FILTER SOLUTIONS INC

PRODUCT CATALOGUE

2018 EDITION-001

SERVING ALL YOUR FILTRATION NEEDS SINCE 1998

FILTER SOLUTIONS INC.

INTRODUCTION

Filter Solutions Inc. (FSI) brings over 20 years of experience, knowledge and skill in the manufacture of innovative and cost-effective solutions to the large array of process fluid filtration challenges facing industry today.

FSI provides custom engineered and fabricated filtration equipment such as bag, cartridge, high flow & magnetic filtration units, pipeline strainers, and gas/liquid & liquid/liquid separators, to meet all industrial filtration needs. FSI also distributes a wide range of filter elements (absolute rating of 0.2 to 200 microns) from the most reputable manufacturers in North America.

FSI's equipment, including 10 and 25ton cranes, welding positioners from 400lbs to 12ton capacity, Sub Arc, Tig, Mig and Stick welding machines, radial drill press, 65 ton press brake, water jet and plasma cutters, and 30,000 sq.ft of manufacturing area, consisting of 4,000 sq.ft of receiving, painting and assembly space, 6,000 sq.ft of stainless steel fabrication, 8,000 sq.ft of carbon steel fabrication, and 12,000 sq.ft of water jet & plasma cutting, are effectively employed to expedite production and allow FSI to provide the fastest deliveries. While FSI's highly qualified staff and strict quality assurance program ensures steadfast conformance to all industry requirements.

All "U" or "UM" Code filter housings are designed, manufactured and tested in Canada in accordance with ASME Section VIII Division 1, certifying the highest level of quality and safety in all our products. FSI Code vessels can also be registered with CRN and National Board upon request. Non-Destructive Examination (NDE), such as radiography, ultrasonic, and magnetic particle testing, as well as others, can be utilized in compliance with Code or the industry's most stringent requirements. All fabricated vessels are 100% tested and inspected to ensure that every product performs to design specifications before leaving our facility.

MISSION STATEMENT

It is Filter Solutions Inc.'s mission to provide the finest industrial fluid filtration products and the most comprehensive solutions for all the challenges faced in industry today. FSI is committed to become a world innovator in filtration engineering, design and manufacturing, and to cater to all the needs of the filtration industry. Through careful analysis, highest level customer support, and cost effective solutions, FSI strives to become a business that is highly respected in industry across the globe.

Filter Solutions Inc. continues to honour a tradition of quality, reliability and performance when serving the needs of our market. These guiding values will continue to be the driving force behind the success of the company, its employees and the clients we serve.

649 Enfield Road, Burlington, Ontario L7T 2X9 Toll Free: 877-352-2301 Fax: 905-637-3031 info@filtersolutions.com www.filtersolutions.com

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OVERVIEW

ENGINEERING CAPABILITIES
Mechanical Calculation: Yes
Process Calculation: Yes
CAD: Yes
Compress: Yes
FEA: Yes

DRAFTING CAPABILITIES
Vessel: Yes
Piping: Yes
Structural Skid/Platform: Yes
3D: Yes

CODE DESIGN CAPABILITIES
ASME B31.1, B31.3, B31.4, B31.8
ASME SECTION VIII DIV.1
CSA B51
Others

CODE STAMP CAPABILITIES
"U" and "UM"
Others are available upon request

MANUFACTURE QUALITY SYSTEM
FSI's QS (ASME & TSSA approved)

VESSEL REGISTRATION CAPABILITIES
CRN registration
National Board registration

INDUSTRY COMPLIANCE CAPABILITIES
Sour Service: NACE MR103, MR1075 & ISO-15156-1
Sour Service Welding: NACE SP0472
PIP Standard
All Petroleum/Oil & Gas Specifications
Sanitary finish (CIP & COP)

WELDING CAPABILITIES
SMAW: CS, SS, Alloy20, Hastelloy
GTAW: CS, SS, Duplex SS, Alloy20, Hastelloy, Titanium, Aluminum.
GMAW: CS, SS, Duplex SS
SAW: CS

FINISHING CAPABILITIES
Hydro test: Up to 5000 PSI(345 BAR)
Paint: Yes
Blasting/Electro Polish: Yes
PWHT: Yes

THIRD PARTY NON-DESTRUCTIVE EXAMINATION AVAILABLE
RT, UT, PT, MT, WMT, HT and PMI

PRODUCTS DESIGNED & MANUFACTURED
Bag Filter Housing
Cartridge Filter Housing
High Flow Filter Housing
Gas filter Separator
Gas Coalescer Housing
Liquid Separator Housing
Carbon Canister Housing
Basket Strainer Housing
T-Strainer Housing
Y-Strainer Housing
Temporary Strainer
Magnetic Filtration
All custom skid package system

PRODUCTS DISTRIBUTED
Filter Elements: Absolute/Nominal rated 0.2 to 200 micron
Activated Carbon Canister

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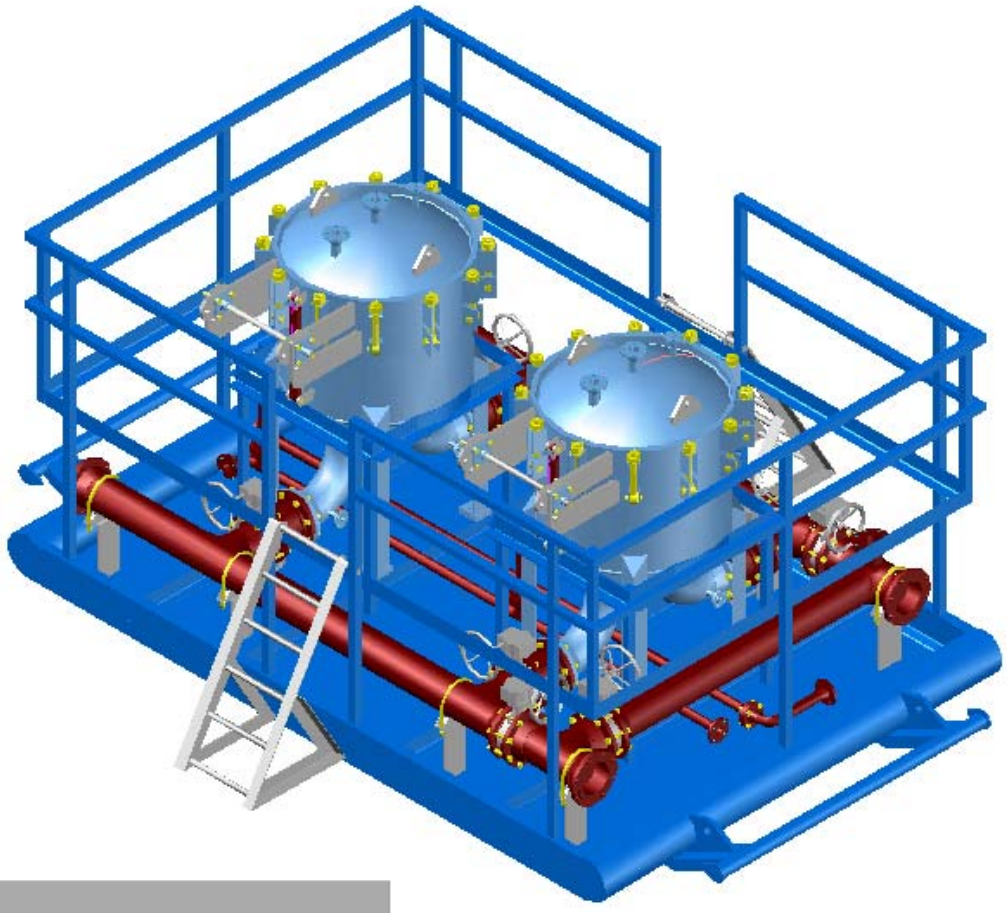

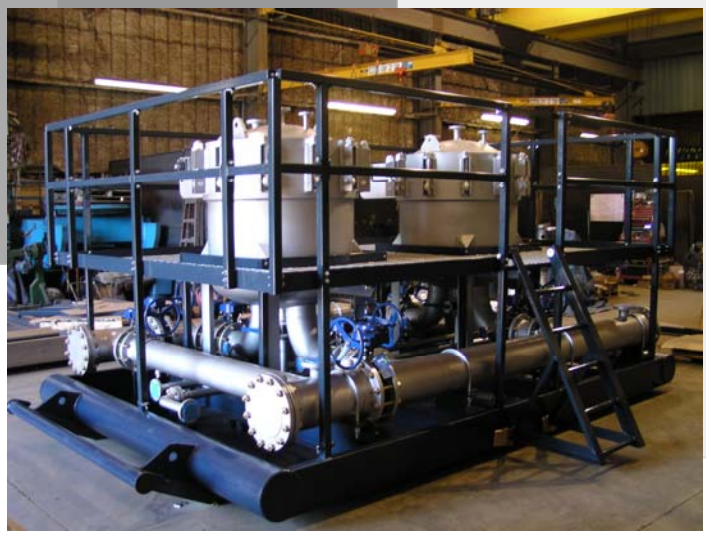

BHFS SERIES

BAG FILTER HOUSING

APPLICATIONS

Oil and Gas Industry
Adhesives and Resins
Water & Waste Water
Pharmaceutical and Cosmetics
Chemical Industry
Food and Beverages
Petroleum Industry
Power Industry

HOUSING MODELS

BHFS - Single Bag Housing

BHFS - Multi Bag Housing

CODE OF CONSTRUCTION

ASME Sect. VIII Div.1 - Pressure Vessel Code

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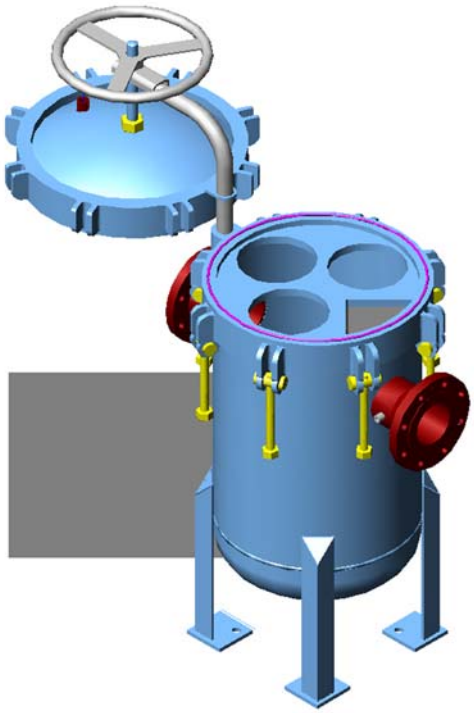
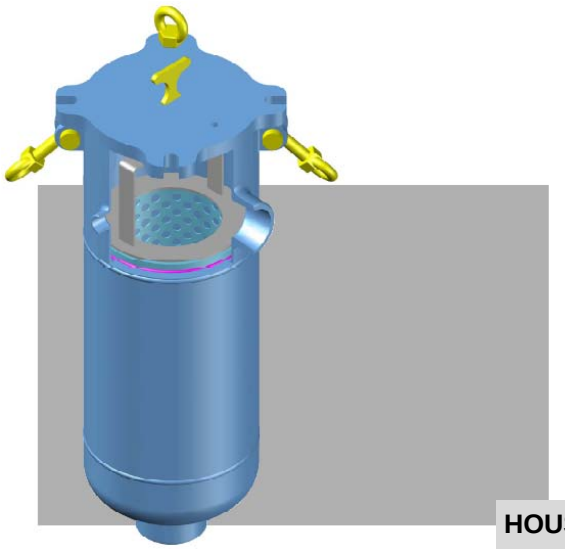
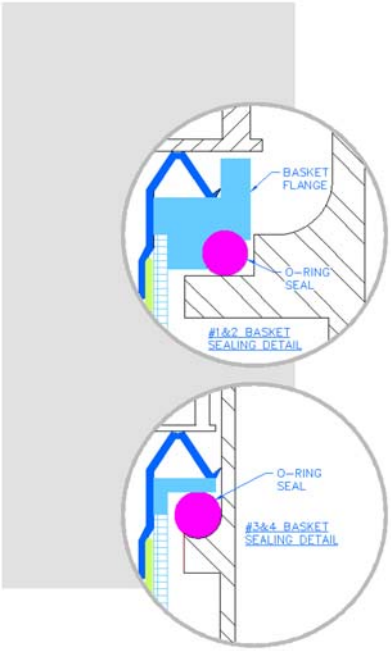
FSI's Filter bag housings can effectively remove dirt, pipe scales an contaminates from process liquids in the chemical processing, petroleum, wastewater process industries and more. Creative innovation has allowed FSI to provide a broad range of filter bag vessels to meet the standards, as well as the most demanding applications, found in process industries.





HOUSING MODELS

BHFS90SE - #1 SIZE BAG HOUSING
BHFS180SE - #2 SIZE BAG HOUSING
BHFS20SE - #3 SIZE BAG HOUSING
BHFS40SE - #4 SIZE BAG HOUSING
BHFS360 TO 4320 - MULTI BAG HOUSING(2 ROUNDS TO 24 ROUNDS)



FEATURES

1. All standard bag housings come with Swing Bolt Closures, with SA 193 B7/SA 194 2H (zinc plated) nuts and bolts, for quick and easy access.
2. All baskets come with an O-ring seal to prevent bypass.

HOUSING STANDARD SPECIFICATIONS

Design Code: ASME Section VIII, Division 1
Design Pressure: 150 PSIG / 1034 KPAG
Design Temperature: -20^{O}F/225^{O}F(-29^{O}C/107^{O}C)
M.O.C: CS, 304SS, 316SS and others
Closure: Swing Bolt with EPDM O-ring seal
Exterior Finish: (SS) Electro-polish
Exterior Finish: (CS) Blue Enamel

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FILTER SOLUTIONS INC

STANDARD SINGLE BAG FILTER HOUSING SPECIFICATIONS

MODEL NUMBER	[2]HOUSING M.O.C	HOUSING SIZE	[2]INLET / OUTLET SIZE	[2]VENT	[2]DRAIN	[2]GAUGE PORT	[2]DESIGN PRESSURE	[2]DESIGN TEMP. RANGE	APPROX EMPTY WEIGHT		[1]MAX. FLOW RATE THROUGH HOUSING WITH BAG		[1]PRESSURE DROP THROUGH HOUSING WITHOUT BAG @ MAX FLOW RATE		[2]HOUSING EXTERNAL SURFACE FINISH		[2]INLET/OUTLET CONFIGURATION STYLE	[2]CLOSURE STYLE	REPLACEMENT BAG SIZE
			N1/2	N3		N4	PSIG/KPAG	°F / °C	LB	KG	GPM	LPM	PSID	KPAD	STAINLESS STEEL	C/S			
BHFS20SE	CS/ 304SS/ 316SS	4"	1"FNPT	1/4"FNPT	N/A	N/A	150 PSIG / 1034 KPAG	-20 TO 225°F/ -29 TO 107°C	20	9	20	95	0.18	1.23	ELECTRO-POLISH	BLUE ENAMEL	STYLE 1	EPDM & SWING BOLT W/ HANDLE	#3
BHFS40SE		4"	1.5"FNPT	1/4"FNPT	N/A	N/A			24	11	40	189	0.71	4.90			STYLE 1		#4
BHFS90SE		8"	2"FNPT	1/4"FNPT	N/A	N/A			80	36	90	303	0.67	4.62			STYLE 1		#1
BHFS180SE		8"	2"FNPT	1/4"FNPT	N/A	N/A			95	43	180	568	2.36	16.24			STYLE 1		#2

STANDARD MULTI BAG FILTER HOUSING SPECIFICATIONS

MODEL NUMBER	[2]HOUSING M.O.C	HOUSING SIZE	[2]INLET / OUTLET SIZE	[2]VENT	[2]DRAIN	[2]GAUGE PORT	[2]DESIGN PRESSURE	[2]DESIGN TEMP. RANGE	APPROX EMPTY WEIGHT		[1]MAX. FLOW RATE THROUGH HOUSING WITH BAG		[1]PRESSURE DROP THROUGH HOUSING WITHOUT BAG @ MAX FLOW RATE		[2]HOUSING EXTERNAL SURFACE FINISH		[2]INLET/OUTLET CONFIGURATION STYLE	[2]CLOSURE STYLE	REPLACEMENT BAG SIZE
			N1/2	N3	N4	N5/6	PSIG/KPAG	°F / °C	LB	KG	GPM	LPM	PSID	KPAD	STAINLESS STEEL	C/S			
BHFS360	CS / 304SS / 316SS	18"	3"-150#	1/4"FNPT	1"FNPT	(2)1/2"FNPT	150 PSIG / 1034 KPAG	-20 to 225°F / -29 to 107°C	430	195	360	1136	1.94	13.38	ELECTRO-POLISH	BLUE ENAMEL	STYLE 1	EPDM & SWING BOLT W/ DAVIT	2-#2
BHFS540		18"	4"-150#	1/2"FNPT	1"FNPT	(2)1/2"FNPT			440	200	540	1703	1.47	10.16			STYLE 1		3-#2
BHFS1080		24"	6"-150#	1/2"FNPT	1.5"FNPT	(2)1/2"FNPT			650	295	1080	3407	1.14	7.89			STYLE 1		6-#2
BHFS1440		30"	6"-150#	1/2"FNPT	1.5"FNPT	(2)1/2"FNPT			930	423	1440	5110	2.57	17.75			STYLE 1		8-#2
BHFS2160		36"	8"-150#	1/2"FNPT	1.5"FNPT	(2)1/2"FNPT			1350	614	2160	7949	2.08	14.32			STYLE 1		12-#2
BHFS3240		42"	10"-150#	1/2"FNPT	1.5"FNPT	(2)1/2"FNPT			2350	1068	3240	10788	1.54	10.62			STYLE 1		18-#2
BHFS4320		48"	12"-150#	1/2"FNPT	1.5"FNPT	(2)1/2"FNPT			3000	1364	4320	14763	2.92	20.13			STYLE 1		24-#2

GENERAL NOTES

1. Housing pressure drop is based on the flow of water through an 1/8" diameter perforated basket without a filter bag. The total system pressure drop is the sum of the housing and filter bag pressure drops. For optimal system flow rates, the type of fluid, housing pressure drop and filter element rating need to be taken into account. Increasing nozzle inlet/outlet connection sizes will decrease housing pressure drops at the same flow rate. All technical information in this bulletin are for use as a general guide only. Actual results may vary depending on the fluid being filtered, viscosity, dirt loading and temperature.
2. See housing ordering guide for options
3. Housing Model: BHFS90 & BHFS180 housings c/w C.S zinc plated adjustable legs. BHFS20 & BHFS40 adjustable legs are optional.

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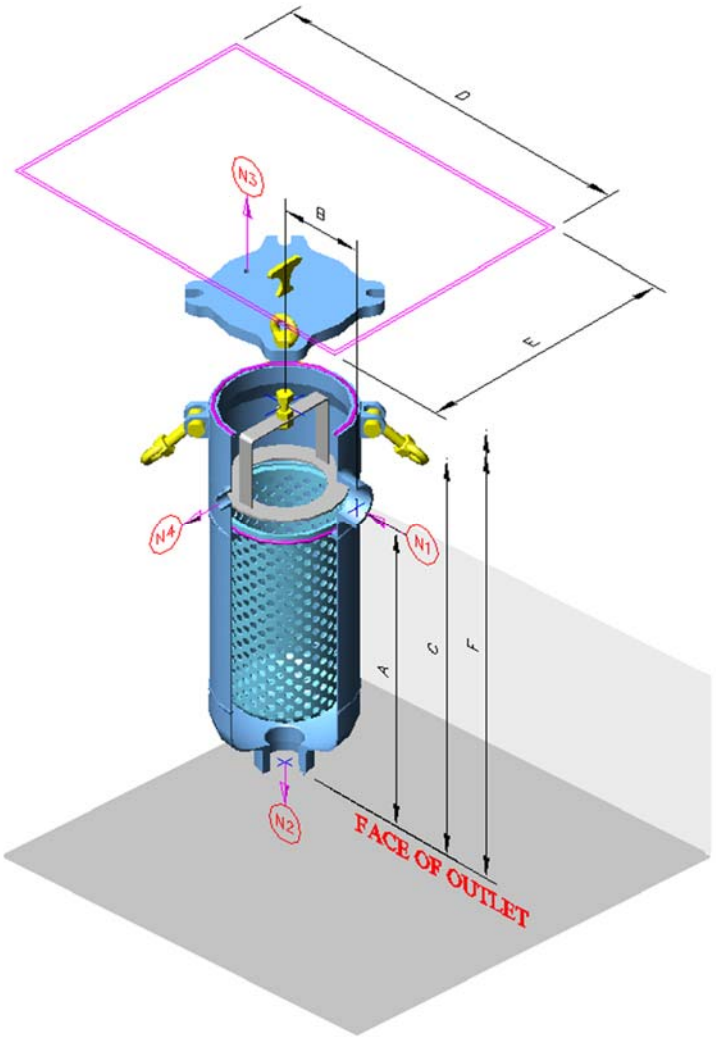
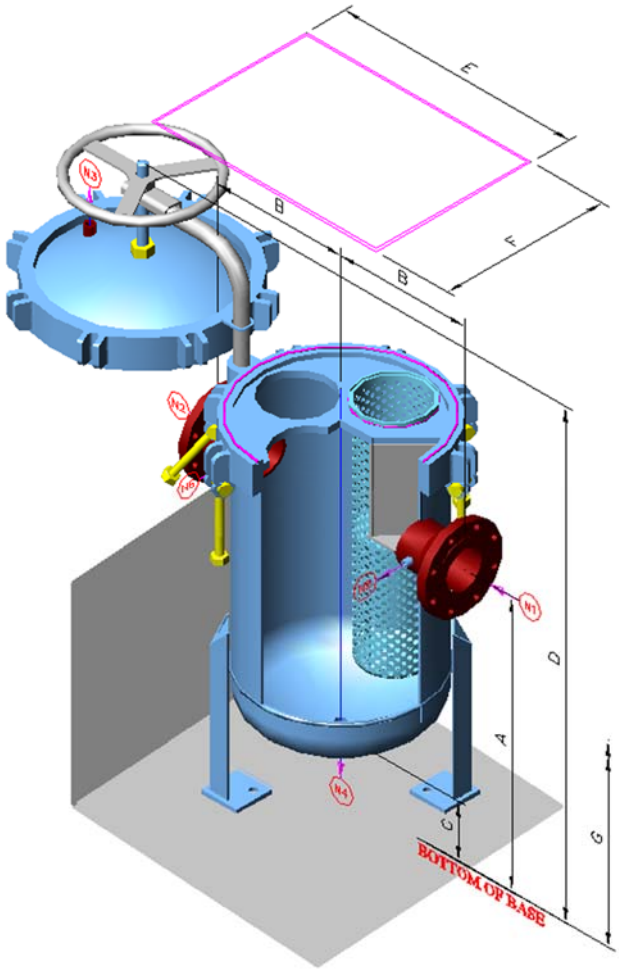


SINGLE BAG HOUSING DIMENSIONS

MODEL NUMBER	INLET C'L TO OUTLET FACE		VESSEL C'L TO INLET FACE		HOUSING (OAH)		HOUSING (OAL)		HOUSING (OAW)		BASKET REMOVAL CLEARANCE	
	A(IN)	A(mm)	B(IN)	B(mm)	C(IN)	C(mm)	D(IN)	D(mm)	E(IN)	E(mm)	F(IN)	F(mm)
BHFS20SE	11-5/8	295	3-1/4	83	17-1/4	438	6-5/16	160	6-1/8	156	21-1/4	540
BHFS40SE	16-15/16	430	3-7/16	87	22-9/16	573	6-1/2	165	6-1/8	156	31-3/4	806
BHFS90SE	20-1/16	510	5-11/16	144	27-9/16	700	10-9/16	268	10	254	38-1/4	972
BHFS180SE	34-1/16	865	5-11/16	144	41-9/16	1056	10-9/16	268	10	254	64-1/4	1632

Dimensions shown are for reference only. Consult FSI for certified drawing when required.

MULTI BAG HOUSING DIMENSIONS



MODEL NUMBER	FLOOR TO C'L INLET/OUTLET		VESSEL C'L TO INLET / OUTLET FACE		FLOOR TO DRAIN FACE		HOUSING (OAH)		HOUSING (OAL)		HOUSING (OAW)		BASKET REMOVAL CLEARANCE	
	A(IN)	A(mm)	B(IN)	B(mm)	C(IN)	C(mm)	D(IN)	D(mm)	E(IN)	E(mm)	F(IN)	F(mm)	G(IN)	G(mm)
BHFS360	29	737	14	356	5-7/8	149	51	1295	28-1/2	724	22-1/2	572	63	1600
BHFS540	29	737	14	356	5-7/8	149	51	1295	28-1/2	724	22-1/2	572	63	1600
BHFS1080	29	737	18	457	6-1/16	154	54-1/2	1384	36-1/2	927	28	711	65	1651
BHFS1440	29	737	21	533	5-5/8	143	57-1/2	1461	42	1067	36	914	67	1702
BHFS2160	29	737	24	610	6-1/16	154	60-1/2	1537	48-1/2	1232	42	1067	69	1753
BHFS3240	29	737	29	737	6-5/8	168	70	1778	58	1473	50-1/2	1283	71	1803
BHFS4320	29	737	32	813	5-15/16	151	71	1803	64-1/2	1638	56-1/2	1435	72	1829

Dimensions shown are for reference only. Consult FSI for certified drawing when required.

