. If the equipment requiring protection is a pump, the Basket Strainer must be placed on the suction side of the pump.

Step 2:
To provide for easier maintenance, the Basket Strainer should be located where the drain plug can be removed and where there is ample space above the Basket Strainer for screen removal. Refer to the certified engineering drawing to determine the screen clearance requirements.

Step 3:
Before placing the Basket Strainer into place, support the existing pipeline with pipe supports near the inlet and outlet connections of the Basket Strainer.

Step 4:
Place the Basket Strainer into the pipeline, ensuring that the flow arrow on the body of the Basket Strainer is pointing in the direction of the pipeline flow. For large or heavy Basket Strainers, lift the Basket Strainer into place using slings positioned underneath the inlet and outlet connections.

Step 5:
Install a standard, ANSI (1/8" thick) flange gasket between the Basket Strainer and pipeline flanges, on both sides. Install lubricated flange bolts and hand tighten. Flange bolts should then be tightened, using a star or crisscross pattern to evenly load the bolts, in accordance with established piping standards. This is illustrated in Figure 3.

CAUTION:

Excessive bolt torque may damage flanges. Please refer to established flange bolt torques for guidelines.

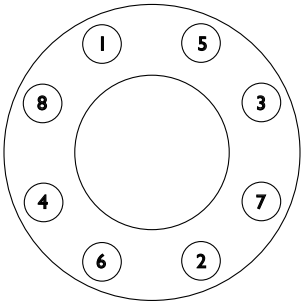


Figure 3: Bolting Sequence Pattern

OPERATION:

Once proper installation has been successfully completed, start the system gradually, at start up as well as after shut down. This eliminates sudden shock to the strainer and other equipment in the line.

Start-up Procedure:

Step 1:
Remove air from the pipeline by opening the blow-down valve or other vent near the Basket Strainer.

CAUTION:

With piping systems that contain fluids other than water or when the working temperature is above 120° F, fluid must be drained to safe area, away from the operator. Operators should always be fitted with appropriate protective equipment when venting is performed.

Step 2:
Start the piping system by opening the outlet valve nearest the Basket Strainer's outlet first. Then gradually open the inlet valve nearest the Basket Strainer's inlet, approximately 25% of normal operational flow. It is important to start the system gradually to avoid displacing or damaging the Basket Strainer.

Step 3:
Continue to open the inlet valve until the desired service flow has been reached.

Step 4:
Close blow-down valve or other pipeline vent.

MAINTENANCE:

Titan Flow Control Simplex Basket Strainers require little monitoring once they are properly installed. The pressure differential across the basket should be check periodically to determine if the basket needs to be cleaned or replaced. If the pressure differential goes unchecked and the screen becomes completely clogged, the screen will break and require replacing.

CAUTION:

Basket Strainer screens are not designed to withstand the same pressure ratings as the housings. If the basket becomes completely clogged, it will be exposed to the same pressure as the housing. In most cases, this will cause the basket to fail and potentially damage downstream equipment.

Titan Flow Control Basket Strainers are designed to require very little maintenance. Regular maintenance involves:

- Periodically checking for leaks.
- Timely cleaning or replacement of screen.

During normal use, the basket will become clogged with foreign matter, causing the differential pressure to increase. Once the differential pressure has increased to an unacceptable value, typically by 5 psi to 10 psi, it is time to clean or replace the basket. It is not advisable to let the differential pressure increase by 20 psi. This may cause the screen to fail and possibly damage downstream equipment.

A convenient and safe way to determine when the basket needs to be replaced is to install pressure gauges on the inlet and outlet sides of the Basket Strainer. The maximum acceptable pressure drop across the Basket Strainer will indicate when the screen needs to be replaced. Basket size and construction determine the maximum pressure drop a Basket Strainer screen can withstand. Please consult factory for exact pressure ratings.