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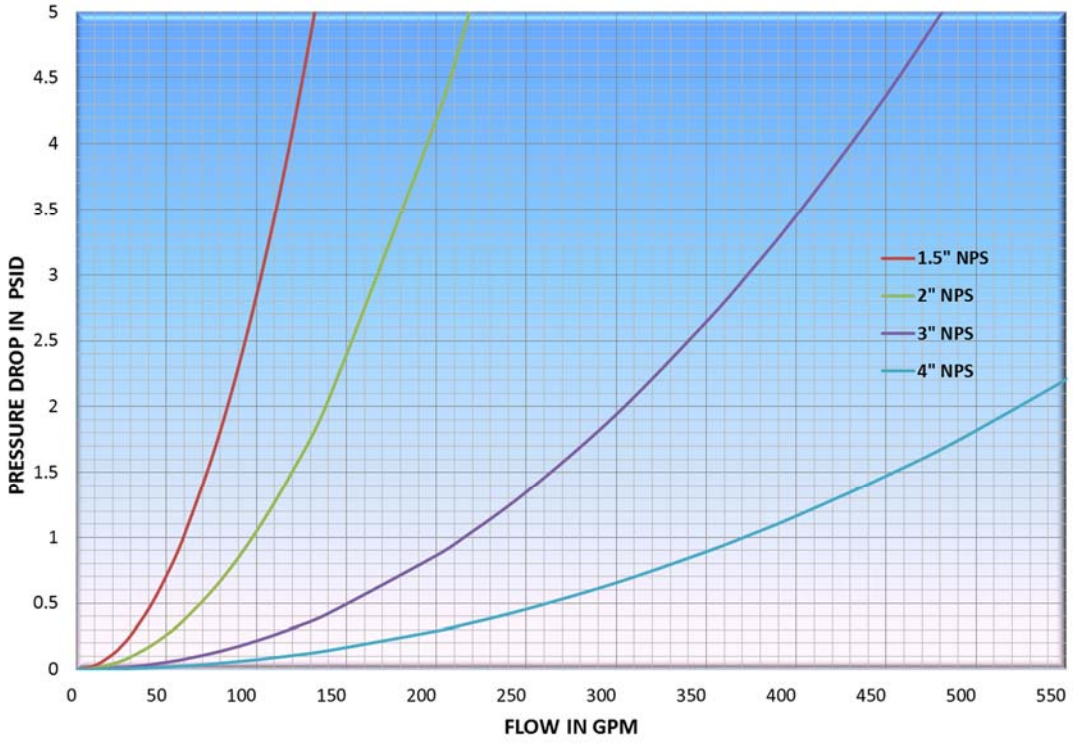
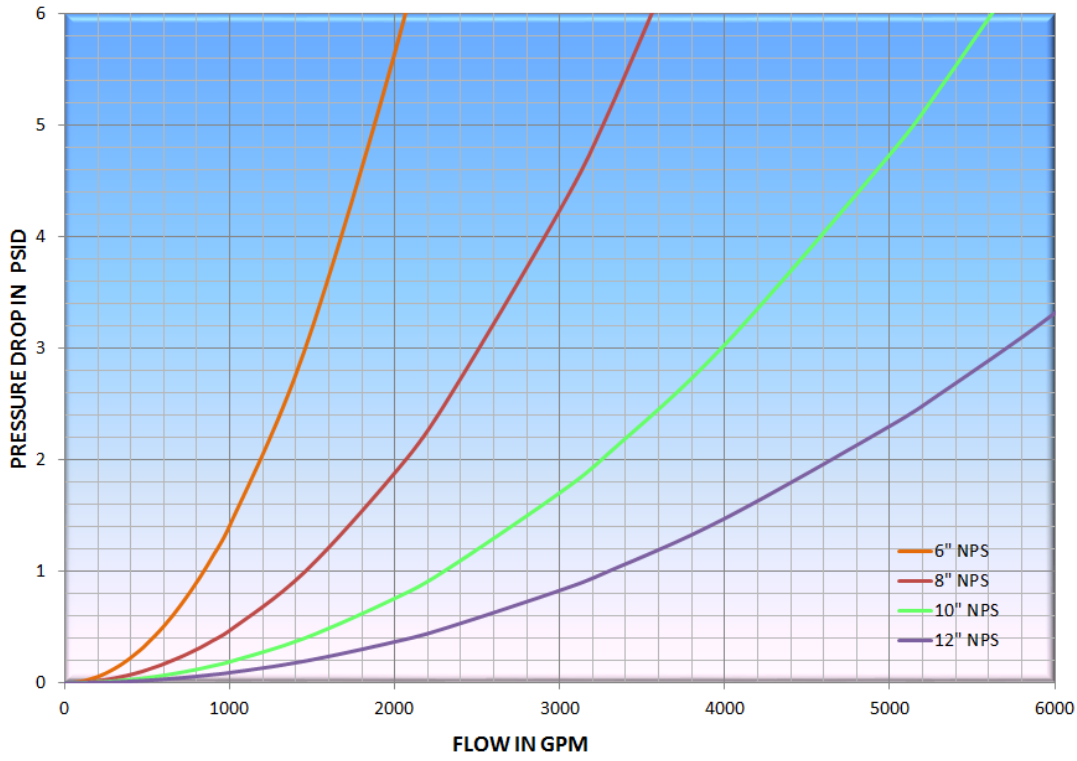
BAG HOUSING CLEAN PRESSURE DROP FOR 1.5"-4" INLET/OUTLET



BAG HOUSING CLEAN PRESSURE DROP FOR 6"-12" INLET/OUTLET



SINGLE BAG HOUSING ORDERING GUIDE

BHFS — **316SS** — **2”FNPT** — **ST1** — **UM** — **1**

Housing Model

- ☐ **BHFS90SE** = #1 size bag housing
- ☐ **BHFS180SE** = #2 size bag housing
- ☐ **BHFS20SE** = #3 size bag housing
- ☐ **BHFS40SE** = #4 size bag housing

Housing Material

- ☐ **304SS** - 304 Stainless
- ☐ **316SS** - 316 Stainless
- ☐ **CS** - Carbon Steel
- ☐ Other

Inlet/Outlet - Type

- ☐ **1” FNPT**
- ☐ **2” FNPT**
- ☐ **3” FNPT**
- ☐ **4” FNPT**
- ☐ **1”-150#FL to 4”-150#FL**
- ☐ Other

Configuration

- ☐ **ST1** = Style 1
- ☐ **ST2** = Style 2
- ☐ **ST3** = Style 3
- ☐ Other

Code Stamping

- ☐ **NC** = Non-Code
- ☐ **U** = U Stamp
- ☐ **UM** = UM Stamp
- ☐ Other

CRN

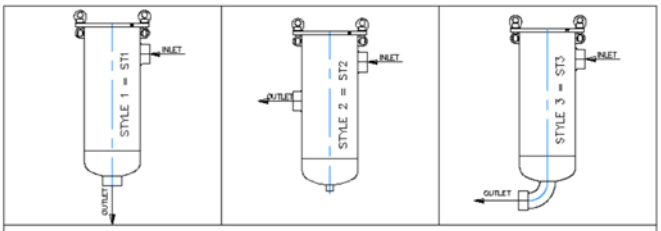
- ☐ **Blank** = None
- ☐ **BC** = 1
- ☐ **AB** = 2
- ☐ **SK** = 3
- ☐ **MB** = 4
- ☐ **ON** = 5
- ☐ **QC** = 6
- ☐ **NB** = 7
- ☐ **NS** =8
- ☐ **PEI** = 9
- ☐ **NF** = 0
- ☐ Other

HOUSING OPTIONS

(Consult FSI)

Pressure Class: Up to 2500# ANSI Flange
Code Stamping: ASME "U" ,"UM" and National Board Stamp
CRN Registration: All the applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or special requirement
Sour Service: Nace MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
Housing Material: Hastelloy, Alloy 20 and other
Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
Adjustable Leg: Stainless Steel option
Connection: Add and up size
Configuration Style: All available styles and other such as duplex, Triplex etc.
Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
Coating: Ext / Internal with special paint.
O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other
Closure: Clam Shell Style, Q.O.C, ANSI bolted type and other

HOUSING CONFIGURATION



OTHERS CONFIGURATIONS
-DUPLEX
-TRIPLEX
-QUADPLEX
THE ABOVE CAN BE CONNECTED
IN SERIES OR PARALLEL
AND SERIES/ PARALLEL.

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MULTI BAG HOUSING ORDERING GUIDE

BHFS — **540** — **316SS** — **4”-150#FL** — **ST1** — **UM** — **1**

Housing Series

☐ **BHFS** = Multi Bag Series

Number of Bags

☐ **360 to 4320**
Example **180** = one #2 size bag
540 = three #2 size bag
☐ Other

Housing Material

☐ **304SS** - 304 Stainless
☐ **316SS** - 316 Stainless
☐ **CS** - Carbon Steel
☐ Other

Inlet/Outlet - Type

☐ **3”-150#FL**
☐ **4”-150#FL**
☐ **6”-150#FL**
☐ **8”-150#FL**
☐ **10”-150#FL**
☐ **12”-150#FL**
☐ Other

Configuration

☐ **ST1** = Style 1
☐ **ST2** = Style 2
☐ **ST3** = Style 3
☐ **ST4** = Style 4
☐ Other

Code Stamping

☐ **NC** = Non-Code
☐ **U** = U Stamp
☐ **UM** = UM Stamp
☐ Other

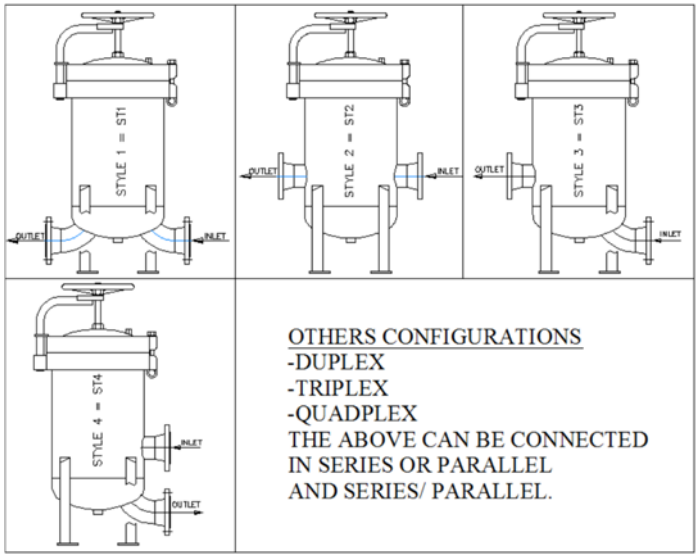
CRN

☐ **Blank** = None
☐ **BC** = 1
☐ **AB** = 2
☐ **SK** = 3
☐ **MB** = 4
☐ **ON** = 5
☐ **QC** = 6
☐ **NB** = 7
☐ **NS** =8
☐ **PEI** = 9
☐ **NF** = 0
☐ Other

HOUSING OPTIONS
(Consult FSI)

Pressure Class: Up to 2500# ANSI Flange
Code Stamping: ASME "U" ,"UM" and National Board Stamp
CRN Registration: All the applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or special requirement
Sour Service: Nace MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
Housing Material: Hastelloy, Alloy 20 and other
Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
Adjustable Leg: Stainless Steel option
Connection: Add and up size
Configuration Style: All available styles and other such as duplex, Triplex etc.
Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
Coating: Ext / Internal with special paint.
O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other

HOUSING CONFIGURATION



CHFS SERIES

CARTRIDGE FILTER HOUSING

APPLICATIONS

Oil and Gas Industry
Adhesives and Resins
Water, Pre-RO
Pharmaceutical and Cosmetics
Chemical Industry
Food and Beverages
Petroleum Industry
Power Industry
Pulp & Paper Industry
Paints, Coatings & Ink
All Process Fluids

HOUSING MODELS

CHFS-1R to 55R: Single round to 55 round Cartridge Housing

CODE OF CONSTRUCTION

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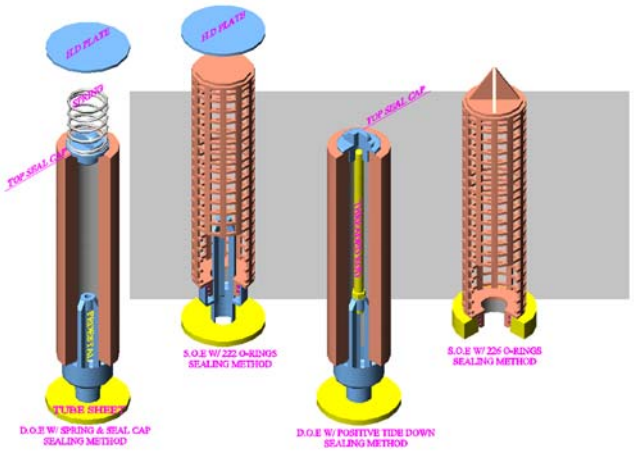
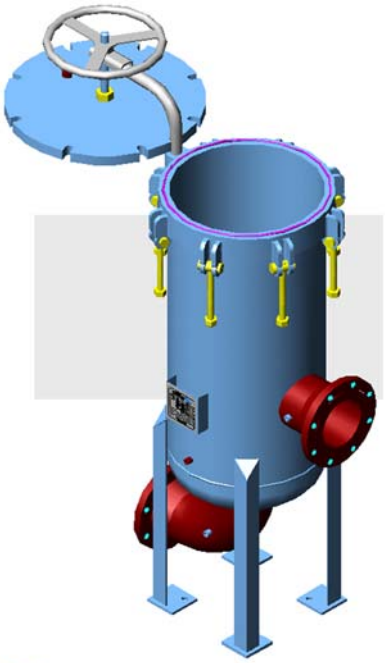
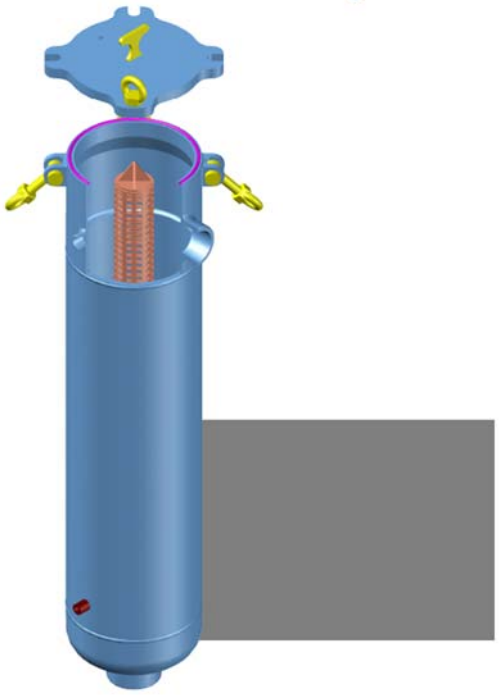
FSI's cartridge filter housing can be used in many areas of the process industries such as oil and gas, water treatment, adhesive, resin and more. FSI's cartridge filter housing is furnished with a unique pedestal design which accommodates a variety of sealing mechanisms such as DOE with spring and seal, SOE with 222 O-ring, and positive-tied-down without the aid of a centering post.







HOUSING MODELS

CHFS-1R - 1 ROUND CARTRIDGE HOUSING
CHFS-6R - 6 ROUND CARTRIDGE HOUSING
CHFS-10R - 10 ROUND CARTRIDGE HOUSING
CHFS-12R - 12 ROUND CARTRIDGE HOUSING
CHFS-22R - 22 ROUND CARTRIDGE HOUSING
CHFS-28R - 28 ROUND CARTRIDGE HOUSING
CHFS-55R - 55 ROUND CARTRIDGE HOUSING

FEATURES

1. All standard cartridge housings come with Swing Bolt Closures, with SA 193 B7/SA 194 2H (zinc plated) nuts and bolts, for quick and easy access.
2. Housings can accommodate various sealing mechanisms.

HOUSING STANDARD SPECIFICATIONS

Design Code: ASME Section VIII, Division 1
Design Pressure: 150 PSIG / 1034 KPAG
Design Temperature: -20^{O}F/225^{O}F(-29^{O}C/107^{O}C)
M.O.C: CS, 304SS, 316SS and others
Closure: Swing Bolt with EPDM O-ring seal
Exterior Finish: (SS) Electro-polish
Exterior Finish: (CS) Blue Enamel

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STANDARD CARTRIDGE FILTER HOUSING SPECIFICATIONS

MODEL NUMBER	HOUSING SIZE	[2]INLET / OUTLET SIZE	[2]VENT	[2]DRAIN	[2]GAUGE PORT	APPROX EMPTY WEIGHT		[1]MAX. FLOW RATE		[1]PRESSURE DROP @ MAX FLOW RATE		[2]IN/OUTLET CONFIG-URATION STYLE	[2]REPLACEMENT ELE-MENT (QTY) - SIZE
		N1/2	N3	N4A/B	N5	LB	KG	GPM	LPM	PSID	KPAD		
CHFS-1R1H	4"	1.5"FNPT	1/4"FNPT	1/2"FNPT	N/A	35	15.9	5	19	0.38	2.64	STYLE 1	(1)2.5"O.D x 10"LG.
CHFS-1R2H	4"	1.5"FNPT	1/4"FNPT	1/2"FNPT	N/A	40	18.2	10	38	0.77	5.29	STYLE 1	(1)2.5"O.D x 20"LG.
CHFS-1R3H	4"	1.5"FNPT	1/4"FNPT	1/2"FNPT	N/A	45	20.5	15	57	1.15	7.94	STYLE 1	(1)2.5"O.D x 30"LG.
CHFS-1R4H	4"	1.5"FNPT	1/4"FNPT	1/2"FNPT	N/A	50	22.7	20	76	1.53	10.58	STYLE 1	(1)2.5"O.D x 40"LG.
CHFS-6R2H	8"	2"FNPT	1/4"FNPT	1/2"FNPT	1/2"FNPT	100	45.5	60	227	1.65	11.37	STYLE 1	(6)2.5"O.D x 20"LG.
CHFS-6R3H	8"	2"FNPT	1/4"FNPT	1/2"FNPT	1/2"FNPT	110	50	90	341	2.47	17.06	STYLE 1	(6)2.5"O.D x 30"LG.
CHFS-6R4H	8"	2"FNPT	1/4"FNPT	1/2"FNPT	1/2"FNPT	120	55	120	454	3.30	22.75	STYLE 1	(6)2.5"O.D x 40"LG.
CHFS-10R2H	10"	3"-150#	1/4"FNPT	1/2"FNPT	1/2"FNPT	190	86	100	379	1.85	12.76	STYLE 1	(10)2.5"O.D x 20"LG.
CHFS-10R3H	10"	3"-150#	1/4"FNPT	1/2"FNPT	1/2"FNPT	210	95	150	568	2.80	19.31	STYLE 1	(10)2.5"O.D x 30"LG.
CHFS-10R4H	10"	3"-150#	1/4"FNPT	1/2"FNPT	1/2"FNPT	230	105	200	757	3.70	25.51	STYLE 1	(10)2.5"O.D x 40"LG.

STANDARD CARTRIDGE FILTER HOUSING SPECIFICATIONS

MODEL NUMBER	HOUSING SIZE	[2]INLET / OUTLET SIZE	[2]VENT	[2]DRAIN	[2]GAUGE PORT	APPROX EMPTY WEIGHT		[1]MAX. FLOW RATE		[1]PRESSURE DROP @ MAX FLOW RATE		[2]IN/OUTLET CONFIGURATION STYLE	[2]REPLACEMENT ELEMENT (QTY) - SIZE
		N1/2	N3	N4/5	N6	LB	KG	GPM	LPM	PSID	KPAD		
CHFS-12R2H	12"	3"-150#	1/4"FNPT	(2)1/2"FNPT	1/2"FNPT	310	141	140	530	1.72	11.87	STYLE 3	(12)2.5"O.D x 20"LG.
CHFS-12R3H	12"	3"-150#	1/4"FNPT	(2)1/2"FNPT	1/2"FNPT	340	155	210	795	2.58	17.80	STYLE 3	(12)2.5"O.D x 30"LG.
CHFS-12R4H	12"	3"-150#	1/4"FNPT	(2)1/2"FNPT	1/2"FNPT	370	168	280	1060	3.44	23.74	STYLE 3	(12)2.5"O.D x 40"LG.
CHFS-22R3H	16"	4"-150#	1/2"FNPT	(2)1"FNPT	1/2"FNPT	490	223	360	1363	2.57	17.74	STYLE 3	(22)2.5"O.D x 30"LG.
CHFS-22R4H	16"	4"-150#	1/2"FNPT	(2)1"FNPT	1/2"FNPT	540	245	480	1817	3.43	23.66	STYLE 3	(22)2.5"O.D x 40"LG.
CHFS-28R3H	18"	6"-150#	1/2"FNPT	(2)1"FNPT	1/2"FNPT	690	314	450	1703	1.71	11.79	STYLE 3	(28)2.5"O.D x 30"LG.
CHFS-28R4H	18"	6"-150#	1/2"FNPT	(2)1"FNPT	1/2"FNPT	740	336	600	2271	2.28	15.71	STYLE 3	(28)2.5"O.D x 40"LG.
CHFS-55R3H	24"	6"-150#	1/2"FNPT	(2)1.5"FNPT	1/2"FNPT	875	398	840	3180	1.79	12.36	STYLE 3	(55)2.5"O.D x 30"LG.
CHFS-55R4H	24"	8"-150#	1/2"FNPT	(2)1.5"FNPT	1/2"FNPT	935	425	1120	4240	2.39	16.47	STYLE 3	(55)2.5"O.D x 40"LG.

GENERAL NOTES

1. Housing pressure drop is based on the flow of water through an open tube sheet and without filter elements. The total system pressure drop is the sum of the housing and filter element pressure drops. For optimal system flow rates, the type of fluid, housing pressure drop and filter element rating need to be taken into account. Increasing nozzle inlet/outlet connection sizes will decrease the housing pressure drop at the same flow rate. All technical information in this bulletin are for use as a general guide only. Actual results may vary depending on the fluid being filtered, viscosity, dirt loading and temperature.
2. See housing ordering guide for options
3. Housing Model: CHFS-6R & CHFS-10R housing c/w C.S zinc plated adjustable legs. CHFS-1R adjustable legs are optional.

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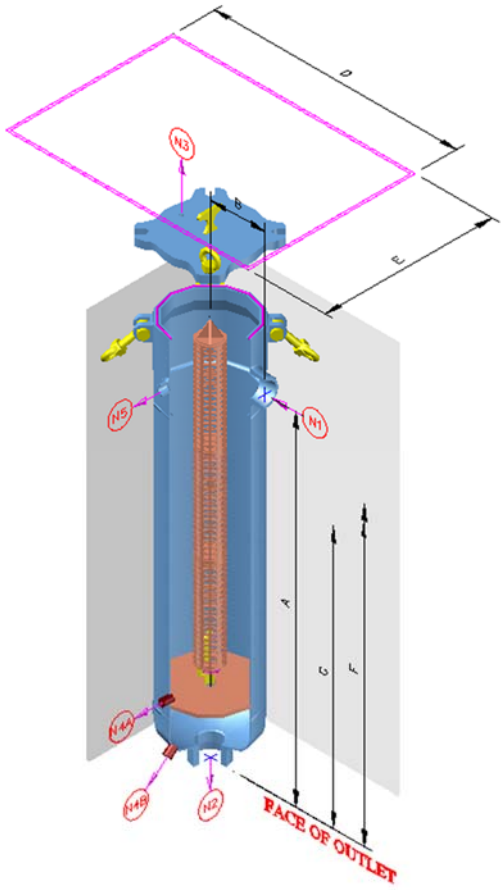
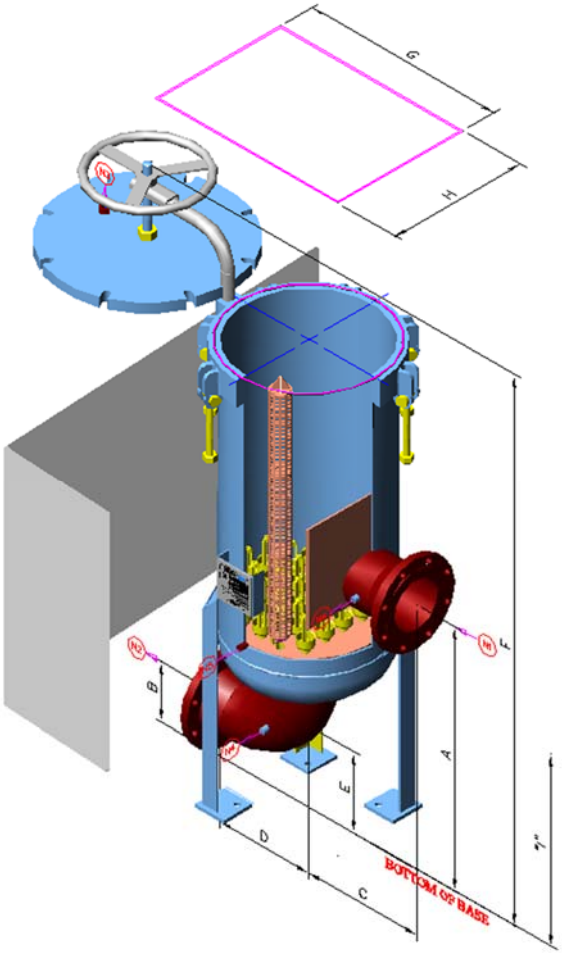


1R to 10R CARTRIDGE HOUSING DIMENSIONS

MODEL NUMBER	INLET C'L TO OUTLET FACE		VESSEL C'L TO INLET FACE		HOUSING (OAH)		HOUSING (OAL)		HOUSING (OAW)		ELEMENT REMOVAL CLEARANCE	
	A(IN)	A(mm)	B(IN)	B(mm)	C(IN)	C(mm)	D(IN)	D(mm)	E(IN)	E(mm)	F(IN)	F(mm)
CHFS-1R1H	11-5/16	287	3-1/4	83	16-1/2	419	6-1/2	165	5-3/4	146	24	610
CHFS-1R2H	21-5/16	541	3-1/4	83	26-1/2	673	6-1/2	165	5-3/4	146	44	1118
CHFS-1R3H	31-5/16	795	3-1/4	83	36-1/2	927	6-1/2	165	5-3/4	146	64	1626
CHFS-1R4H	41-5/16	1049	3-1/4	83	46.-1/2	1181	6-1/2	165	5-3/4	146	84	2134
CHFS-6R2H	25-7/8	657	5-3/4	146	33	838	11-1/4	286	10	254	50	1270
CHFS-6R3H	35-7/8	911	5-3/4	146	43	1092	11-1/4	286	10	254	70	1778
CHFS-6R4H	45-7/8	1165	5-3/4	146	53	1346	11-1/4	286	10	254	90	2286
CHFS-10R2H	26-5/16	668	10-3/8	264	42-1/2	1080	16-3/4	425	13-1/4	337	52	1321
CHFS-10R3H	36-5/16	922	10-3/8	264	52-1/2	1334	16-3/4	425	13-1/4	337	72	1829
CHFS-10R4H	46-5/16	1176	10-3/8	264	62-1/2	1588	16-3/4	425	13-1/4	337	92	2337

Dimensions shown are for reference only. Consult FSI for certified drawing when required.

12R to 55R CARTRIDGE HOUSING DIMENSIONS



MODEL NUMBER	FLOOR TO INLET C'L		FLOOR TO OUTLET C'L		VESSEL C'L TO INLET FACE		VESSEL C'L TO OUTLET FACE		FLOOR TO CLEAN DRAIN C'L		HOUSING (OAH) IN OPERATING		HOUSING (OAL) IN OPERATING		HOUSING (OAW) IN OPERATING		ELEMENT REMOVAL CLEARANCE	
	A (IN)	A (mm)	B (IN)	B (mm)	C (IN)	C (mm)	D (IN)	D (mm)	E (IN)	E (mm)	F (IN)	F (mm)	G (IN)	G (mm)	H (IN)	H (mm)	I (IN)	I (mm)
CHFS-12R2H	28	711	7-5/8	194	11-3/8	289	7-1/4	184	8-15/16	227	54	1372	20-3/4	527	15	381	60	1524
CHFS-12R3H	28	711	7-5/8	194	11-3/8	289	7-1/4	184	8-15/16	227	64	1626	20-3/4	527	15	381	80	2032
CHFS-12R4H	28	711	7-5/8	194	11-3/8	289	7-1/4	184	8-15/16	227	74	1880	20-3/4	527	15	381	100	2540
CHFS-22R3H	29	737	6-3/16	157	13	330	9	229	7-15/16	202	65	1651	24-1/4	616	18-1/2	470	81	2057
CHFS-22R4H	29	737	6-3/16	157	13	330	9	229	7-15/16	202	75	1905	24-1/4	616	18-1/2	470	101	2565
CHFS-28R3H	32	813	7-3/16	183	14	356	12-1/2	318	9-7/8	251	67	1702	27	686	23	584	86	2184
CHFS-28R4H	32	813	7-3/16	183	14	356	12-1/2	318	9-7/8	251	77	1956	27	686	23	584	106	2692
CHFS-55R3H	37	940	7-3/4	197	18	457	16	406	11-1/4	286	77	1956	34-1/2	876	28	711	90	2286
CHFS-55R4H	37	940	7-3/4	197	18	457	16	406	11-1/4	286	87	2210	34-1/2	876	28	711	110	2794

Dimensions shown are for reference only. Consult FSI for certified drawing when required.

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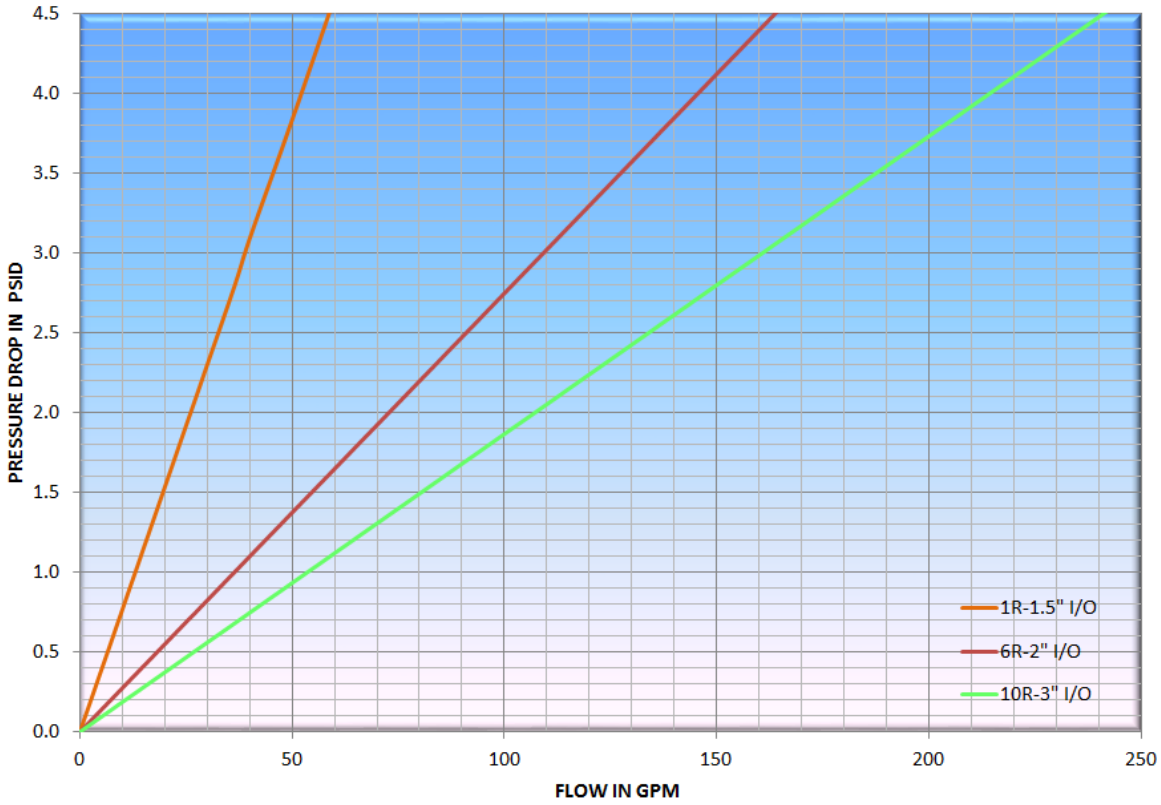
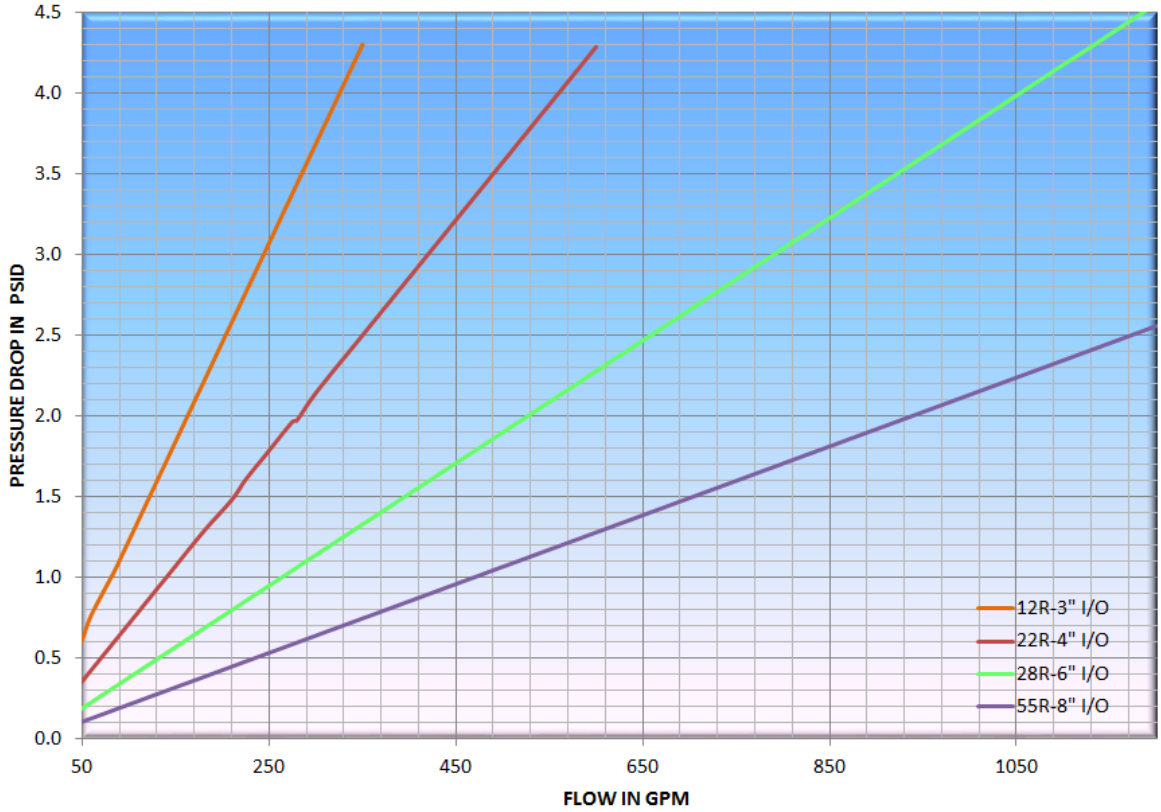
1R TO 10R CARTRIDGE HOUSING CLEAN PRESSURE DROP



12R TO 55R CARTRIDGE HOUSING CLEAN PRESSURE DROP



CHFS CARTRIDGE HOUSING ORDERING GUIDE

CHFS — **6R2H** — **316SS** — **2”FNPT** — **ST1** — **U** — **1**

Housing Series

Cartridge Housing

Number of Element Length

- ☐ **1R** = 1 ELEMENT
- ☐ **6R** = 6 ELEMENTS
- ☐ **10R** = 10 ELEMENTS
- ☐ **12R** = 12 ELEMENTS
- ☐ **22R** = 22 ELEMENTS
- ☐ **28R** = 28 ELEMENT
- ☐ **55R** = 55 ELEMENT

- ☐ **1H** = 10”LG. ELEMENT
- ☐ **2H** = 20”LG. ELEMENT
- ☐ **3H** = 30”LG. ELEMENT
- ☐ **4H** = 40”LG. ELEMENT

Housing Material

- ☐ **304SS** - 304 Stainless
- ☐ **316SS** - 316 Stainless
- ☐ **CS** - Carbon Steel
- ☐ Other

Inlet/Outlet - Type

- ☐ **1” FNPT**
- ☐ **2” FNPT**
- ☐ **3” FNPT**
- ☐ **4” FNPT**
- ☐ **1”-150#FL to 8”-150#FL**
- ☐ Other

Configuration

- ☐ **ST1** = Style 1
- ☐ **ST2** = Style 2
- ☐ **ST3** = Style 3
- ☐ **ST4** = Style 4
- ☐ Other

Code Stamping

- ☐ **NC** = Non-Code
- ☐ **U** = U Stamp
- ☐ **UM** = UM Stamp
- ☐ Other

CRN

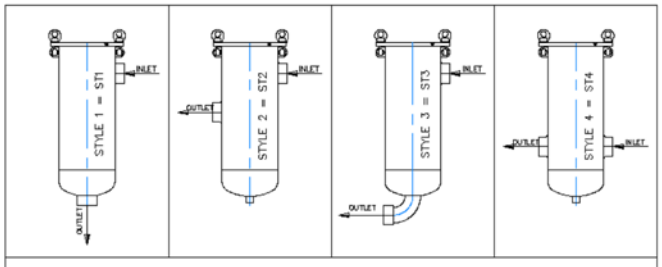
- ☐ **Blank** = None
- ☐ **BC** = 1
- ☐ **AB** = 2
- ☐ **SK** = 3
- ☐ **MB** = 4
- ☐ **ON** = 5
- ☐ **QC** = 6
- ☐ **NB** = 7
- ☐ **NS** =8
- ☐ **PEI** = 9
- ☐ **NF** = 0
- ☐ Other

HOUSING OPTIONS

(Consult FSI)

Pressure Class: Up to 2500# ANSI Flange
Code Stamping: ASME "U" ,"UM" and National Board Stamp
CRN Registration: All the applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or special requirement
Sour Service: Nace MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
Housing Material: Hastelloy, Alloy 20 and other
Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
Adjustable Leg: Stainless Steel option
Connection: Add and up size
Configuration Style: All available styles and other such as duplex, triplex etc.
Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
Coating: Ext / Internal with special paint.
O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other
Closure: Clam Shell Style, Q.O.C, ANSI bolted type and other

HOUSING CONFIGURATION



OTHERS CONFIGURATIONS
-DUPLEX
-TRIPLEX
-QUADPLEX
THE ABOVE CAN BE CONNECTED IN SERIES OR PARALLEL AND SERIES/ PARALLEL.

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HFFS SERIES

HIGH FLOW FILTER HOUSING

HFFS

HOUSING MODELS

HFFS-1R to 12R: Single round to 12 rounds High Flow Housing with vertical or horizontal configurations.

APPLICATIONS

Oil and Gas Industry
Adhesives and Resins
Water, Pre-RO
Pharmaceutical and Cosmetics
Chemical Industry
Food and Beverages
Petroleum Industry
Power Industry
Pulp & Paper Industry
Paints, Coatings & Ink
All Process Fluids

CODE OF CONSTRUCTION

ASME Sect. VIII Div.1 - Pressure Vessel Code

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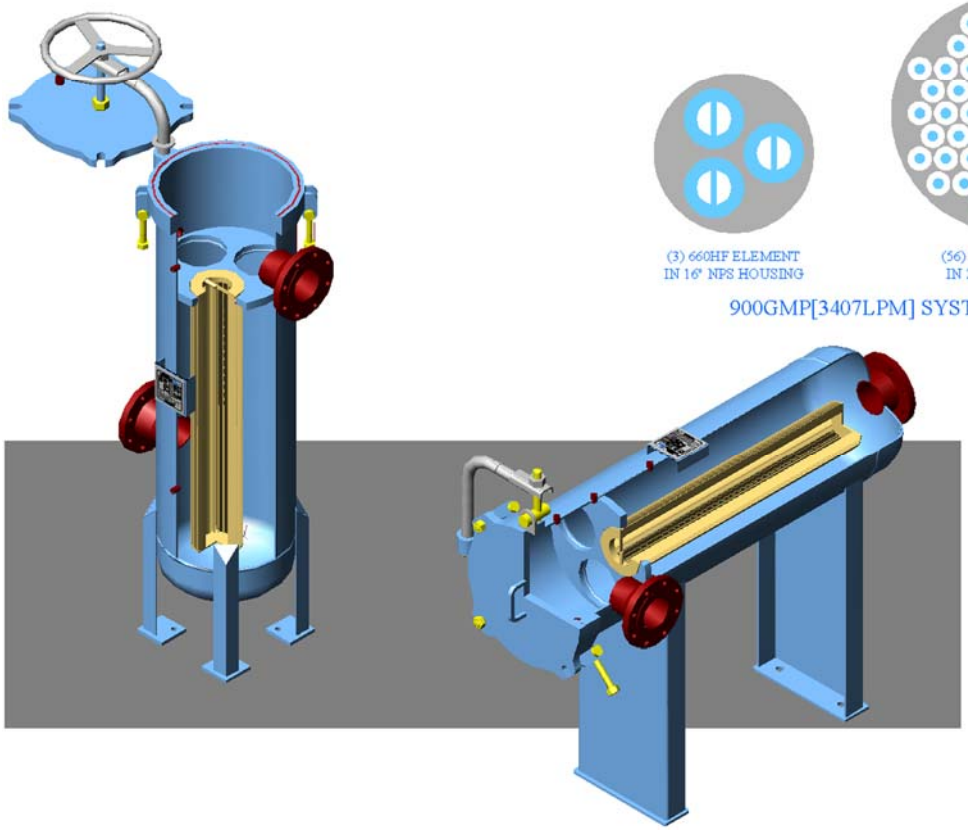
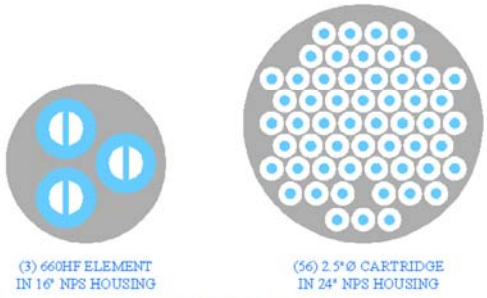
FSI's HFFS filter housing is designed to accommodate high flow rates ranging from 175 GPM to 3600 GPM. HFFS filter housing's compact design and versatile configuration allows for reduction in maintenance and disposal costs as a result of fewer element change outs.



FILTER SYSTEM COMPARISON

300GMP[1135LPM] SYSTEM



900GMP[3407LPM] SYSTEM

HOUSING STANDARD SPECIFICATIONS

Design Code: ASME Section VIII, Division 1
Design Pressure: 150 PSIG / 1034 KPAG
Design Temperature: -20^{O}F/225^{O}F(-29^{O}C/107^{O}C)
M.O.C: CS, 304SS, 316SS and others
Closure: Swing Bolt with EPDM O-ring seal
Exterior Finish: (SS) Electro-polish
Exterior Finish: (CS) Blue Enamel

FEATURES

1. Fewer elements and reduced change out interval.
2. All standard housings come with Swing Bolt Closures for quick and easy access.
3. Higher efficiency units reduce floor foot print.

HOUSING MODELS

HFFS-1R - 1 ROUND HIGH FLOW CARTRIDGE HOUSING
HFFS-3R - 3 ROUNDS HIGH FLOW CARTRIDGE HOUSING
HFFS-5R - 5 ROUNDS HIGH FLOW CARTRIDGE HOUSING
HFFS-7R - 7 ROUNDS HIGH FLOW CARTRIDGE HOUSING
HFFS-12R - 12 ROUNDS HIGH FLOW CARTRIDGE HOUSING

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FILTER SOLUTIONS INC

STANDARD 1R HIGH FLOW FILTER HOUSING SPECIFICATIONS

MODEL NUMBER	HOUSING SIZE	[2]INLET / OUTLET SIZE	[2]VENT	[2]DRAIN	[2]GAUGE PORT	APPROX EMPTY WEIGHT		[1]MAX. FLOW RATE		[1]PRESSURE DROP @ MAX. FLOW RATE		[2]IN/OUTLET CONFIGURATION STYLE	[2]REPLACEMENT ELEMENT (QTY) - SIZE
		N1/2	N3	N4/5	NG	LB	KG	GPM	LPM	PSID	KPAD		
HFFS-1R-40V	8"	3"-150#	1/4"FNPT	N/A	1/2"FNPT	150	68	175	662	3.21	22.10	STYLE 1	(1)6"DIA. x 40"LG.
HFFS-1R-40H	8"	3"-150#	1/2"FNPT	(2)1/2"FNPT	1/2"FNPT	170	77	175	662	3.21	22.10	STYLE 1	(1)6"DIA. x 40"LG.
HFFS-1R-60H	8"	4"-150#	1/2"FNPT	(2)1/2"FNPT	1/2"FNPT	200	91	300	1136	1.94	13.38	STYLE 1	(1)6"DIA. x 60"LG.

STANDARD MULTI ROUND HIGH FLOW FILTER HOUSING SPECIFICATIONS

MODEL NUMBER	HOUSING SIZE	[2]INLET / OUTLET SIZE	[2]VENT	[2]DRAIN	[2]GAUGE PORT	APPROX EMPTY WEIGHT		[1]MAX. FLOW RATE		[1]PRESSURE DROP @ MAX. FLOW RATE		[2]IN/OUTLET CONFIGURATION STYLE	[2]REPLACEMENT ELEMENT (QTY) - SIZE
		N1/2	N3	N4/5	N6/7	LB	KG	GPM	LPM	PSID	KPAD		
HFFS-3R-40V	16"	4"-150#	1/2"FNPT	(2)1"FNPT	(2)1/2"FNPT	525	239	525	1987	2.01	13.82	STYLE 2	(3)6"DIA. x 40"LG.
HFFS-3R-40H	16"	4"-150#	1/2"FNPT	(2)1"FNPT	(2)1/2"FNPT	540	245	525	1987	2.01	13.82	STYLE 1	(3)6"DIA. x 40"LG.
HFFS-3R-60H	16"	6"-150#	1/2"FNPT	(2)1"FNPT	(2)1/2"FNPT	660	300	900	3407	1.14	7.89	STYLE 2	(3)6"DIA. x 60"LG.
HFFS-5R-40V	20"	6"-150#	1/2"FNPT	(2)1"FNPT	(2)1/2"FNPT	780	355	875	3312	1.08	7.45	STYLE 2	(5)6"DIA. x 40"LG.
HFFS-5R-40H	20"	6"-150#	1/2"FNPT	(2)1"FNPT	(2)1/2"FNPT	800	364	875	3312	1.08	7.45	STYLE 1	(5)6"DIA. x 40"LG.
HFFS-5R-60H	20"	8"-150#	1/2"FNPT	(2)1"FNPT	(2)1/2"FNPT	970	441	1500	5678	1.06	7.31	STYLE 2	(5)6"DIA. x 60"LG.
HFFS-7R-40V	24"	8"-150#	1/2"FNPT	(2)1.5"FNPT	(2)1/2"FNPT	980	445	1225	4637	0.71	4.87	STYLE 2	(7)6"DIA. x 40"LG.
HFFS-7R-40H	24"	8"-150#	1/2"FNPT	(2)1.5"FNPT	(2)1/2"FNPT	1000	455	1225	4637	0.71	4.87	STYLE 1	(7)6"DIA. x 40"LG.
HFFS-7R-60H	24"	10"-150#	1/2"FNPT	(2)1.5"FNPT	(2)1/2"FNPT	1200	545	2100	7949	0.84	5.76	STYLE 2	(7)6"DIA. x 60"LG.
HFFS-12R-40V	30"	10"-150#	1/2"FNPT	(2)1.5"FNPT	(2)1/2"FNPT	1300	591	2100	7949	0.84	5.76	STYLE 2	(12)6"DIA. x 40"LG.
HFFS-12R-40H	30"	10"-150#	1/2"FNPT	(2)1.5"FNPT	(2)1/2"FNPT	1330	605	2100	7949	0.84	5.76	STYLE 1	(12)6"DIA. x 40"LG.
HFFS-12R-60H	30"	12"-150#	1/2"FNPT	(2)1.5"FNPT	(2)1/2"FNPT	1620	736	3600	13627	1.20	8.24	STYLE 2	(12)6"DIA. x 60"LG.

GENERAL NOTES

1. Housing pressure drop is based on the flow of water through an open tube sheet and without filter elements. The total system pressure drop is the sum of the housing and filter element pressure drops. For optimal system flow rates, the type of fluid, housing pressure drop and filter element rating need to be taken into account. Increasing nozzle inlet/outlet connection sizes will decrease the housing pressure drop at the same flow rate. All technical information in this bulletin are for use as a general guide only. Actual results may vary depending on the fluid being filtered, viscosity, dirt loading and temperature.
2. See housing ordering guide for options
3. Housing Model: HFFS-1R- housings c/w C.S zinc plated adjustable legs/saddles.