Strainer Element Cleaning

CAUTION:

Before removing the cover of the Basket Strainer, the pressure inside the vessel must be reduced to atmospheric via suction or venting. Failure to do so may result in serious bodily injury.

Strainer Element Cleaning: continued...

CAUTION:

Before removing the Basket Strainer's cover, ensure that the media that is flowing in the pipeline is known and any special handling precautions are understood. Please review the Material Safety Data Sheet (MSDS) for that specific fluid.

Step 1:
Isolate the Basket Strainer by closing the inlet and outlet valve connections on either side of the Basket Strainer.

Step 2:
Open vent or drain plug to relieve pressure inside the Basket Strainer. Drain fluid up to screen seat level.

Step 3:
Once pressure is relieved, remove the cover.

Step 4:
Remove basket and clean. Avoid banging or hitting the screen to remove stubborn debris. It is recommended to use a high pressure water or air stream to clean screen.

Step 5:
Inspect basket and cover gasket for damage. If either is damaged, replace. Always ensure there is a spare gasket and basket on hand prior to maintenance.

Step 6:
Remove any debris or sludge from within the Basket Strainer.

Step 7:
Replace clean basket into its original position, ensuring it is squarely positioned on the screen seat.

Step 8:
Replace cover gasket and replace and tighten cover.

Follow the Start-up procedure outlined within the OPERATION section of this manual.

SPARE PARTS LIST:

For the bill of materials and spare parts listing of each Basket Strainer model, please refer to the corresponding Engineering Specification Sheet. For special or fabricated units, please refer to the certified engineering drawing for that unit.

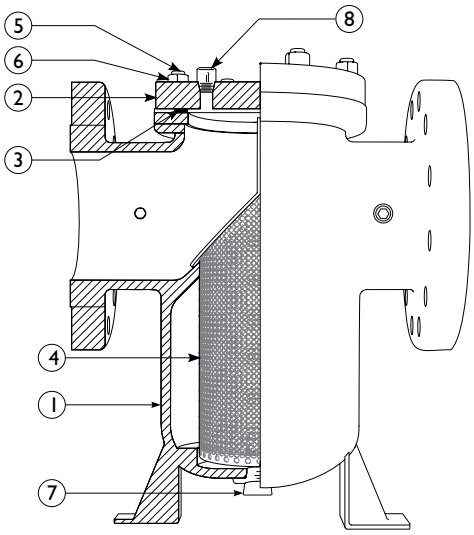


Figure 4: CAD Illustration

SAMPLE PARTS LIST	
No.	**Simplex Basket Strainer**
1	BODY
2	COVER
3*	COVER GASKET
4*	BASKET
5*	STUD
6	NUT
7	NPT PLUG
8	NPT PLUG

* Denotes recommended spare parts

WARRANTY:

Seller warrants each of the products and parts sold hereunder, under normal use of service, and subject to user's compliance with any operating instructions and other directions given by seller, to be free from defects in materials or workmanship for a period of one year from date of shipment from seller's plant. Seller's liability, under this warranty, shall be limited to, at the seller's option, to repairing or replacing any such defective product FOB seller's plant in Lumberton, NC, and reimbursing purchaser for shipping costs, subject to the following: (1) Timely receipt of purchaser's written notice that such products are defective. (2) Seller's written authorization to purchaser for the return of such products, (3) the return of such products to seller with shipping charges prepaid and (4) seller's inspection of and confirmation that such products are defective in materials or workmanship. If seller's inspection shows that the products returned are defective due to dirt, rust or any foreign material not attributable to seller: improper usage, over tightening on threads, abuse or incorrect assembly in the field, or other cause not due to seller's improper manufacture, seller will, subject to purchaser's written authorization, repair or replace such products at cost. Seller's factory inspection and testing reports will be made available to purchaser upon request.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY. SELLER SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. NO REPRESENTATIVE OR SELLER HAS AUTHORITY TO MAKE ANY REPRESENTATIONS OR WARRANTIES, EXCEPT AS STATED HEREIN.