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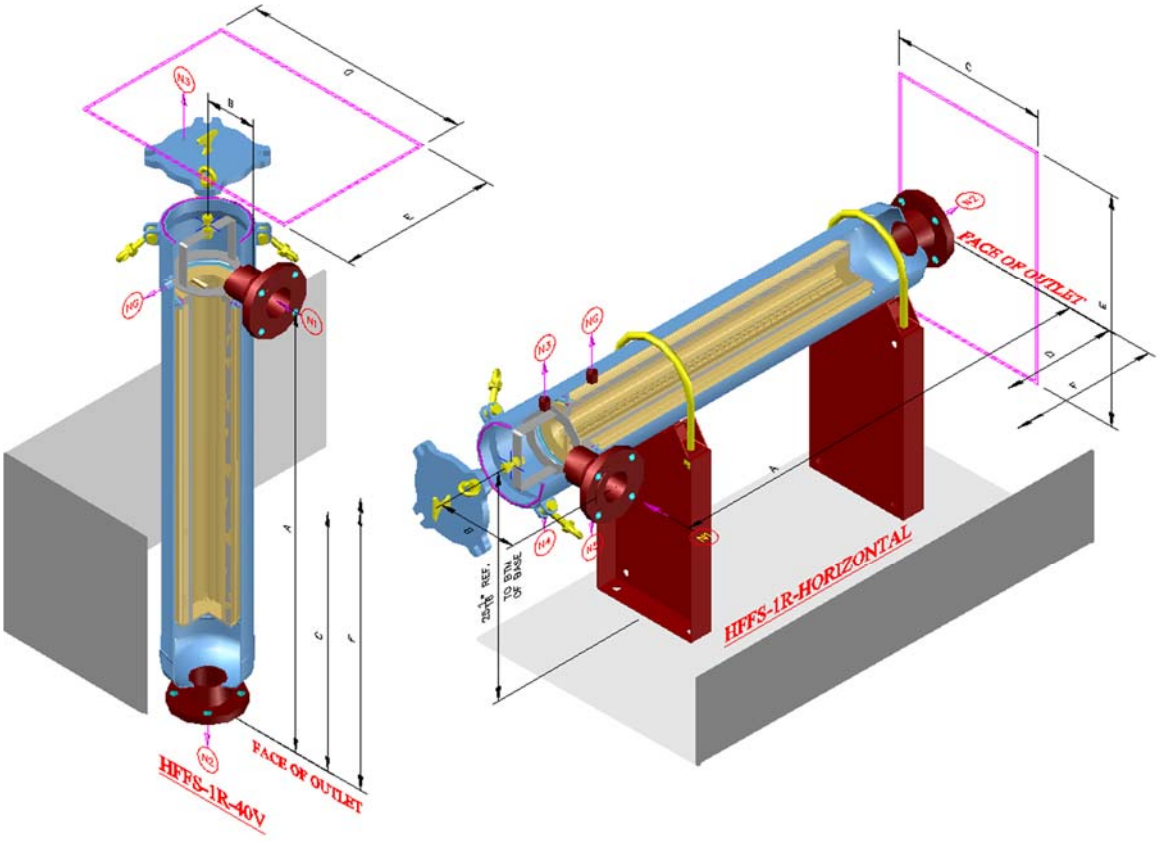
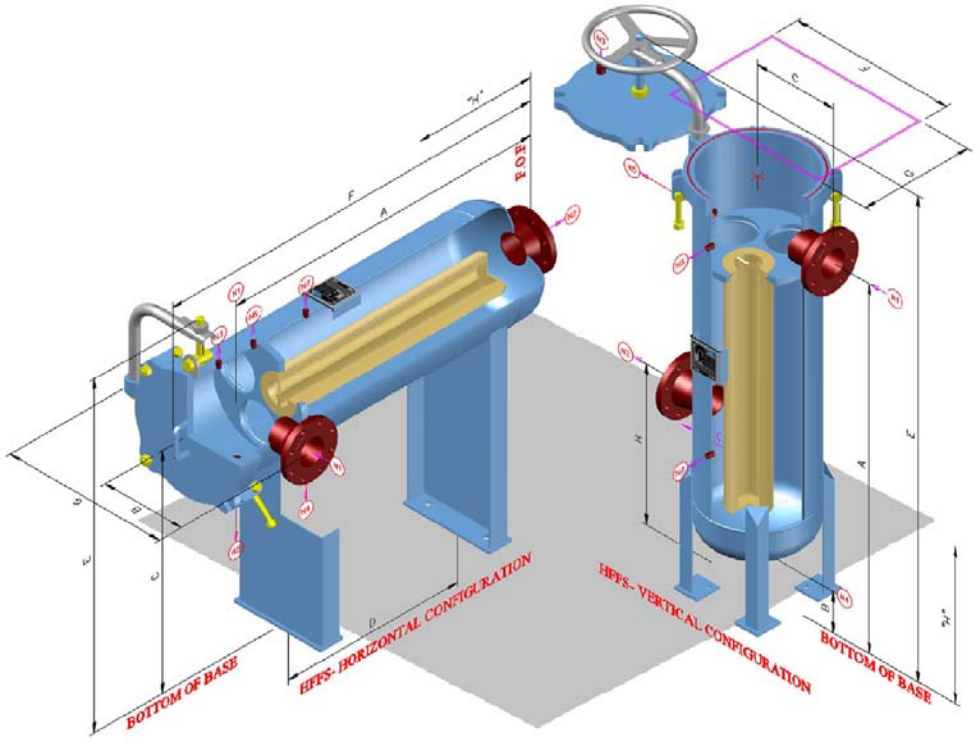


1R HFFS HOUSING DIMENSIONS

MODEL NUMBER	INLET C'L TO OUTLET FACE		VESSEL C'L TO INLET FACE		HOUSING (OAH) IN OPERATING		HOUSING (OAL) IN OPERATING		HOUSING (OAW) IN OPERATING		ELEMENT REMOVAL CLEARANCE	
	A(IN)	A(mm)	B(IN)	B(mm)	C(IN)	C(mm)	D(IN)	D(mm)	E(IN)	E(mm)	F(IN)	F(mm)
HFFS-1R-40V	47-3/8	1203	5-3/4	146	54-1/2	1384	13	330	13	330	91	2311
HFFS-1R-40H	47-3/8	1203	5-3/4	146	30-1/2	775	54-1/2	1384	12	305	91	2311
HFFS-1R-60H	68-1/2	1740	9-5/16	237	30-1/2	775	75-1/2	1918	15-1/2	394	111	2819
Dimensions shown are for reference only. Consult FSI for certified drawing when required.												



MULTI ROUND VERTICAL HFFS HOUSING DIMENSIONS

MODEL NUMBER	FLOOR TO INLET C'L		FLOOR TO OUTLET C'L		VESSEL C'L TO INLET/OUTLET FACE		FLOOR TO DRAIN FACE		HOUSING (OAH) IN OPERATING		HOUSING (OAL) IN OPERATING		HOUSING (OAW) IN OPERATING		ELEMENT REMOVAL CLEARANCE	
	A (IN)	A (mm)	B (IN)	B (mm)	C (IN)	C (mm)	D (IN)	D (mm)	E (IN)	E (mm)	F (IN)	F (mm)	G (IN)	G (mm)	H (IN)	H (mm)
HFFS-3R-40V	55	1397	24	610	13	330	6-1/16	154	74	1880	26-1/2	673	18-1/2	470	102	2591
HFFS-5R-40V	56	1422	25	635	15	381	6-9/16	167	75-/14	1911	30-1/2	775	23	584	103	2616
HFFS-7R-40V	59	1499	26	660	18	457	6-1/16	154	84-1/2	2146	36-1/2	927	28	711	109	2769
HFFS-12R-40V	62	1575	28	711	23	584	6-5/8	168	91-1/2	2324	46-1/2	1181	35-1/2	902	114	2896

MULTI ROUND HORIZONTAL HFFS HOUSING DIMENSIONS

MODEL NUMBER	INLET C'L TO OUTLET FACE		VESSEL C'L TO INLET FACE		FLOOR TO VESSEL C'L		SADDLE C'L TO C'L		HOUSING (OAH) IN OPERATING		HOUSING (OAL) IN OPERATING		HOUSING (OAW) IN OPERATING		ELEMENT REMOVAL CLEARANCE	
	A (IN)	A (mm)	B (IN)	B (mm)	C (IN)	C (mm)	D (IN)	D (mm)	E (IN)	E (mm)	F (IN)	F (mm)	G (IN)	G (mm)	H (IN)	H (mm)
HFFS-3R-40H	50-13/16	1291	13	330	36	914	29	737	53	1346	62	1575	25-1/2	648	98	2489
HFFS-3R-60H	71-1/16	1805	14	356	36	914	49	1245	53	1346	82-1/2	2096	26-1/2	673	138	3505
HFFS-5R-40H	51-5/8	1311	15	381	36	914	29	737	55-1/4	1403	63-1/4	1607	26-1/2	673	99	2515
HFFS-5R-60H	73	1854	15	381	36	914	49	1245	55-1/4	1403	85-3/4	2178	26-1/2	673	140	3556
HFFS-7R-40H	55-1/4	1403	18	457	36	914	32	813	58-1/2	1486	74-1/4	1886	32-1/4	819	105	2667
HFFS-7R-60H	76	1930	20	508	36	914	52	1321	58-1/2	1486	96	2438	34-1/4	870	147	3734
HFFS-12R-40H	57-13/16	1462	23	584	36	914	34	864	61-1/2	1562	80-3/4	2051	41	1041	110	2794
HFFS-12R-60H	78-7/8	2003	23	584	36	914	54	1372	61-1/2	1562	102	2591	41	1041	150	3810

Dimensions shown are for reference only. Consult FSI for certified drawing when required.

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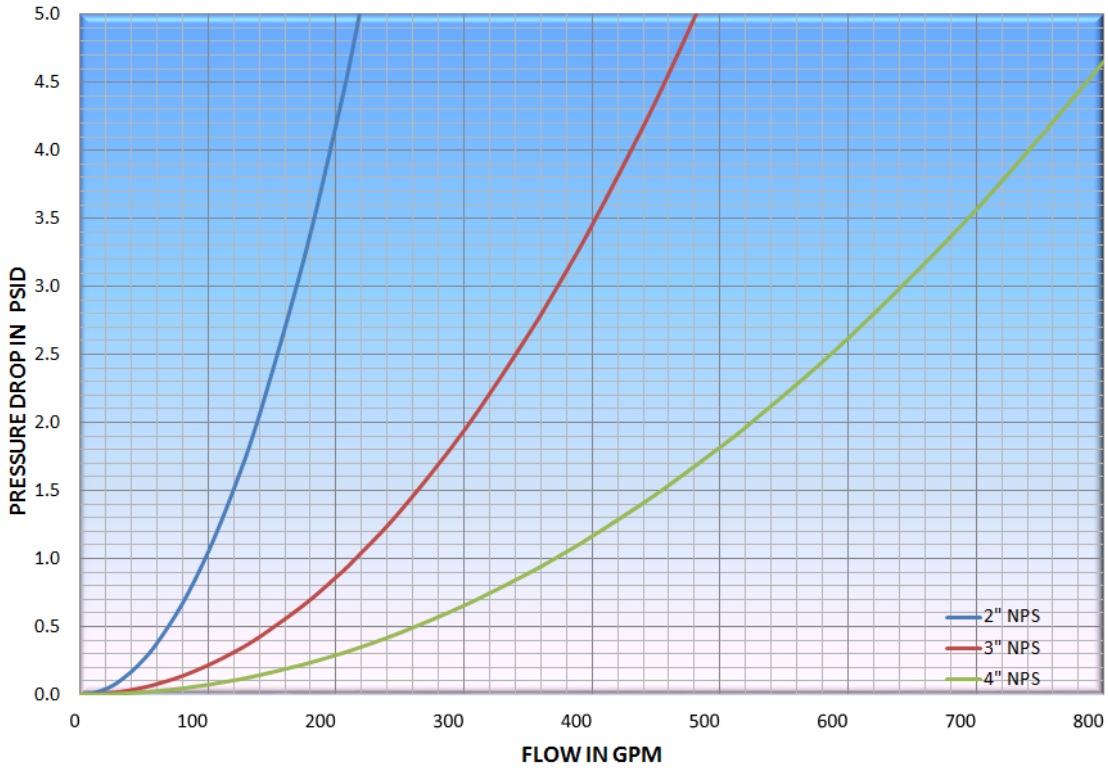
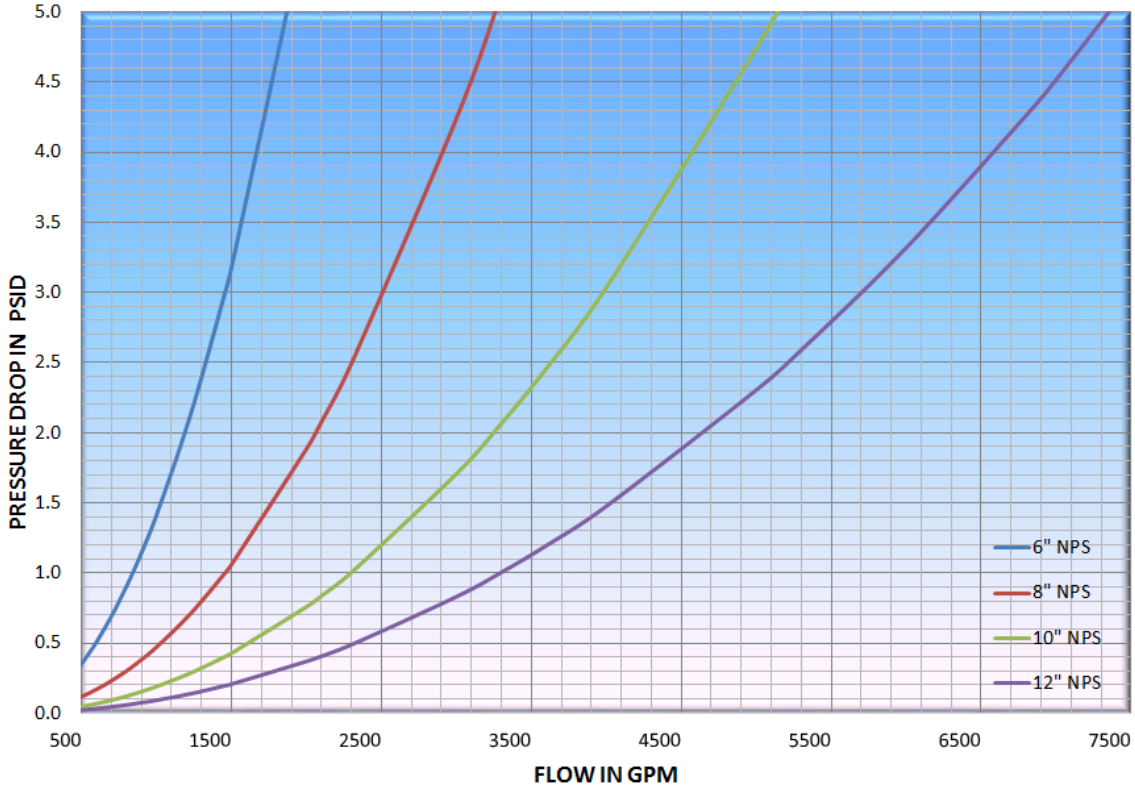
HIGH FLOW HOUSING CLEAN PRESSURE FOR 2"-4" INLET/OUTLET



HIGH FLOW HOUSING CLEAN PRESSURE FOR 6"-12" INLET/OUTLET



HFFS HOUSING ORDERING GUIDE

HFFS — **3R** — **40V** — **316SS** — **4”-150#FL** — **ST1** — **UM** — **1**

Housing Series
High Flow Housing

Number of Elements
- ☐ **1R** = 1 ELEMENT
- ☐ **3R** = 3 ELEMENTS
- ☐ **5R** = 5 ELEMENTS
- ☐ **7R** = 7 ELEMENTS
- ☐ **12R** = 12 ELEMENTS
- ☐ Other

Element Length
- ☐ **40V** = 40” LG. ELEMENT
- ☐ **40H** = 40” LG. ELEMENT
- ☐ **60H** = 60” LG. ELEMENT
- ☐ **V** = Vertical position
- ☐ **H** = Horizontal position

Housing Material
- ☐ **304SS** - 304 Stainless
- ☐ **316SS** - 316 Stainless
- ☐ **CS** - Carbon Steel
- ☐ Other

Inlet/Outlet - Type
- ☐ **2” FNPT**
- ☐ **3” FNPT**
- ☐ **2” to 12”-150#FL**
- ☐ Other

Configuration
- ☐ **ST1** = Style 1
- ☐ **ST2** = Style 2
- ☐ **ST3** = Style 3
- ☐ **ST4** = Style 4
- ☐ Other

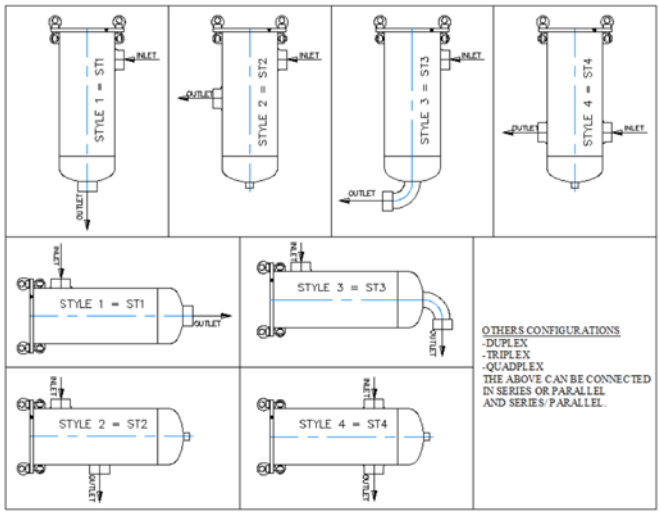
Code Stamping
- ☐ **NC** = Non-Code
- ☐ **U** = U Stamp
- ☐ **UM** = UM Stamp
- ☐ Other

CRN
- ☐ **Blank** = None
- ☐ **BC** = 1
- ☐ **AB** = 2
- ☐ **SK** = 3
- ☐ **MB** = 4
- ☐ **ON** = 5
- ☐ **QC** = 6
- ☐ **NB** = 7
- ☐ **NS** =8
- ☐ **PEI** = 9
- ☐ **NF** = 0
- ☐ Other

HOUSING OPTIONS
(Consult FSI)

Pressure Class: Up to 2500# ANSI Flange
Code Stamping: ASME "U" ,"UM" and National Board Stamp
CRN Registration: All the applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or special requirement
Sour Service: Nace MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
Housing Material: Hastelloy, Alloy 20 and other
Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
Adjustable Leg: Stainless Steel option
Connection: Add and up size
Configuration Style: All available styles and other such as duplex, triplex etc.
Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
Coating: Ext / Internal with special paint.
O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other
Closure: Clam Shell Style, Q.O.C, ANSI bolted type and other

HOUSING CONFIGURATION



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SPECIALTY SERIES

SPECIALTY FILTER HOUSING

SPEC

HOUSING MODELS

DFFS - Dual Function Filter Housing
MFFS - Multi Function Filter Housing
BHFSGN - Top Entry Bag Filter Housing

CODE OF CONSTRUCTION

ASME Sect. VIII Div.1 - Pressure Vessel Code

APPLICATIONS

Oil and Gas Industry
Adhesives and Resins
Water & Waste Water
Pharmaceutical and Cosmetics
Chemical Industry
Food and Beverages
Petroleum Industry
Power Industry
Pulp & Paper Industry
Paints, Coatings & Ink
All Process Fluids

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DFFS DUOFX SERIES

FSI's DuoFx filter housing is specially designed for interchangeability between bag and cartridge elements and also can be used as a strainer for coarse filtration. The interchangeable feature is an added convenience for any application that requires coarse, nominal or absolute filtration in a single process line.

HOUSING STANDARD SPECIFICATIONS

Design Code: ASME Section VIII, Division 1
Design Pressure: 300 PSIG / 2068 KPAG
Design Temperature: -20^{O}F/300^{O}F(-29^{O}C/149^{O}C)
Configuration: Vertical
M.O.C: 304SS or 316SS
Housing Diameter: 4" NPS [DIN100]
Closure: Swing Bolt
O-ring Seal: EPDM
Exterior Finish: Electro-polish
Bolt/Nut: SA 193 B7/SA 194 2H (zinc plated)

APPLICATION

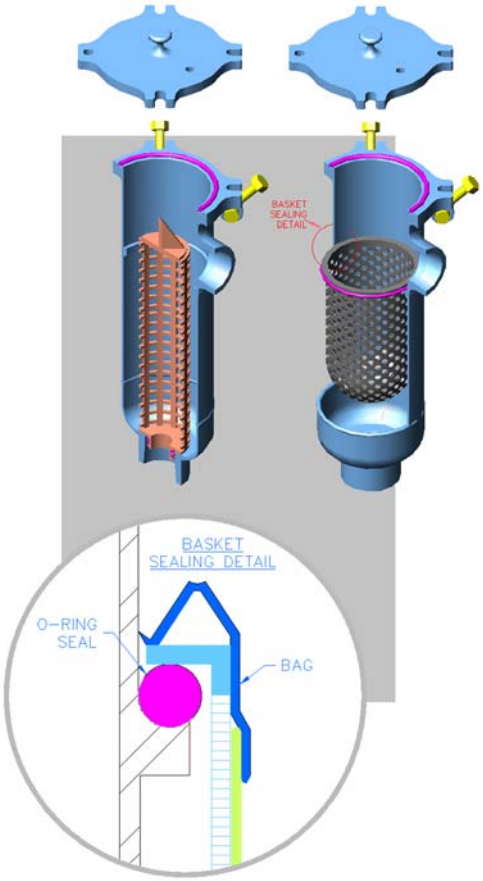
Chemical Processing
Pharmaceuticals
Food and Beverages
Industrial Water
Paints, Coatings and Inks
Adhesives and Resins
Coolant and Lubricants
Edible Oils
Beer and Wine

HOUSING MODEL AND ACCOMMODATIONS

DFFS20 - #3 size bag & single 2.5"O.D x 10" cartridge element
DFFS40 - #4 size bag & single 2.5"O.D x 20" cartridge element

MAXIMUM FLOW CAPACITY

DFFS20 - 25GPM[95LPM] for #3 Bag
DFFS20 - 5GPM[19LPM] for 10" Cartridge
DFFS40 - 50GPM[189LPM] for #4 Bag
DFFS40 - 10GPM[38LPM] for 20" Cartridge



FEATURES

1. Three applications in one (coarse, nominal or absolute filtration)
2. Interchangeable bag and cartridge element
3. All Stainless Steel construction
4. Stainless Steel hardware available
5. Swing Bolt Closure for quick and easy change out
6. Baskets with O-ring seals preventing bypass

HOUSING OPTIONS

Leg Type: Adjustable legs
O-Ring: Buna-N, Viton, Silicon, T.E.V
CRN: Any applicable Canadian Jurisdiction
Code Stamp: "UM" or "U"
Surface Finish: Sanitary

For all other requests consult with FSI

MFFS MULTI FX SERIES

FSI's MultiFx filter housing is specially designed for interchangeability between bag, cartridge, high flow and custom filter elements and also can be used as a strainer for coarse filtration. The interchangeable feature is an added convenience for applications that may have coarse, nominal, absolute or special filtration requirements within a single process line.

HOUSING STANDARD SPECIFICATIONS

Design Code: ASME Section VIII, Division 1
Design Pressure: 150 PSIG / 1034 KPAG
Design Temperature: -20^{O}F/225^{O}F(-29^{O}C/107^{O}C)
Configuration: Vertical
M.O.C: 304SS or 316SS
Housing Diameter: 8" NPS [DIN200]
Closure: Swing Bolt
O-ring Seal: EPDM
Exterior Finish: Electro-polish
Bolt/Nut: SA 193 B7/SA 194 2H (zinc plated)
Leg Type: Adjustable

APPLICATION

Chemical Processing
Pharmaceuticals
Food and Beverages
Industrial Water
Paints, Coatings and Inks
Adhesives and Resins
Coolant and Lubricants
Edible Oils
Beer and Wine

HOUSING MODEL AND ACCOMMODATIONS

MFFS180- #2 size bag, #2 size Pleated bag element, 730 series High flow element and custom element up to 7"[178mm] O.D x 32"[813mm] in length.
MFFS90 - #1 size bag, #1 size Pleated bag element, 720 series High flow element and custom element up to 7"[178mm] O.D x 20"[508mm] in length.

FEATURES

1. Various interchangeable elements and applications
2. 300 PSIG (2068 KPAG) design pressure
3. Stainless Steel construction
4. Stainless Steel hardware available
5. Swing Bolt Closure for quick and easy change out
6. Baskets with O-ring seals preventing bypass

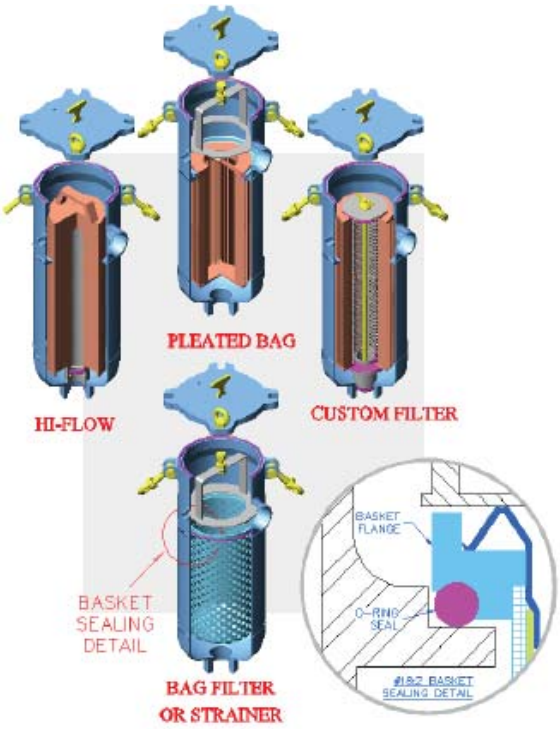
FLOW CAPACITY

Ranges from 40 to 150GPM [151 to 568LPM]
Due to various type and element sizes.
Consult FSI to determine the flow capacity for your desired application

HOUSING OPTIONS

O-Ring: Buna-N, Viton, Silicon, T.E.V
CRN: Any applicable Canadian Jurisdiction
Code Stamp: "UM" or "U"
Surface Finish: Sanitary

For all other requests consult with FSI



SPEC

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GOOSE NECK TOP ENTRY BAG HOUSING SERIES

FSI's Top Entry Bag housings series has an ASME Code design and construction. Housings are designed with an 8"NPS body and closure & top inlet nozzles o-ring seals to provide a simple operational change out for all users.

HOUSING STANDARD SPECIFICATIONS

Design Code: ASME Section VIII, Division 1
Design Pressure: 150 PSIG / 1034 KPAG
Design Temperature: -20^{O}F/150^{O}F(-29^{O}C/107^{O}C)
Configuration: Vertical
M.O.C: CS, 304SS or 316SS
Housing Diameter: 8" NPS [DIN200]
Inlet/Outlet Size: 2" FNPT
Closure: Swing Bolt
O-ring Seal: EPDM
Exterior Finish: Electro-polish
Bolt/Nut: SA 193 B7/SA 194 2H (zinc plated)

APPLICATION

Automotive Industries
Pharmaceuticals
Food and Beverages
Industrial Water
Paints, Coatings and Inks
Adhesives and Resins
Coolant and Lubricants
Edible Oils
Beer and Wine

HOUSING MODEL AND ACCOMMODATIONS

BHFS90 - #1 size Top Entry bag housing
BHFS180 - #2 size Top Entry bag housing

MAXIMUM FLOW CAPACITY

BHFS90 - 90GPM[341LPM]
BHFS180 - 180GPM[681LPM]

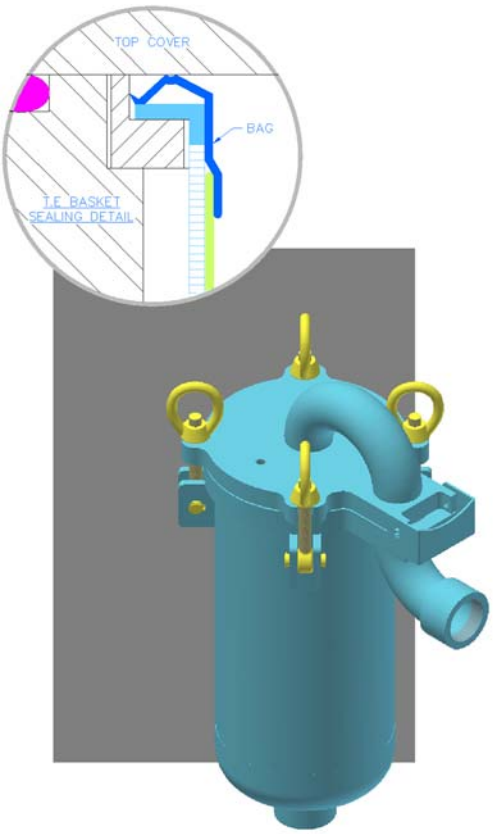
FEATURES

1. 8"NPS Body
2. Easy change out & operational user friendly
3. Stainless Steel construction
4. Stainless Steel hardware available
5. No leakage at inlet nozzle

HOUSING OPTIONS

Leg Type: Adjustable legs
O-Ring: Buna-N, Viton, Silicon, T.E.V
CRN: Any applicable Canadian Jurisdiction
Code Stamp: "UM" or "U"
Surface Finish: Sanitary 120-180grit

For all other requests consult with FSI



FSFS SERIES

FABRICATED/CAST STRAINER

FSFS

STRAINER MODELS

BSFS - Basket Strainer
FS-125CB - 125# Cast Basket Strainer
FS-150CB - 150# Cast Basket Strainer
TSFS - T-Strainer
YSFS - Y-Strainer
TCSFS - Temporary Cone Strainer
TBSFS - Temporary Basket Strainer
TPSFS - Temporary Plate Strainer

APPLICATIONS

Process Industry
Metal & Mining
Water & Waste Water
Chemical Industry
Oil and Gas Industry
Marine Industry
Petroleum Industry
Process Equipment
Power Industry
Pulp & Paper Industry
Pumps, Meters and Valves protections
All Process Fluids

CODE OF CONSTRUCTION

ASME B31.1 - Power Piping Code
ASME B31.3 - Process Piping Code
ASME Sect. VIII Div.1 - Pressure Vessel Code
Others are available upon request

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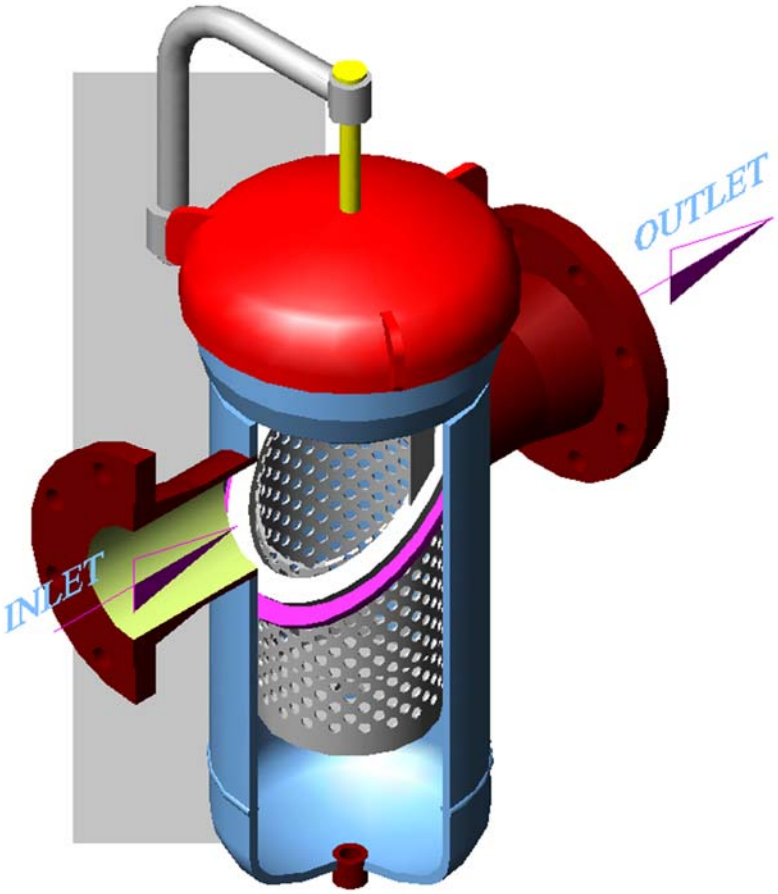
BASKET STRAINER

BSFS MODEL



TYPICAL APPLICATIONS

Oil and Gas
Chemical Process
Steam
Petroleum
Water
Other

MATERIAL OF CONSTRUCTION

304/316 Stainless Steel
Carbon Steel
Carbon Steel L.T.
Nace Compliance
Other

RATINGS

ANSI Class 150
ANSI Class 300
ANSI Class 600
ANSI Class 900
ANSI Class 1500
ANSI Class 2500
Other

END CONNECTIONS

Buttweld
Ring Type Joint
Raised Face Flange
Flat Face Flange
Other

SIZES

1.5”(DIN40) to 24”(DIN600)
Larger sizes available upon request.

FEATURES

- Large open area ratio.
- Duo-flo & Tri-flo optional basket.
- Filtration down to 40 microns.

BASKET STRAINER ORDERING GUIDE

BSFS — **316SS** — **8”** — **150#** — **RF** — **B** — **1/8”** — **10**

Model
- ☐ **BSFS** = Basket Strainer

Material
- ☐ **304SS** - 304 Stainless
- ☐ **316SS** - 316 Stainless
- ☐ **CS** - Carbon Steel
- ☐ **CSLT** - Carbon Steel - Low Temperature
- ☐ **MONEL**
- ☐ **HASTELLOY**
- ☐ Other

Inlet/Outlet Size
- ☐ **1.5”**
- ☐ **2”**
- ☐ **3”**
- ☐ **4”**
- ☐ **6”**
- ☐ **8”**
- ☐ **10”**
- ☐ **12”**
- ☐ **14”**
- ☐ **16”**
- ☐ **18”**
- ☐ **20”**
- ☐ **24”**
- ☐ Other

Class
- ☐ **150#**
- ☐ **300#**
- ☐ **600#**
- ☐ **900#**
- ☐ **1500#**
- ☐ Other

Connection Type
- ☐ **BW** = [2]Buttweld
- ☐ **FF** = Flat Face Flange
- ☐ **SW** = Socketweld
- ☐ **RJ** = Ring Joint Flange
- ☐ **RF** = Raised Face Flange
- ☐ **FNPT** = Threaded
- ☐ Other

Closure Type
- ☐ **B** = Bolted with blind
- ☐ **SB** = Swing Bolt Closure
- ☐ **QT** = Q.O.C Twist Style
- ☐ **QC** = Q.O.C Clamp Style
- ☐ Other

Perf
- ☐ **3/64”**
- ☐ **1/32”**
- ☐ **1/16”**
- ☐ **3/32”**
- ☐ **1/8”**
- ☐ **5/32”**
- ☐ **3/16”**
- ☐ Other

Mesh
- ☐ **Blank** = None
- ☐ **10MESH**
- ☐ **20MESH**
- ☐ **30MESH**
- ☐ **40MESH**
- ☐ **50MESH**
- ☐ **60MESH**
- ☐ **80MESH**
- ☐ **100MESH**
- ☐ **120MESH**
- ☐ Other

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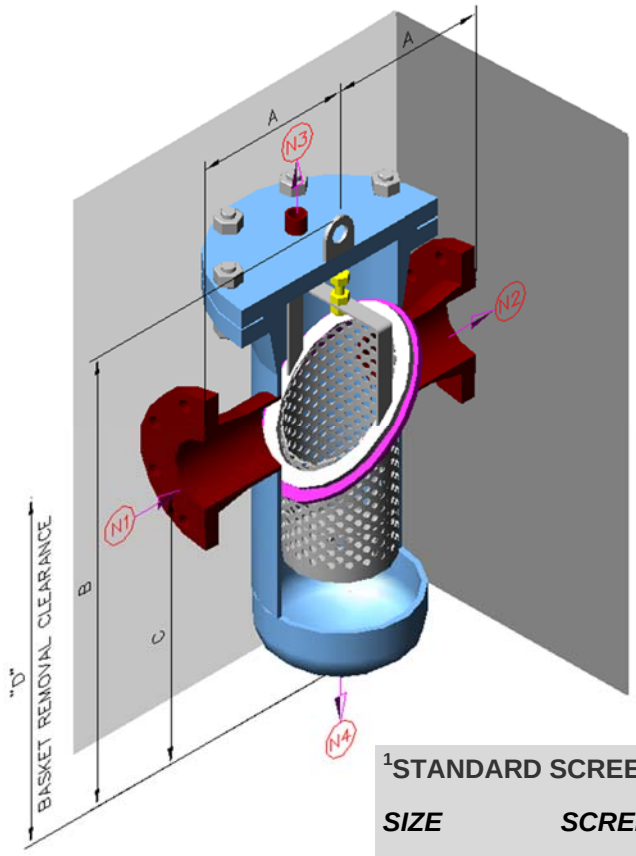
BASKET STRAINER DATA SHEET



[1]STANDARD SCREEN

SIZE	*SCREEN*	*MATERIAL*
1.5” - 24”	1/8" Perf	304SS

NOTES

1. Other screens, mesh liners and material available upon request. Consult FSI.
2. For Buttweld connection please specify mating pipe schedule.
3. Dimensions shown are subject to change. Contact FSI for certified drawing when required.

Materials of Construction
([1]Carbon Steel Shown)

Body	ASTM A106B / A53B / A516-70
Nozzles	ASTM A106B
Flanges / Coupling	ASTM A105
Bottom Heads	ASTM A516-70 / A234 WPB
Int/Ext. Attachment	C/S
Basket	304SS
Gasket	304SS Spiral Wound
Stud	ASTM A193-B7
Nut	ASTM A194-2H

BASKET STRAINER DATA SHEET

INLET/ OUTLET (N1/2)	HOUSING SIZE	VENT (N3)	DRAIN (N4)	A		B		C		D		WEIGHT	
				CLASS		CLASS		CLASS		CLASS		CLASS	
				150#	300#	150#	300#	150#	300#	150#	300#	150#	300#
1.5"	4"	1/4"	1/2"	6-1/4	6-1/4	19-7/16	20-1/8	9-7/16	9-7/16	25-1/2	26	55	75
(DIN40)	(DIN100)	(DIN8)	(DIN15)	(159)	(159)	(494)	(511)	(240)	(240)	(648)	(660)	(25)	(34)
2"	4"	1/4"	1/2"	6-1/4	6-1/4	19-7/8	20-9/16	9-7/16	9-7/16	26-1/2	27	90	205
(DIN50)	(DIN100)	(DIN8)	(DIN15)	(159)	(159)	(505)	(522)	(240)	(240)	(673)	(686)	(41)	(93)
3"	8"	1/4"	1/2"	9-5/16	9-5/16	28-11/16	29-9/16	15-15/16	15-15/16	42	43	147	263
(DIN80)	(DIN200)	(DIN8)	(DIN15)	(237)	(237)	(729)	(751)	(405)	(405)	(1067)	(1092)	(67)	(119)
4"	8"	1/4"	1/2"	9-5/16	9-5/16	29-11/16	30-9/16	15-15/16	15-15/16	44	45	153	315
(DIN100)	(DIN200)	(DIN8)	(DIN15)	(237)	(237)	(754)	(776)	(405)	(405)	(1118)	(1143)	(69)	(143)
6"	8"	1/4"	1/2"	10-5/16	10-5/16	34-13/16	35-11/16	18-15/16	18-15/16	54-1/2	55	173	355
(DIN150)	(DIN200)	(DIN8)	(DIN15)	(262)	(262)	(884)	(906)	(481)	(481)	(1384)	(1397)	(78)	(161)
8"	12"	1/2"	1"	12-3/8	12-3/8	41-11/16	43-1/16	23-3/16	23-3/16	65-1/2	67	441	715
(DIN200)	(DIN300)	(DIN15)	(DIN25)	(314)	(314)	(1059)	(1094)	(589)	(589)	(1664)	(1702)	(200)	(324)
10"	16"	1/2"	1"	16	16	49-1/2	51-1/16	28-3/16	28-3/16	80	81-1/2	683	1155
(DIN250)	(DIN400)	(DIN15)	(DIN25)	(406)	(406)	(1257)	(1297)	(716)	(716)	(2032)	(2070)	(310)	(524)
12"	18"	1/2"	1"	17	17	56-1/2	58-1/16	31-11/16	31-11/16	91	92-1/2	1266	1733
(DIN300)	(DIN450)	(DIN15)	(DIN25)	(432)	(432)	(1435)	(1475)	(805)	(805)	(2311)	(2350)	(574)	(786)
14"	20"	1/2"	1.5"	18	18	61-15/16	63-7/16	35-9/16	35-9/16	100	101-1/2	1680	2730
(DIN350)	(DIN500)	(DIN15)	(DIN40)	(457)	(457)	(1573)	(1611)	(903)	(903)	(2540)	(2578)	(762)	(1238)
16"	24"	1/2"	1.5"	20	20	70-15/16	72-7/16	42-1/16	42-1/16	116-1/2	117-1/2	2064	2888
(DIN400)	(DIN600)	(DIN15)	(DIN40)	(508)	(508)	(1802)	(1840)	(1068)	(1068)	(2959)	(2895)	(936)	(1310)
18"	24"	1/2"	1.5"	22	22	72-15/16	74-7/16	42-1/16	42-1/16	120-1/2	121-1/2	2310	3502
(DIN450)	(DIN600)	(DIN15)	(DIN40)	(559)	(559)	(1853)	(1891)	(1068)	(1068)	(3061)	(3086)	(1048)	(1588)
20"	30"	1/2"	1.5"	25	25	80-1/2	84-1/2	49-9/16	49-9/16	135	140	3360	5455
(DIN500)	(DIN750)	(DIN15)	(DIN40)	(635)	(635)	(2045)	(2146)	(1259)	(1259)	(3429)	(3556)	(1524)	(2474)
24"	36"	1/2"	1.5"	28	28	93	97-1/4	57-1/16	57-1/16	159-1/2	164-1/2	4725	6849
(DIN600)	(DIN900)	(DIN15)	(DIN40)	(711)	(711)	(2362)	(2470)	(1449)	(1449)	(4051)	(4178)	(2143)	(3106)

-All dimensions shown in inches with millimetres in brackets beneath.

FSFS

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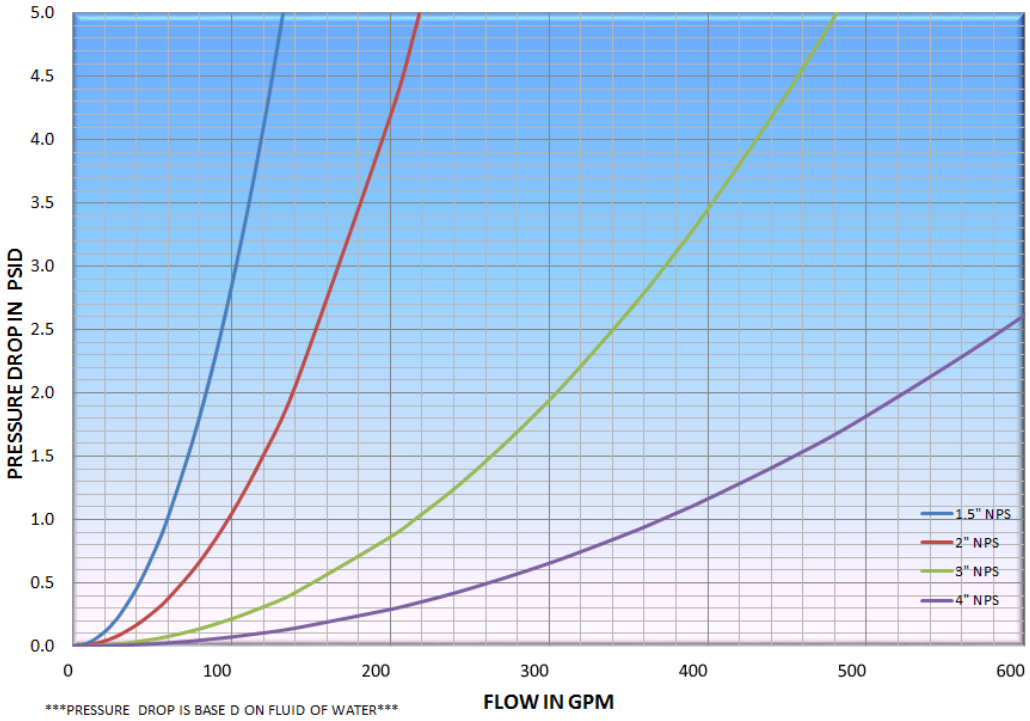
BASKET STRAINER

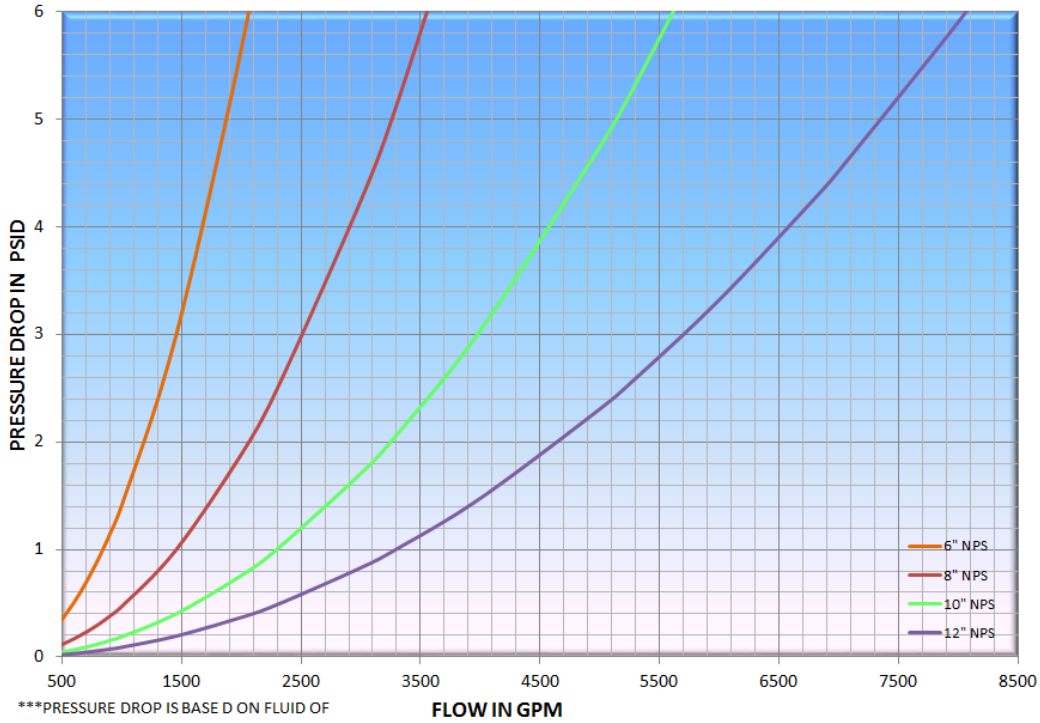
BSFS MODEL

BASKET STRAINER CLEAN PRESSURE DROP FOR 1.5"-4" INLET/OUTLET

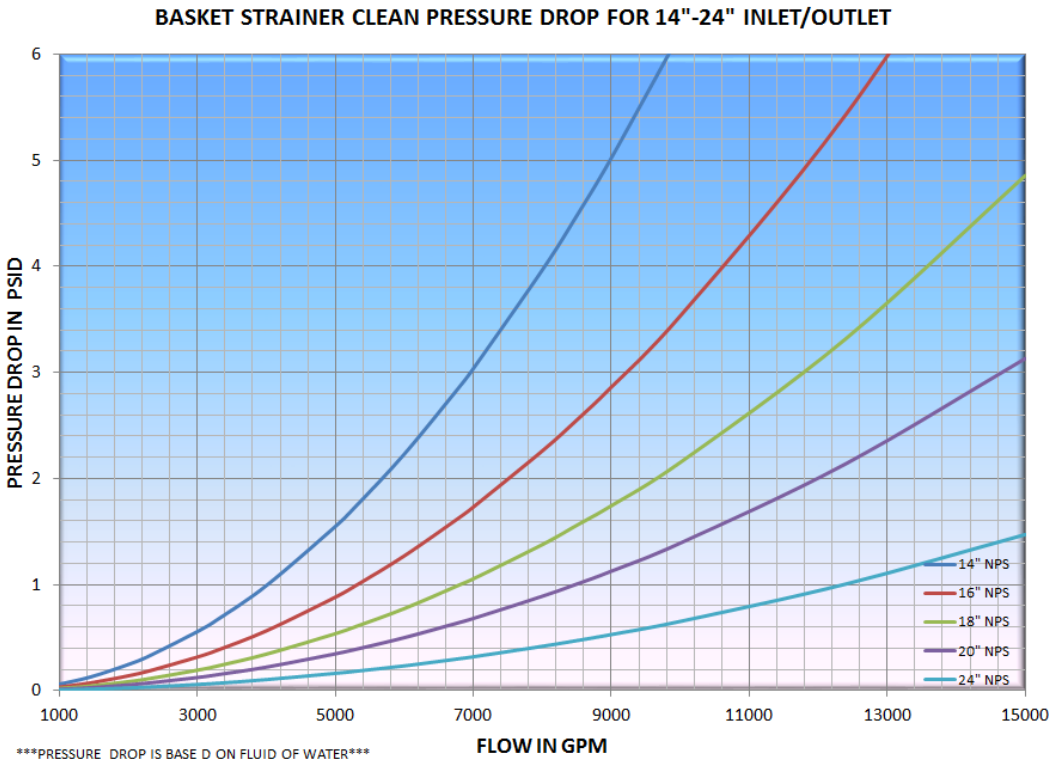


PRESSURE DROP IS BASE D ON FLUID OF WATER

BASKET STRAINER CLEAN PRESSURE DROP FOR 6"-12" INLET/OUTLET



***PRESSURE DROP IS BASE D ON FLUID OF


BASKET STRAINER CLEAN PRESSURE DROP FOR 14"-24" INLET/OUTLET
PRESSURE DROP IN PSID
0
1
2
3
4
5
6
1000
3000
5000
7000
9000
11000
13000
15000
FLOW IN GPM
14" NPS
16" NPS
18" NPS
20" NPS
24" NPS
PRESSURE DROP IS BASE D ON FLUID OF WATER

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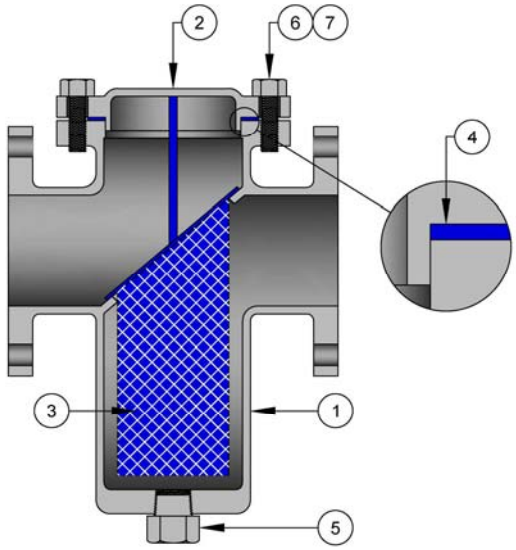
BASKET STRAINER

FS-125CB MODEL - ANSI CLASS 125LB.

FSI specializes in Industrial Filtration applications. We offer a wide range of filters, filter systems, strainers and separation equipment to service the Chemical, Environmental, Petroleum, Pulp and Paper and Pharmaceutical industries.

FEATURES

1. Flat faced flanged inlet/outlet connections in accordance with ASME B16.1.
2. ASME B16.1 wall thickness and pressure - temperature ratings.
3. Straight through flow design with angular basket minimizes flow obstruction resulting in low pressure drop.
4. Bolted cover flange with gasket. Cover flange meets the design requirements of ASME VIII-1 appendix II.
5. Plugs supplied installed in the drain/ blow down connection.
6. Large straining capacity to minimize time between cleaning.
7. It is recommended that model FS-125CB basket strainers be used to filter/ strain down to 250 microns minimum. For finer filtration requirements please contact FSI.



Materials of Construction

1.	Body	ASTM A126-B
2.	Cover	ASTM A126-B
3.	Straining Element *(1)(2)*	TYPE 304SS
4.	Gasket *(1)*	GRAPHITE
5.	NPT Plug (Blow-off)	ASTM A126-B
6.	Cover Studs *(3)*	ASTM A307-B
7.	Cover Nuts *(3)*	ASTM A563

(1) Recommended Spares. (2) Maximum recommended differential pressure is 10 psid before cleaning. (3) Materials of equivalent strength may be substituted at manufacturer's option. (4) Contact FILTER SOLUTIONS INC. for special gaskets materials.

PRESSURE-TEMPERATURE RATINGS NOTES

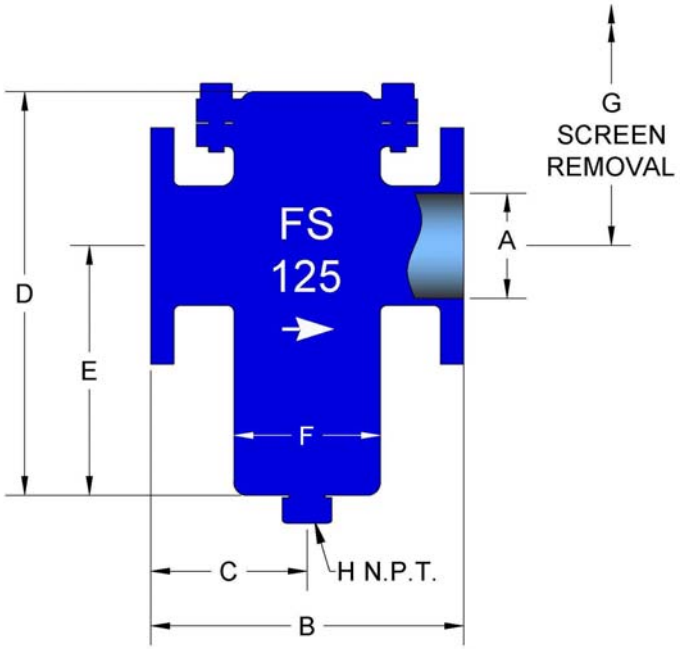
(1) Permissible for service temperature up to 400°F due to gasket material.
(2) 353°F to reflect the temperature of saturated steam at 125 psi
(3) 406°F to reflect the temperature of saturated steam at 250 psi .
(4) For intermediate temperatures, linear interpolation is permitted.
(5) ASME B31.1, ASME B31.3 and other codes limit the maximum operating pressure and temperature of threaded connections and A126-B cast iron. Please consult these codes for your application.

Pressure-Temperature Ratings (in accordance with ASME B16.1)	
TEMPERATURE (°F)	Working Pressure (PSI)
-20 to 150	200
200	190
225	180
250	175
275	170
300	165
325	155
352 *(2)*	150
375	145
406 *(1)(3)*	140
425	130
450	125

BASKET STRAINER

FS-125CB MODEL - ANSI CLASS 125LB.

Basket Strainers are suitable to be installed in pipelines to remove unwanted debris from the pipeline, while protecting downstream equipment such as valves, nozzles, compressors, fine filtration equipment and similar. Basket Strainers are suitable to be installed in horizontal pipelines only. FSI offers various mesh and perforation sizes to match your specific filtration requirements.



STANDARD SCREENS	
SIZE RANGE	OPENING
2" - 3"	3/64" PERF. 0.045 INCH
50mm - 80mm	1.2mm
4" - 12"	1/8" PERF. 0.125 INCH
100mm - 300mm	3.2mm

NLET/ OULET (N1/2)	DRAIN (H)	HOUSING SIZE F IN/ (mm)	A IN/ (mm)	B IN/ (mm)	C IN/ (mm)	D IN/ (mm)	E IN/ (mm)	G IN/ (mm)	SCREEN AREA *(2) IN²/(cm²)*	WEIGHT LB/(KG) COVER	WEIGHT LB/(KG) UNIT
2"	1/2"	3	2	8-1/8	4-1/16	8-3/8	5	10-3/4	29	5	23
(DIN50)	(DIN15)	(76)	(51)	(206)	(103)	(213)	(127)	(298)	(188)	2.3	10
2.5"	3/4"	4	2-1/2	8-1/4	4-1/8	9-3/4	6-1/4	13-1/4	45	7	33
(DIN65)	(DIN20)	(102)	(64)	(210)	(105)	(248)	(159)	(337)	(290)	3.2	15
3"	3/4"	5	3	9-7/8	4-15/16	11-1/4	7-1/8	15-3/8	78	9	44
(DIN80)	(DIN20)	(127)	(76)	(251)	(125)	(286)	(181)	(391)	(503)	4.1	20
4"	1"	6	4	11-1/2	5-3/4	12-7/8	8	17-3/4	106	13	67
(DIN100)	(DIN25)	(152)	(102)	(292)	(146)	(327)	(203)	(451)	(683)	5.9	30
5"	1"	6-1/2	5	13-1/8	6-9/16	14-1/2	8-1/2	20-1/2	139	20	88
(DIN125)	(DIN25)	(165)	(127)	(333)	(167)	(368)	(216)	(521)	(896)	9.1	40
6"	1"	8	6	14-7/8	7-7/16	16	9	23	176	26	120
(DIN150)	(DIN25)	(203)	(152)	(378)	(189)	(406)	(229)	(584)	(1135)	12	54
8"	1.5"	10	8	18-3/4	9-3/8	21	12	30	300	45	220
(DIN200)	(DIN40)	(254)	(203)	(476)	(238)	(533)	(305)	(762)	(1935)	20	100
10"	1.5"	12-1/2	10	20	10	24-3/4	14	35-1/2	446	70	353
(DIN250)	(DIN40)	(318)	(254)	(508)	(254)	(629)	(356)	(902)	(2877)	32	160
12"	1.5"	15	12	26-1/4	13-1/8	29-3/4	17	42-1/2	654	110	523
(DIN300)	(DIN40)	(381)	(305)	(667)	(333)	(755)	(432)	(1080)	(4219)	52	237

(1) Dimension "B" is +/- 0.13". (2) Screen Area values are equal to the total surface area of the basket strainer element. The screen open area is equal to the Screen Area multiplied by the Percentage Open Area of the basket strainer element material. (3) Filter Solutions Inc. makes every effort to ensure the information presented in this literature is accurate. Dimensions shown are subject to change. Contact FSI for certified prints when required.

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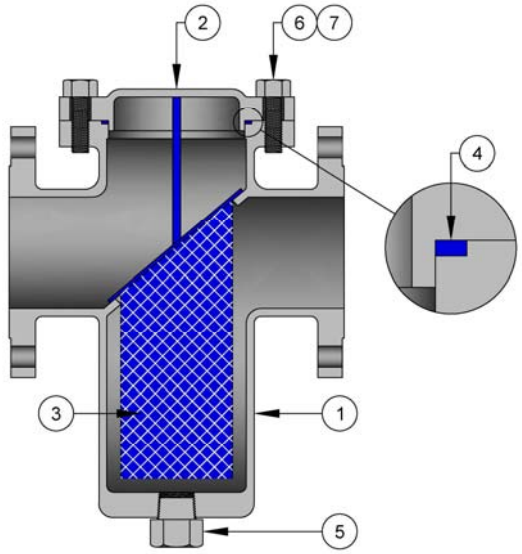
BASKET STRAINER

FS-150CB MODEL - ANSI CLASS 150LB.

FSI specializes in Industrial Filtration applications. We offer a wide range of filters, filter systems, strainers and separation equipment to service the Chemical, Environmental, Petroleum, Pulp and Paper and Pharmaceutical industries.

FEATURES

1. Flanged inlet/outlet connections in accordance with ASME B16.5.
2. ASME B16.5 / B16.34 wall thickness and pressure - temperature ratings.
3. Straight through flow design with angular basket minimizes flow obstruction resulting in low pressure drop.
4. Bolted cover flange with the gasket retained in a recess machined into the body prevents leakage and gasket blow-out. Cover flange meets the design requirements of ASME VIII-1 appendix II.
5. Solid plugs supplied installed in the drain/blow down connection.
6. Large straining capacity to minimize time between cleanings
7. It is recommended that model FS-150CB basket strainers be used to filter/ strain down to 250 microns minimum. For finer filtration requirements please contact FSI.



Pressure-Temperature Ratings (in accordance with ASME B16.1)		
TEMPERATURE (°F)	Working Pressure (PSI) (WCB, CLASS 150)	Working Pressure (PSI) (CF8M, CLASS 150)
-20 to 100	285	275
200	260	235
300	230	215
400	200	195

1) Permissible for service temperature up to 400°F due to gasket material. When operating FILTER SOLUTIONS FS-150CB strainers at higher temperatures please consult FSI. (2) WCB lower temperature limit –20°F, CF8M lower temperature limit –50°F (*WITH IMPACT TESTING SPECIFIED*), otherwise CF8M lower temperature limit is –20°F . (3) WCB: WOG (Non-shock) = 285 psig @ 100°F, Saturated Steam = 150 psig @ 366°F, CF8M: WOG (Non-shock) = 275 psig @ 100°F, Saturated Steam = 150 psig at 100°F. (4) For intermediate temperatures, linear interpolation is permitted. (5) ASME B31.1, ASME B31.3 and other codes limit the maximum operating pressure and temperature of threaded connections. Please consult these codes for your application.

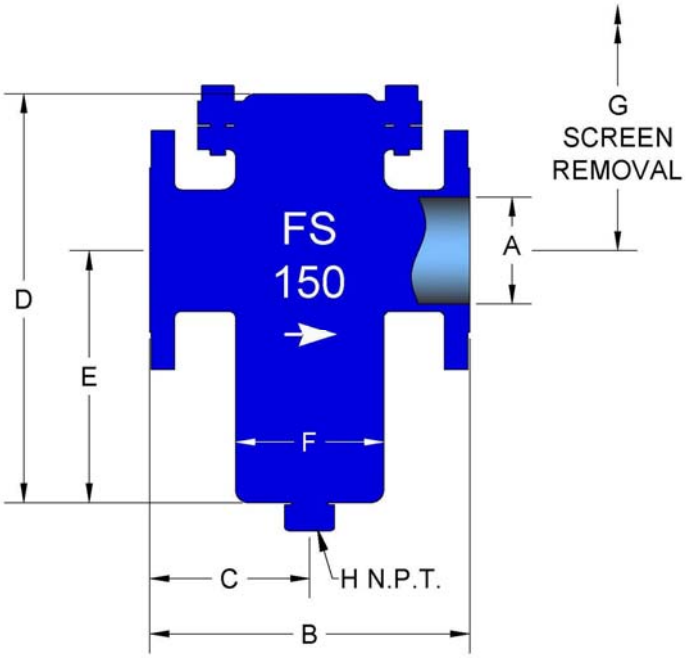
Materials of Construction		MODEL FS-150CB-S CARBON STEEL	MODEL FS-150CB-SS STAINLESS STEEL
1.	Body	ASTM A126-WCB	ASTM A351-CF8M
2.	Cover	ASTM A126-WCB	ASTM A351-CF8M
3.	Straining Element *(1)(2)*	TYPE 304SS	TYPE 304SS
4.	Gasket *(1)*	TEFLON	TEFLON
5.	NPT Plug (Blow-off)	ASTM A105	ASTM A182-316
6.	Cover Studs *(3)*	ASTM A193-B7	ASTM A193-B8
7.	Cover Nuts *(3)*	ASTM A194-2H	ASTM A194-8

(1) Recommended Spares. (2) Maximum recommended differential pressure is 10 psid before cleaning. (3) Materials of equivalent strength may be substituted at manufacturer's option. (4) Contact FILTER SOLUTIONS INC. for special gaskets materials.

BASKET STRAINER

FS-150CB MODEL - ANSI CLASS 150LB.

Basket Strainers are suitable to be installed in pipelines to remove unwanted debris from the pipeline, while protecting downstream equipment such as valves, nozzles, compressors, fine filtration equipment and similar. Basket Strainers are suitable to be installed in horizontal pipelines only. FSI offers various mesh and perforation sizes to match your specific filtration requirements.



STANDARD SCREENS	
SIZE RANGE	OPENING
2" - 3"	3/64" PERF. 0.045 INCH
50mm - 80mm	1.2mm
4" - 12"	1/8" PERF. 0.125 INCH
100mm - 300mm	3.2mm

NLET/ OULET (N1/2)	DRAIN (H)	HOUSING SIZE F IN/ (mm)	A IN/ (mm)	B IN/ (mm)	C IN/ (mm)	D IN/ (mm)	E IN/ (mm)	G IN/ (mm)	SCREEN AREA *(2)* $IN^2/(cm^2)$	WEIGHT LB/(KG) COVER	WEIGHT LB/(KG) UNIT
2"	1"	3-7/8	2	8-1/8	4-1/16	8-7/8	5-1/4	12-1/2	35	5	29
(DIN50)	(DIN25)	(98)	(51)	(206)	(103)	(225)	(133)	(318)	(225)	2.3	13
2.5"	1"	4	2-1/2	8-3/4	4-3/8	9-3/4	5-1/2	14	50	7	33
(DIN65)	(DIN25)	(102)	(64)	(222)	(111)	(248)	(140)	(356)	(323)	3.2	15
3"	1"	4-3/8	3	9-7/8	4-15/16	11-1/4	7-1/8	15-3/8	58	9	44
(DIN80)	(DIN25)	(111)	(76)	(251)	(125)	(286)	(181)	(391)	(374)	4.1	20
4"	1"	5-1/4	4	11-1/2	5-3/4	15-3/8	9-1/2	21-1/4	116	13	67
(DIN100)	(DIN25)	(133)	(102)	(292)	(146)	(391)	(241)	(540)	(748)	5.9	30
5"	1"	7-1/2	5	13-1/8	6-9/16	15-7/8	9-1/2	22-1/4	140	20	105
(DIN125)	(DIN25)	(191)	(127)	(333)	(167)	(403)	(241)	(565)	(903)	9.1	48
6"	1"	7-1/2	6	14-7/8	7-7/16	16	9-1/2	22-1/4	167	26	120
(DIN150)	(DIN25)	(191)	(152)	(378)	(189)	(406)	(241)	(572)	(1077)	12	54
8"	1"	10	8	18-3/4	9-3/8	21	12-5/8	29-3/8	303	45	220
(DIN200)	(DIN25)	(254)	(203)	(476)	(238)	(533)	(321)	(746)	(1954)	20	100
10"	1"	11-5/8	10	20-1/8	10-1/16	24-3/4	14-1/2	35	409	70	292
(DIN250)	(DIN25)	(296)	(254)	(511)	(256)	(629)	(368)	(889)	(2638)	32	132
12"	1.5"	16	12	26-1/4	13-1/8	29-3/4	17	42-1/2	694	110	455
(DIN300)	(DIN40)	(403)	(305)	(667)	(333)	(755)	(432)	(1080)	(4475)	52	205

(1) Dimension "B" is +/- 0.13". (2) Screen Area values are equal to the total surface area of the basket strainer element. The screen open area is equal to the Screen Area multiplied by the Percentage Open Area of the basket strainer element material. (3) Filter Solutions Inc. makes every effort to ensure the information presented in this literature is accurate. Dimensions shown are subject to change. Contact FSI for certified prints when required.

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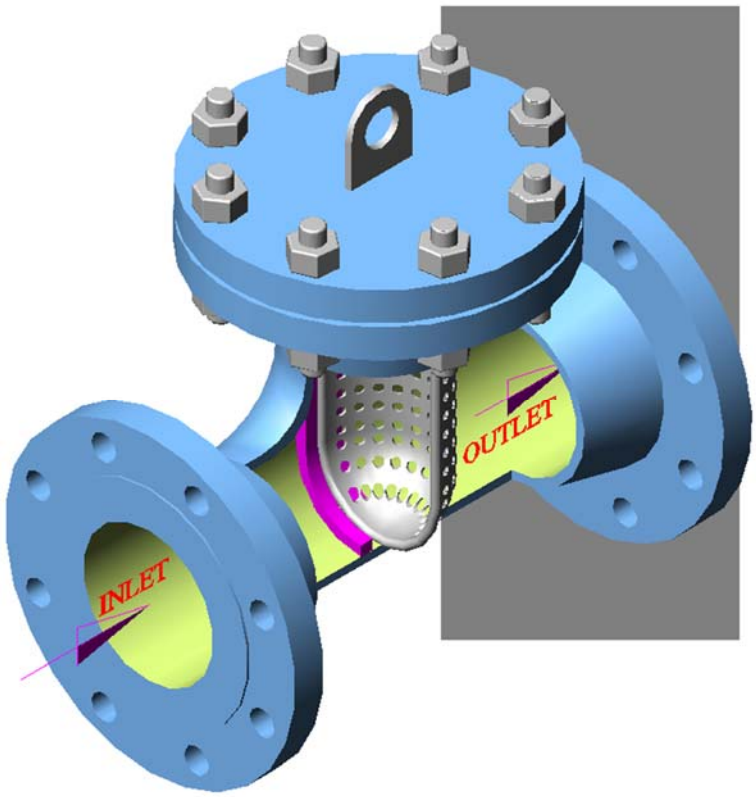
T-STRAINER

TSFS MODEL



TYPICAL APPLICATIONS

Oil and Gas
Chemical Process
Steam
Petroleum
Water
Other

MATERIAL OF CONSTRUCTION

304/316 Stainless Steel
Carbon Steel
Carbon Steel L.T.
Nace Compliance
Other

RATINGS

ANSI Class 150
ANSI Class 300
ANSI Class 600
ANSI Class 900
ANSI Class 1500
ANSI Class 2500
Other

END CONNECTIONS

Buttweld
Ring Type Joint
Raised Face Flange
Flat Face Flange
Other

SIZES

2”(DIN50) to 24”(DIN600)
Larger sizes available upon request.

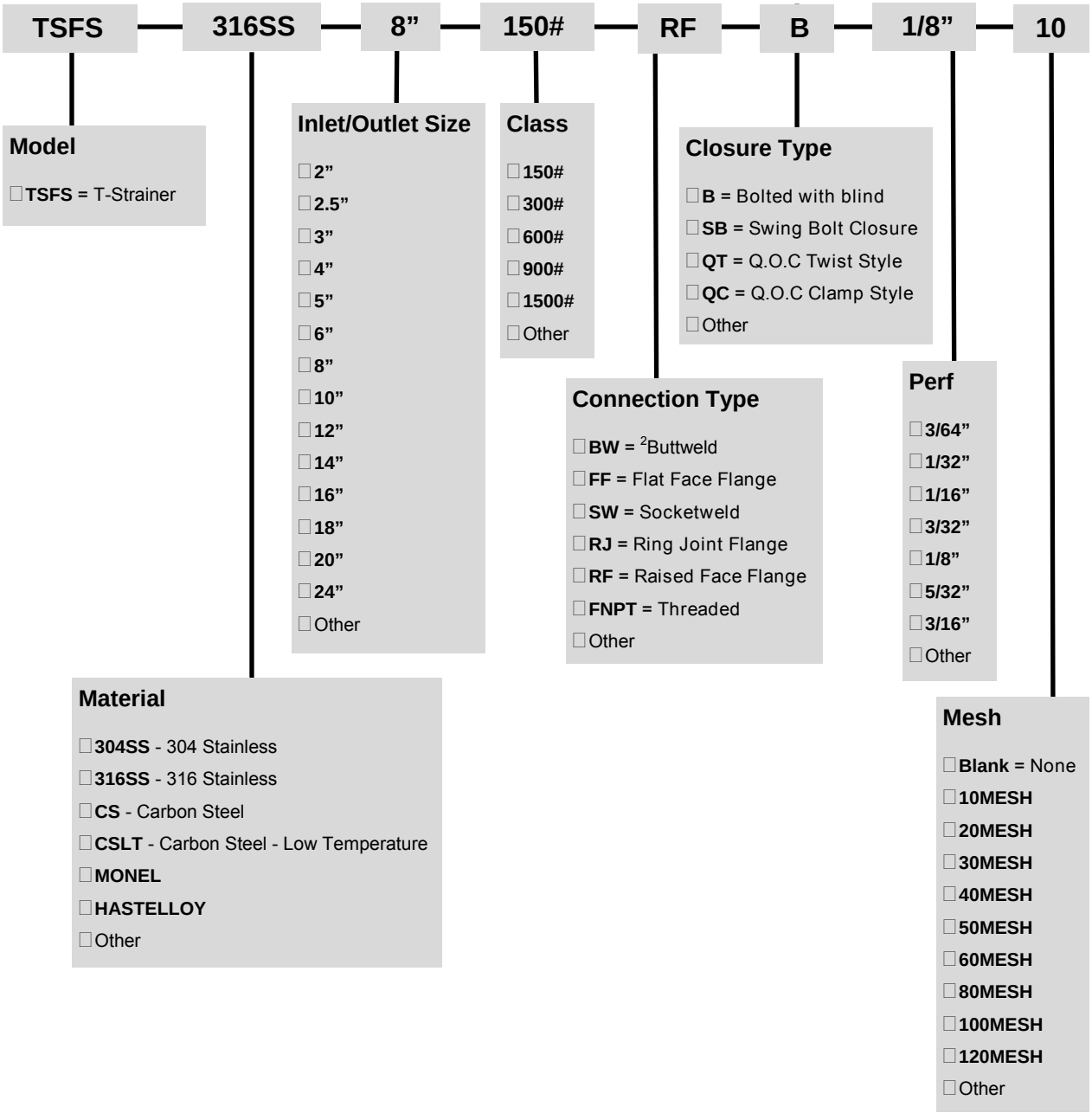
FEATURES

-Heavy duty construction.

-Compact design.

-Standard stainless steel screens.

T-STRAINER ORDERING GUIDE



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FILTER SOLUTIONS INC

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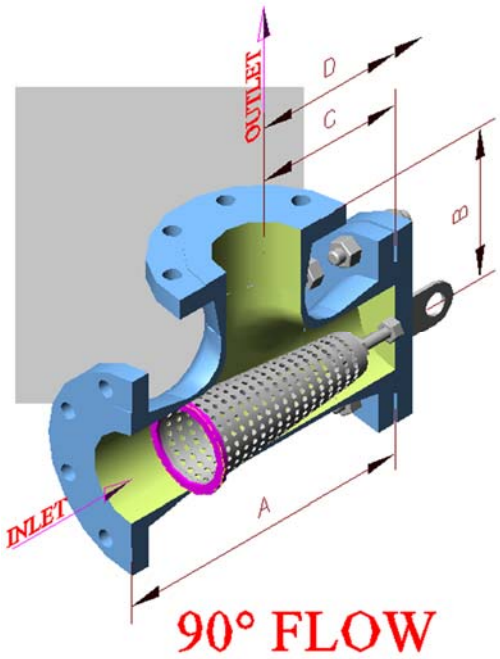
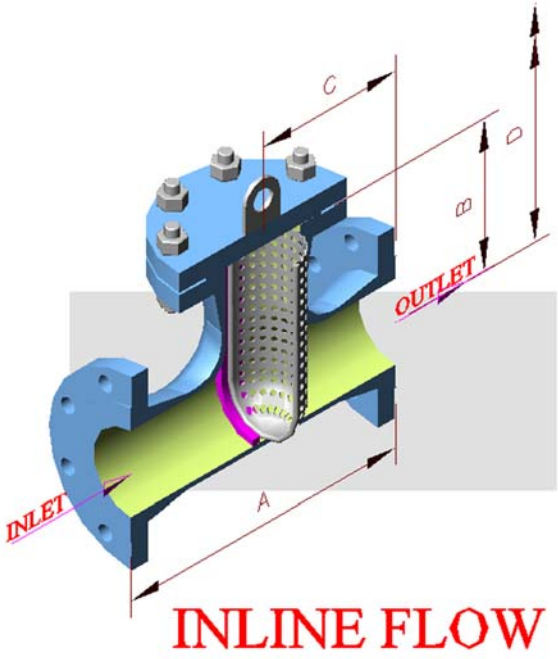
T-STRAINER DATA SHEET



90° FLOW



INLINE FLOW

[1]STANDARD SCREEN

SIZE	*SCREEN*	*MATERIAL*
2” - 24”	1/8" Perf	304SS

NOTES

1. Other screens, mesh liners and material available upon request. Consult FSI.
2. For Buttweld connection please specify mating pipe schedule.
3. Dimensions shown are subject to change. Contact FSI for certified drawing when required.

Materials of Construction
([1]Carbon Steel Shown)

Body	ASTM A234-WPB
Flanges	ASTM A105
Screen	304SS
Int/Ext. Attachment	C/S
Coupling/Threadolets	ASTM A105
Gasket	304SS Spiral Wound
Stud	ASTM A193-B7
Nut	ASTM A194-2H

T-STRAINER DATA SHEET

SIZE	A				B				C				D		Approx. Weights LBS/(kg)			
	Flanged		[2]Buttweld		Flanged		[2]Buttweld		Flanged		[2]Buttweld		Flanged/ Butt-weld		Unit (Flanged)		Unit (Buttweld)	
	CLASS		CLASS		CLASS		CLASS		CLASS		CLASS		CLASS		CLASS		CLASS	
	150#	300#	150#	300#	150#	300#	150#	300#	150#	300#	150#	300#	150#	300#	150#	300#	150#	300#
2"	10-3/16	10-11/16	5	5	5-1/8	5-3/8	2-1/2	2-1/2	5-1/8	5-3/8	2-1/2	2-1/2	12-5/8	13-1/8	28	42	16	24
(50)	(259)	(271)	(127)	(127)	(130)	(137)	(64)	(64)	(130)	(137)	(64)	(64)	(321)	(333)	(13)	(19)	(7)	(11)
2.5"	11-11/16	12-3/16	6	6	5-7/8	6-1/8	3	3	5-7/8	6-1/8	3	3	14-7/8	15-5/8	40	55	25	30
(65)	(297)	(310)	(152)	(152)	(149)	(156)	(76)	(76)	(149)	(156)	(76)	(76)	(378)	(397)	(18)	(25)	(11)	(14)
3"	12-7/16	13-3/16	6-3/4	6-3/4	6-1/4	6-5/8	3-3/8	3-3/8	6-1/4	6-5/8	3-3/8	3-3/8	15-3/8	16-1/8	52	72	32	42
(80)	(316)	(335)	(171)	(171)	(159)	(168)	(86)	(86)	(159)	(168)	(86)	(86)	(391)	(410)	(24)	(33)	(15)	(19)
4"	14-7/16	15-3/16	8-1/4	8-1/4	7-1/4	7-5/8	4-1/8	4-1/8	7-1/4	7-5/8	4-1/8	4-1/8	18-1/2	19-1/4	79	125	49	75
(100)	(367)	(386)	(210)	(210)	(184)	(194)	(105)	(105)	(184)	(194)	(105)	(105)	(470)	(489)	(36)	(57)	(22)	(34)
5"	16-15/16	17-11/16	9-3/4	9-3/4	8-1/2	8-7/8	4-7/8	4-7/8	8-1/2	8-7/8	4-7/8	4-7/8	21-3/4	22-1/2	105	160	67	96
(125)	(430)	(449)	(248)	(248)	(216)	(225)	(124)	(124)	(216)	(225)	(124)	(124)	(552)	(572)	(48)	(73)	(30)	(44)
6"	18-7/16	19-3/16	11-1/4	11-1/4	9-1/4	9-5/8	5-5/8	5-5/8	9-1/4	9-5/8	5-5/8	5-5/8	23-3/4	24-3/4	140	225	92	141
(150)	(468)	(487)	(286)	(286)	(235)	(244)	(143)	(143)	(235)	(244)	(143)	(143)	(603)	(629)	(63)	(102)	(42)	(64)
8"	22-3/16	22-15/16	14	14	11	11-1/2	7	7	11-1/8	11-1/2	7	7	29-1/8	29-7/8	230	350	152	216
(200)	(564)	(583)	(356)	(356)	(279)	(292)	(178)	(178)	(283)	(292)	(178)	(178)	(740)	(759)	(104)	(159)	(69)	(98)
10"	25-3/16	26-7/16	17	17	12-5/8	13-1/4	8-1/2	8-1/2	12-5/8	13-1/4	8-1/2	8-1/2	33-5/8	34-7/8	325	495	221	313
(250)	(640)	(672)	(432)	(432)	(321)	(337)	(216)	(216)	(321)	(337)	(216)	(216)	(854)	(886)	(147)	(224)	(100)	(142)
12"	29-3/16	30-7/16	20	20	14-1/2	15-1/4	10	10	14-5/8	15-1/4	10	10	39-1/8	40-3/8	500	765	340	485
(300)	(741)	(773)	(508)	(508)	(368)	(387)	(254)	(254)	(371)	(387)	(254)	(254)	(994)	(1026)	(227)	(347)	(154)	(220)
14"	32-3/16	33-7/16	22	22	16	16-3/4	11	11	16-1/8	16-3/4	11	11	43-1/8	44-3/8	710	1025	490	665
(350)	(818)	(849)	(559)	(559)	(406)	(425)	(279)	(279)	(410)	(425)	(279)	(280)	(1095)	(1127)	(322)	(465)	(222)	(302)
16"	34-3/16	35-11/16	24	24	17-1/8	17-7/8	12	12	17-1/8	17-7/8	12	12	46-1/8	47-5/8	860	1320	580	820
(400)	(868)	(906)	(610)	(610)	(435)	(454)	(305)	(305)	(435)	(454)	(305)	(305)	(1172)	(1210)	(390)	(560)	(263)	(372)
18"	39-3/16	39-11/16	27	27	19-1/8	19-7/8	13-1/2	13-1/2	19-1/8	19-7/8	13-1/2	13-1/2	51-5/8	53-1/8	1025	1700	725	1060
(450)	(970)	(1008)	(686)	(686)	(486)	(505)	(343)	(343)	(486)	(505)	(343)	(343)	(1311)	(1349)	(465)	(771)	(329)	(481)
20"	41-9/16	42-15/16	30	30	20-3/4	21-1/2	15	15	20-3/4	21-1/2	15	15	59-13/16	62-7/8	1350	2250	990	1450
(500)	(1056)	(1091)	(762)	(762)	(527)	(546)	(381)	(381)	(527)	(546)	(381)	(381)	(1519)	(1597)	(612)	(1020)	(449)	(658)
24"	46-3/16	47-7/16	34	34	23-1/8	23-3/4	17	17	23-1/8	23-3/4	17	17	63-1/8	64-3/8	2100	2340	1580	2240
(600)	(1173)	(1205)	(864)	(864)	(587)	(603)	(432)	(432)	(587)	(603)	(432)	(432)	(1603)	(1635)	(952)	(1061)	(717)	(1016)

-All dimensions shown in inches with millimetres in brackets beneath.

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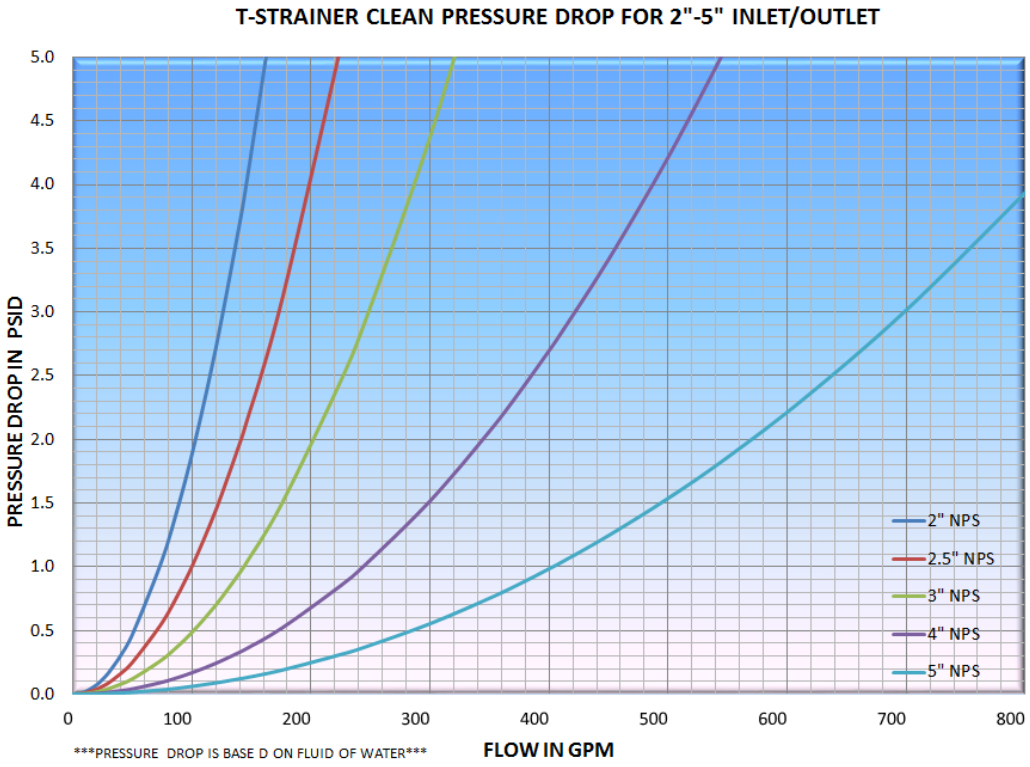
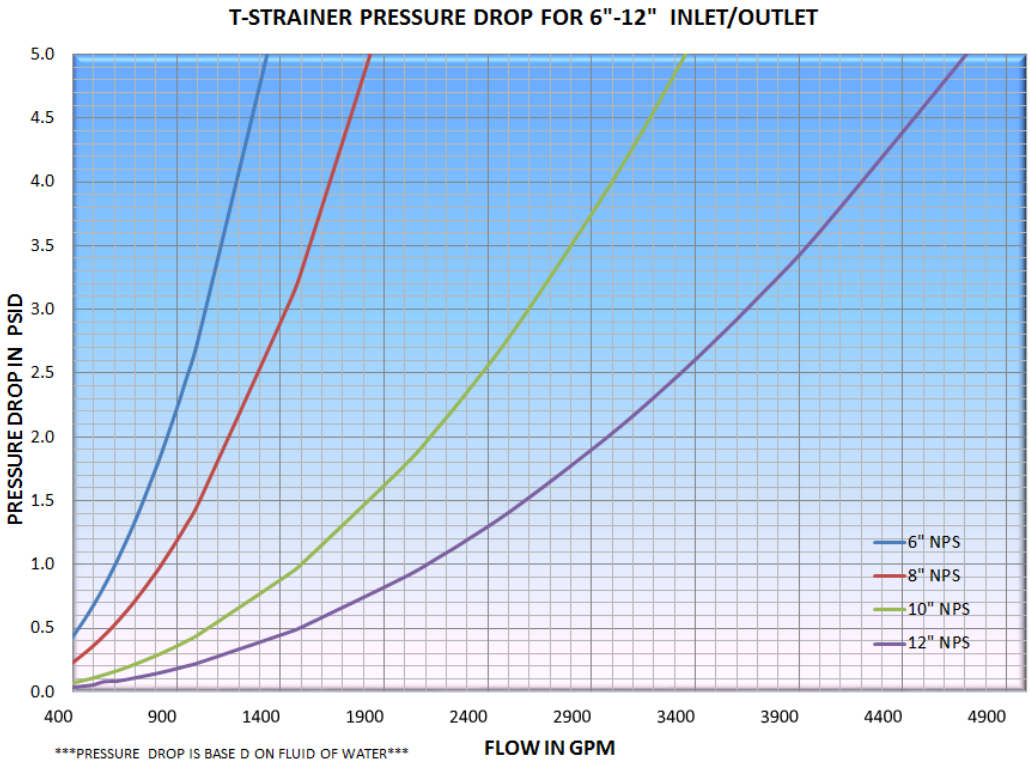
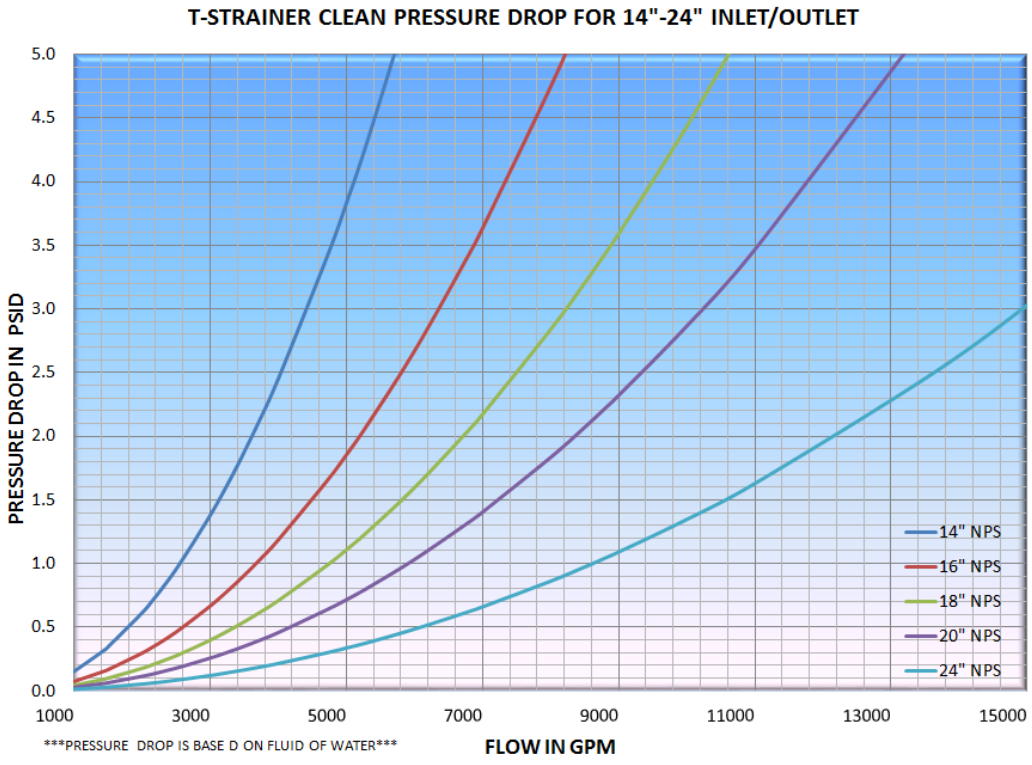
T-STRAINER

TSFS MODEL






T-STRAINER CLEAN PRESSURE DROP FOR 14"-24" INLET/OUTLET
PRESSURE DROP IN PSID
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1000
3000
5000
7000
9000
11000
13000
15000
FLOW IN GPM
14" NPS
16" NPS
18" NPS
20" NPS
24" NPS
PRESSURE DROP IS BASE D ON FLUID OF WATER

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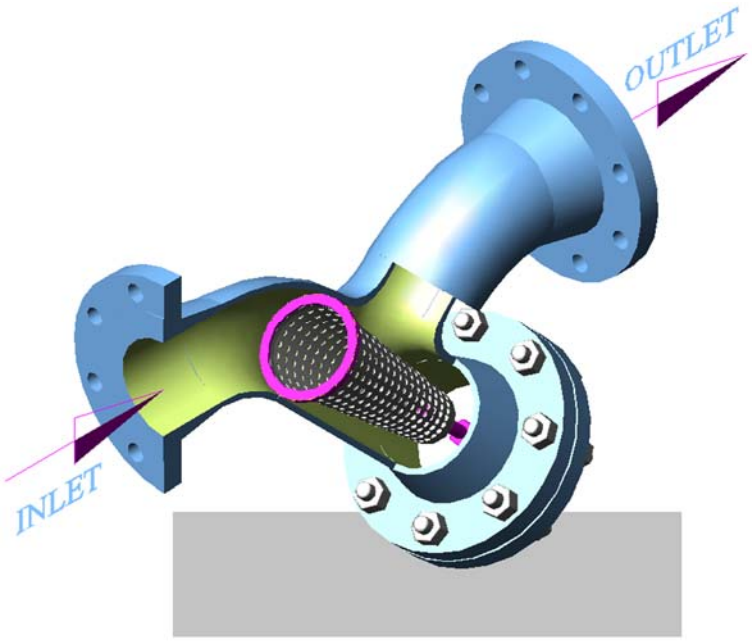
Y-STRAINER

YSFS MODEL



TYPICAL APPLICATIONS

Oil and Gas
Chemical Process
Steam
Petroleum
Water
Other

MATERIAL OF CONSTRUCTION

304/316 Stainless Steel
Carbon Steel
Carbon Steel L.T.
Nace Compliance
Other

RATINGS

ANSI Class 150
ANSI Class 300
ANSI Class 600
ANSI Class 900
ANSI Class 1500
ANSI Class 2500
Other

END CONNECTIONS

Buttweld
Ring Type Joint
Raised Face Flange
Flat Face Flange
Other

SIZES

2”(DIN50) to 24”(DIN600)
Larger sizes available upon request.

FEATURES

-Heavy duty construction.

-Compact design.

-Standard stainless steel screens.

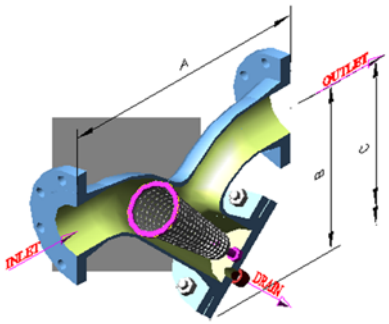
Y-STRAINER DATA SHEET

NOTES

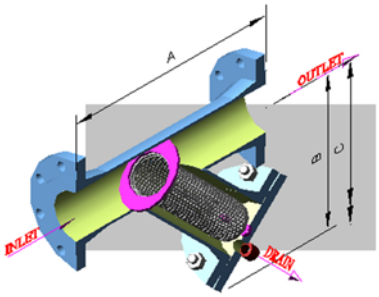
1. Other screens, mesh liners and material available upon request. Consult FSI.
2. For Buttweld connection please specify mating pipe schedule.
3. Dimensions & Weights are shown for 150 Class and are subject to change. Contact FSI for certified drawing when required.

SIZE	[3]A	[3]B	[3]C	Drain	[3]Weight LBS/(kg)	
					Cover	Unit
2"	12-3/4	8-1/4	12-3/4	1/2"	5	28
(50)	(324)	(210)	(324)	DIN15	(2)	(13)
2.5"	15-1/16	10-3/8	15-3/8	1/2"	9	81
(65)	(383)	(264)	(391)	DIN15	(4)	(37)
3"	16-5/8	10-5/8	16	1/2"	9	81
(80)	(422)	(270)	(406)	DIN15	(4)	(37)
4"	20-5/16	13-9/16	19-3/4	1/2"	17	85
(100)	(516)	(345)	(502)	DIN15	(8)	(39)
6"	22	14	22-7/16	1"	26	145
(150)	(559)	(356)	(570)	DIN25	(12)	(66)
8"	24	17-3/4	28-7/16	1"	45	256
(200)	(610)	(451)	(722)	DIN25	(20)	(116)
10"	32	22	35-1/4	1"	70	380
(250)	(813)	(559)	(895)	DIN25	(32)	(173)
12"	33	25	40	1"	110	700
(300)	(838)	(635)	(1016)	DIN25	(50)	(318)
14"	40	27	43-2/4	1"	140	750
(350)	(1016)	(686)	(1099)	DIN25	(64)	(341)
16"	46	30-7/8	49-1/2	1"	180	905
(400)	(1168)	(784)	(1257)	DIN25	(82)	(411)
18"	49	33-7/8	54-1/4	1"	220	1125
(450)	(1245)	(860)	(1378)	DIN25	(100)	(511)
20"	54	39	62-1/2	1"	285	1415
(500)	(1372)	(991)	(1588)	DIN25	(130)	(643)
24"	64	44	70-1/2	1"	430	1825
(600)	(1626)	(1118)	(1791)	DIN25	(195)	(830)

-All dimensions shown in inches with millimetres in brackets beneath.



SIZE 2"-4"



SIZE 6"-24"

[1]STANDARD SCREEN

SIZE	*SCREEN*	*MATERIAL*
2" - 24"	1/8" Perf	304SS

Materials of Construction ([1]Carbon Steel Shown)

Pipe	A106B
Flanges	A105
Coupling/Threadolets	A105
B.W Fittings	A234 WPB
Int/Ext. Attachment	C/S
Screen	304SS
Gasket	304SS Spiral Wound
Stud	A193-B7
Nut	A194-2H

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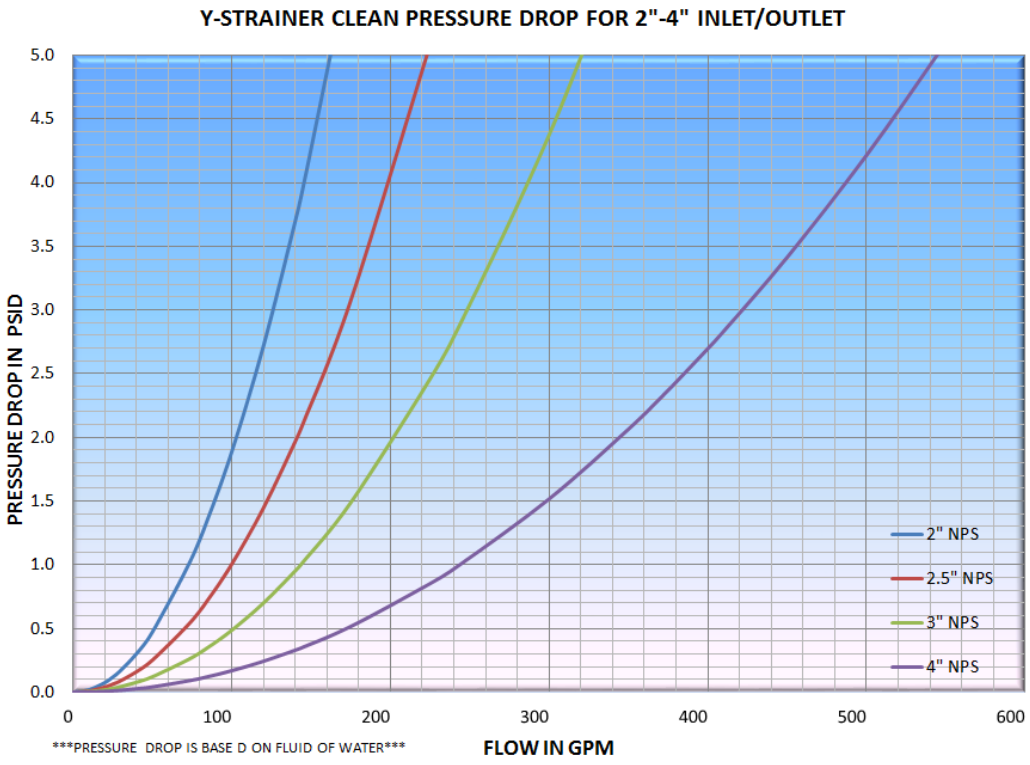
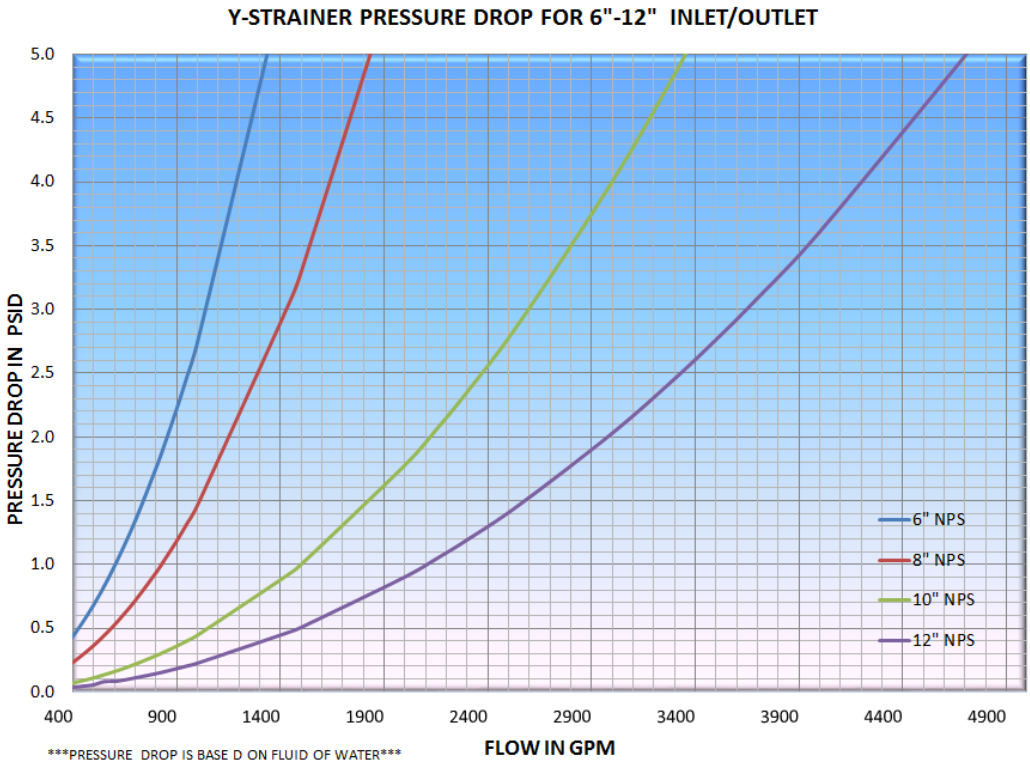
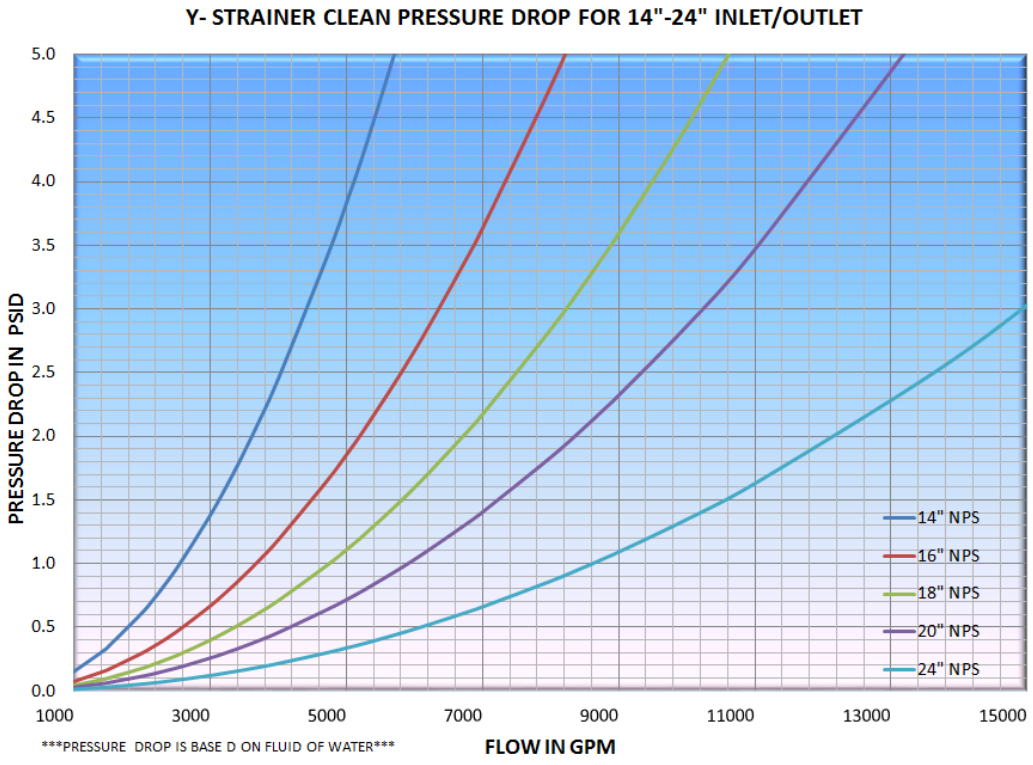
Y-STRAINER

YSFS MODEL






Y- STRAINER CLEAN PRESSURE DROP FOR 14"-24" INLET/OUTLET
PRESSURE DROP IN PSID
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1000
3000
5000
7000
9000
11000
13000
15000
FLOW IN GPM
14" NPS
16" NPS
18" NPS
20" NPS
24" NPS
PRESSURE DROP IS BASE D ON FLUID OF WATER

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Y-STRAINER ORDERING GUIDE

YSFS — **316SS** — **8”** — **150#** — **RF** — **B** — **1/8”** — **10**

Model

- ☐ **YSFS** = Y-Strainer

Material

- ☐ **304SS** - 304 Stainless
- ☐ **316SS** - 316 Stainless
- ☐ **CS** - Carbon Steel
- ☐ **CSLT** - Carbon Steel - Low Temperature
- ☐ **MONEL**
- ☐ **HASTELLOY**
- ☐ Other

Inlet/Outlet Size

- ☐ **2”**
- ☐ **2.5”**
- ☐ **3”**
- ☐ **4”**
- ☐ **5”**
- ☐ **6”**
- ☐ **8”**
- ☐ **10”**
- ☐ **12”**
- ☐ **14”**
- ☐ **16”**
- ☐ **18”**
- ☐ **20”**
- ☐ **24”**
- ☐ Other

Class

- ☐ **150#**
- ☐ **300#**
- ☐ **600#**
- ☐ **900#**
- ☐ **1500#**
- ☐ Other

Connection Type

- ☐ **BW** = [2]Buttweld
- ☐ **FF** = Flat Face Flange
- ☐ **SW** = Socketweld
- ☐ **RJ** = Ring Joint Flange
- ☐ **RF** = Raised Face Flange
- ☐ **FNPT** = Threaded
- ☐ Other

Closure Type

- ☐ **B** = Bolted with blind
- ☐ **SB** = Swing Bolt Closure
- ☐ **QT** = Q.O.C Twist Style
- ☐ **QC** = Q.O.C Clamp Style
- ☐ Other

Perf

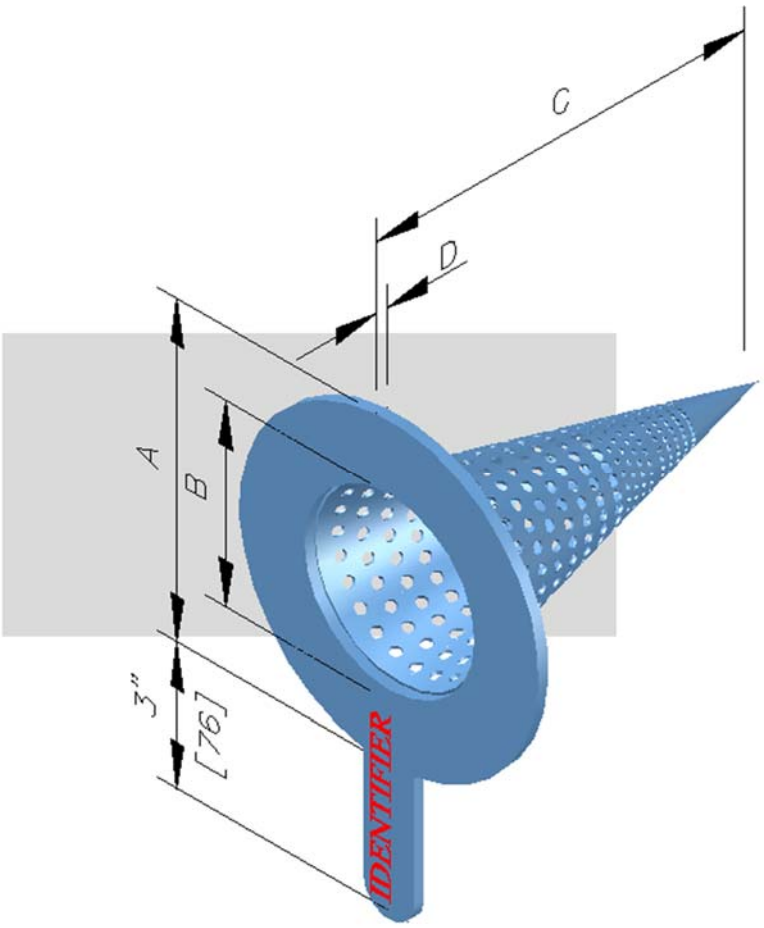
- ☐ **3/64”**
- ☐ **1/32”**
- ☐ **1/16”**
- ☐ **3/32”**
- ☐ **1/8”**
- ☐ **5/32”**
- ☐ **3/16”**
- ☐ Other

Mesh

- ☐ **Blank** = None
- ☐ **10MESH**
- ☐ **20MESH**
- ☐ **30MESH**
- ☐ **40MESH**
- ☐ **50MESH**
- ☐ **60MESH**
- ☐ **80MESH**
- ☐ **100MESH**
- ☐ **120MESH**
- ☐ Other

TEMPORARY CONE STRAINER

TCSFS MODEL



TYPICAL APPLICATIONS

Oil and Gas
Chemical Process
Steam
Water
Essentially any process fluid

MATERIAL OF CONSTRUCTION

304/316 Stainless Steel
Carbon Steel
Monel
Hastelloy
Other

RATINGS

ANSI Class 150
ANSI Class 300
ANSI Class 600
ANSI Class 900
ANSI Class 1500
ANSI Class 2500
Other

END CONNECTIONS

Wafer
Lug
RTJ
Other

SIZES

1"(DIN25) to 24"(DIN600)
Larger sizes available upon request.

FEATURES

-Mesh lining from 10-120 mesh. Larger opening also available.

-Flow direction from in/out, out/in and bi-directional.

-Perforation from 3/64" to 3/8". Larger openings available upon request.

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TEMPORARY CONE STRAINER DATA SHEET

NOTES

1. Other screens, thicker gauge and material available upon request. Please contact FSI.
2. Dimensions shown are subject to change. Contact FSI for certified drawing when required.
3. Dimensions shown using 1/8" perf and no mesh.
4. Changing in perforation size will affect the Open Area percentage.

SIZE	A								B		C								D		WEIGHT	
	150/300#		600#		900#		1500#				100%		150%		200%		300%		THICKNESS		LB	KG
1"	2-1/2	(64)	2-3/4	(70)	3	(76)	3	(76)	3/4	(19)	1-5/8	(41)	2.5	(64)	3-5/16	(85)	5	(127)	1/8	(3)	0.5	(0.2)
1.5"	3-1/4	(83)	3-5/8	(92)	3-3/4	(95)	3-3/4	(95)	1-1/4	(32)	2-3/16	(56)	3-3/8	(86)	4.5	(114)	6-3/4	(171)	1/8	(3)	0.5	(0.2)
2"	4	(102)	4-1/4	(108)	5-1/2	(140)	5-1/2	(140)	1-3/4	(45)	3	(76)	4-1/2	(114)	6	(152)	9-1/8	(232)	1/8	(3)	0.5	(0.2)
2.5"	4-3/4	(121)	5	(127)	6-3/8	(162)	6-3/8	(162)	2-1/4	(57)	3.2	(81)	5	(127)	6-5/8	(169)	10-1/8	(257)	1/8	(3)	1.0	(0.5)
3"	5-1/4	(133)	5-3/4	(146)	6-1/2	(165)	6-3/4	(172)	2-3/4	(70)	4	(102)	6-1/4	(159)	8-1/2	(216)	12-3/4	(324)	1/8	(3)	1.0	(0.5)
4"	6-3/4	(172)	7-1/2	(191)	8	(203)	8-1/8	(206)	3-3/4	(95)	5-1/8	(130)	7-7/8	(200)	10-5/8	(270)	17	(432)	1/8	(3)	2.0	(0.9)
6"	8-5/8	(219)	10-3/8	(264)	11-1/4	(286)	11	(279)	5-3/8	(137)	8-1/8	(206)	13	(330)	17	(432)	26	(660)	1/8	(3)	3.0	(1.4)
8"	10-7/8	(276)	12-1/2	(318)	14	(356)	13-3/4	(349)	7-3/8	(187)	10-3/16	(259)	16	(406)	22	(559)	33	(838)	1/8	(3)	5.0	(2.3)
10"	13-1/4	(337)	15-5/8	(397)	17	(432)	17	(432)	9-3/8	(238)	13	(330)	20	(508)	27	(686)	40	(1016)	1/8	(3)	7.0	(3.2)
12"	16	(406)	17-7/8	(454)	19-1/2	(495)	20-3/8	(518)	11	(279)	16	(406)	24	(610)	33	(838)	49	(1245)	1/8	(3)	11.0	(5.0)
14"	17-3/8	(441)	19	(483)	20-3/8	(518)	22-5/8	(575)	12-1/4	(311)	17	(432)	27	(686)	36	(914)	54	(1372)	1/8	(3)	12.0	(5.4)
16"	20-1/8	(511)	21-7/8	(556)	22-1/2	(572)	25-1/8	(638)	14	(356)	20	(508)	31	(787)	41	(1041)	62	(1575)	1/8	(3)	16.0	(7.3)
18"	21-1/4	(540)	23-3/4	(603)	25	(635)	27-5/8	(702)	15-3/4	(400)	23	(584)	35	(889)	47	(1194)	71	(1803)	1/8	(3)	20.0	(9.1)
20"	23-1/2	(597)	26-5/8	(676)	27-3/8	(695)	29-5/8	(753)	17-1/2	(445)	25	(635)	39	(991)	53	(1346)	79	(2007)	1/8	(3)	26.0	(11.8)
24"	27-7/8	(708)	30-7/8	(784)	32-7/8	(835)	35-3/8	(899)	21-1/4	(540)	30	(762)	47	(1194)	63	(1600)	95	(2413)	1/8	(3)	30.0	(13.6)

-All dimensions shown in inches with millimetres in brackets beneath.

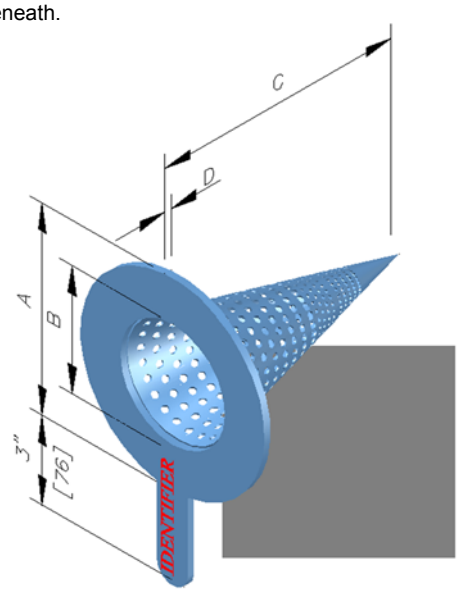
The Open Area Ratio is calculated as follows:

OA% = (Screen area x free area %) x 100 / (Cross sectional area of sch.std pipe)
Note: Free area for 1/8" perf is 40%

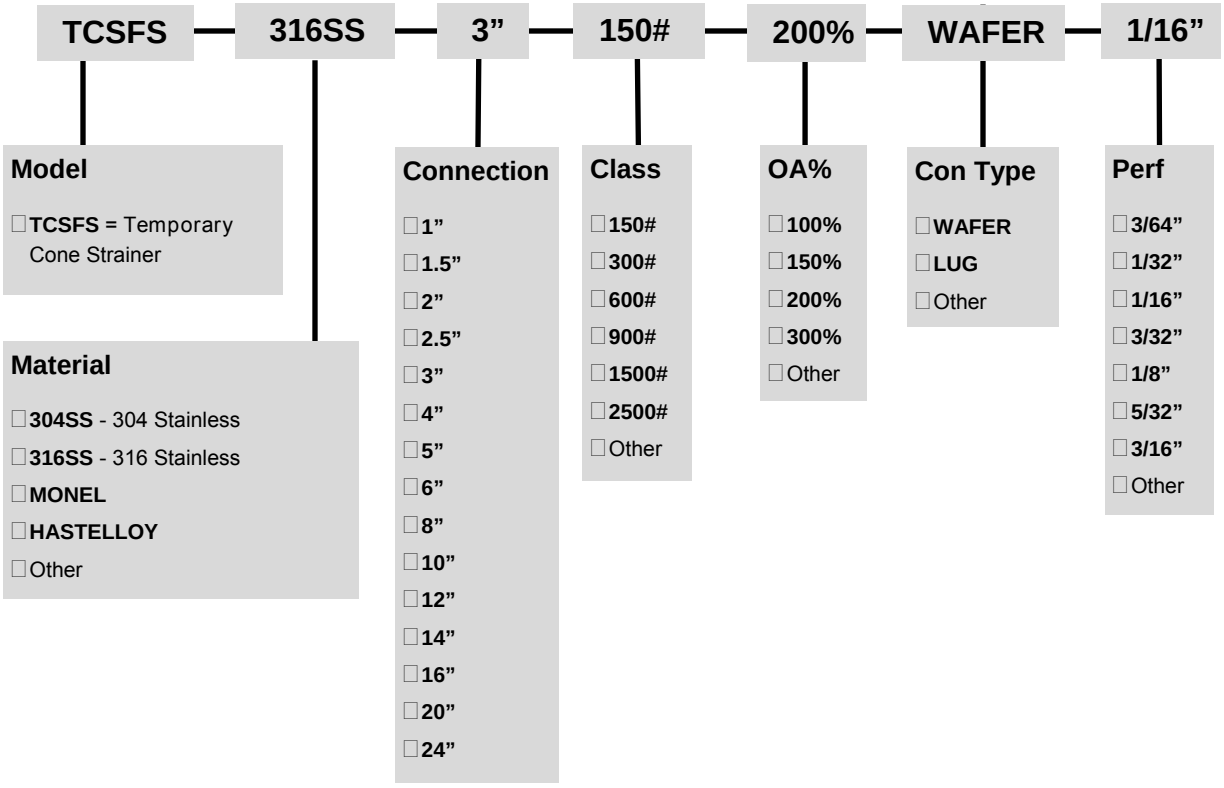
[1]STANDARD SCREEN

SIZE	*SCREEN*	*THICKNESS*	*MATERIAL*
1" - 8"	1/8" Perf	22 Gauge	304SS
10"-24"	1/8" Perf	16 Gauge	304SS

TCSFS are designed to fit between Wafer Flat Faced Smooth, RF Flanges. Standard class 150# up to 2500#. Other custom sizes and connections are available upon request.



TEMPORARY CONE STRAINER ORDERING GUIDE



FSFS

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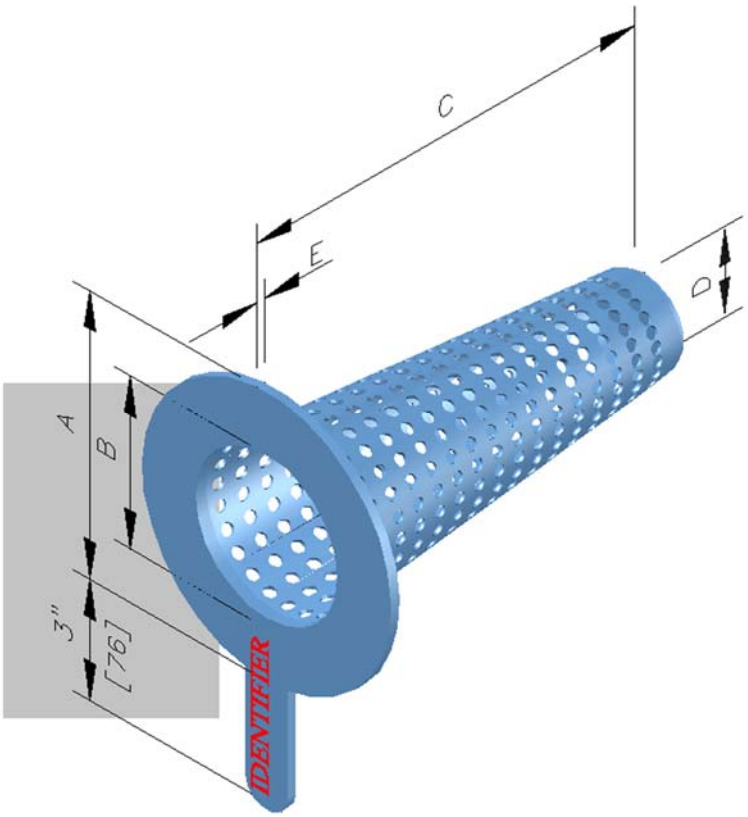
TEMPORARY BASKET STRAINER

TBSFS MODEL



TYPICAL APPLICATIONS

Oil and Gas
Chemical Process
Steam
Water
Essentially any process fluid

MATERIAL OF CONSTRUCTION

304/316 Stainless Steel
Carbon Steel
Monel
Hastelloy
Other

RATINGS

ANSI Class 150
ANSI Class 300
ANSI Class 600
ANSI Class 900
ANSI Class 1500
ANSI Class 2500
Other

END CONNECTIONS

Wafer
Lug
RTJ
Other

SIZES

1”(DIN25) to 24”(DIN600)
Larger sizes available upon request.

FEATURES

-Mesh lining from 10-120 mesh. Larger opening also available.

-Flow direction from in/out, out/in and bi-directional.

-Perforation from 3/64” to 3/8”. Larger openings available upon request.

TEMPORARY BASKET STRAINER DATA SHEET

NOTES

1. Alternative screens, mesh liners, thicker gauges and materials available upon request. Please contact FSI.
2. Dimensions shown are subject to change. Contact FSI for certified drawing when required.
3. Dimensions shown using 1/8" perf and no mesh.
4. Changing in perforation size will affect the Open Area percentage.

SIZE	A								B		C								D		E		WEIGHT	
	150/300#		600#		900#		1500#				100%		150%		200%		300%				THICKNESS		LB	KG
1"	2-1/2	(64)	2-3/4	(70)	3	(76)	3	(76)	3/4	(19)	1-1/8	(29)	1-11/16	(42)	2-1/4	(57)	3-3/8	(86)	3/8	(10)	1/8	(3)	0.5	(0.2)
1.5"	3-1/4	(83)	3-5/8	(92)	3-3/4	(95)	3-3/4	(95)	1-1/4	(32)	1-1/2	(38)	2-1/4	(57)	3	(76)	4-1/2	(114)	5/8	(16)	1/8	(3)	0.5	(0.2)
2"	4	(102)	4-1/4	(108)	5-1/2	(140)	5-1/2	(140)	1-3/4	(45)	2	(51)	3	(76)	4	(102)	6	(152)	7/8	(22)	1/8	(3)	0.5	(0.2)
2.5"	4-3/4	(121)	5	(127)	6-3/8	(162)	6-3/8	(162)	2-1/4	(57)	2-3/16	(56)	3-3/8	(86)	4-1/2	(114)	6-3/4	(172)	1-1/8	(29)	1/8	(3)	1.0	(0.5)
3"	5-1/4	(133)	5-3/4	(146)	6-1/2	(165)	6-3/4	(172)	2-3/4	(70)	2-3/4	(70)	4-1/4	(108)	5-11/16	(144)	8-1/2	(216)	1-3/8	(35)	1/8	(3)	1.0	(0.5)
4"	6-3/4	(172)	7-1/2	(191)	8	(203)	8-1/8	(206)	3-3/4	(95)	3-1/2	(89)	5-5/16	(135)	7-3/16	(183)	11	(279)	1-7/8	(48)	1/8	(3)	2.0	(0.9)
6"	8-5/8	(219)	10-3/8	(264)	11-1/4	(286)	11	(279)	5-3/8	(137)	5-1/2	(140)	8-1/2	(216)	11-3/8	(289)	17	(432)	2-11/16	(68)	1/8	(3)	3.0	(1.4)
8"	10-7/8	(276)	12-1/2	(264)	14	(356)	13-3/4	(349)	7-3/8	(187)	7	(178)	10-11/16	(271)	15	(381)	22	(559)	3-11/16	(94)	1/8	(3)	5.0	(2.3)
10"	13-1/4	(337)	15-5/8	(397)	17	(432)	17	(432)	9-3/8	(238)	8-5/8	(219)	14	(356)	18	(457)	27	(686)	4-11/16	(119)	1/8	(3)	7.0	(3.2)
12"	16	(406)	17-7/8	(454)	19-1/2	(495)	20-3/8	(518)	11	(279)	10-1/2	(267)	17	(432)	22	(559)	33	(838)	5-1/2	(140)	1/8	(3)	11.0	(5.0)
14"	17-3/8	(441)	19	(483)	22-3/8	(518)	22-5/8	(572)	12-1/4	(311)	11-1/2	(292)	18	(457)	24	(610)	36	(914)	6-1/8	(156)	1/8	(3)	12.0	(5.4)
16"	20-1/8	(511)	21-7/8	(556)	22-1/2	(572)	25-1/8	(638)	14	(356)	14	(356)	21	(533)	28	(711)	42	(1067)	7	(178)	1/8	(3)	16.0	(7.3)
18"	21-1/4	(540)	23-3/4	(603)	25	(635)	27-5/8	(702)	15-3/4	(400)	16	(406)	24	(610)	32	(813)	47	(1194)	7-7/8	(200)	1/8	(3)	20.0	(9.1)
20"	23-1/2	(597)	26-5/8	(676)	27-3/8	(695)	29-5/8	(753)	17-1/2	(445)	17	(432)	27	(686)	35	(889)	53	(1346)	8-3/4	(222)	1/8	(3)	26.0	(11.6)
24"	27-7/8	(708)	30-7/8	(784)	32-7/8	(835)	35-3/8	(899)	21-1/4	(540)	21	(533)	32	(813)	42	(1067)	64	(1626)	10-5/8	(270)	1/8	(3)	30.0	(13.6)

The Open Area Ratio is calculated as follows:

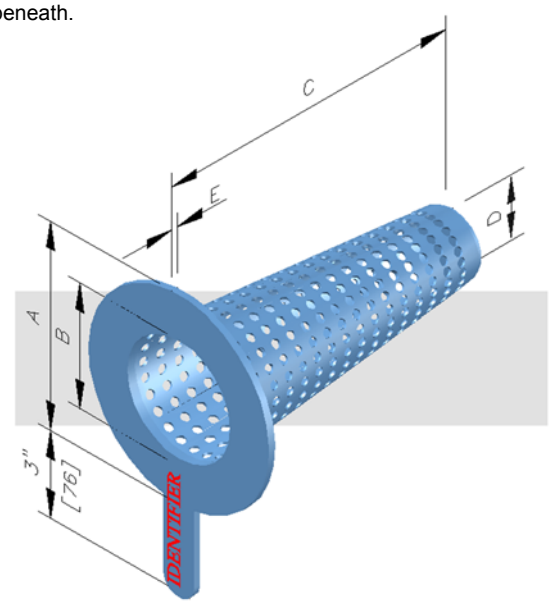
OA% = (Screen area x free area %) x 100 / (Cross sectional area of sch.std pipe)
Note: Free area for 1/8" perf is 40%

[1]STANDARD SCREEN

SIZE	*SCREEN*	*THICKNESS*	*MATERIAL*
1" - 8"	1/8" Perf	22 Gauge	304SS
10"-24"	1/8" Perf	16 Gauge	304SS

TBSFS are designed to fit between Wafer Flat Faced Smooth, RF Flanges. Standard class 150# up to 2500#. Other custom sizes and connections are available upon request.

-All dimensions shown in inches with millimetres in brackets beneath.



FSFS

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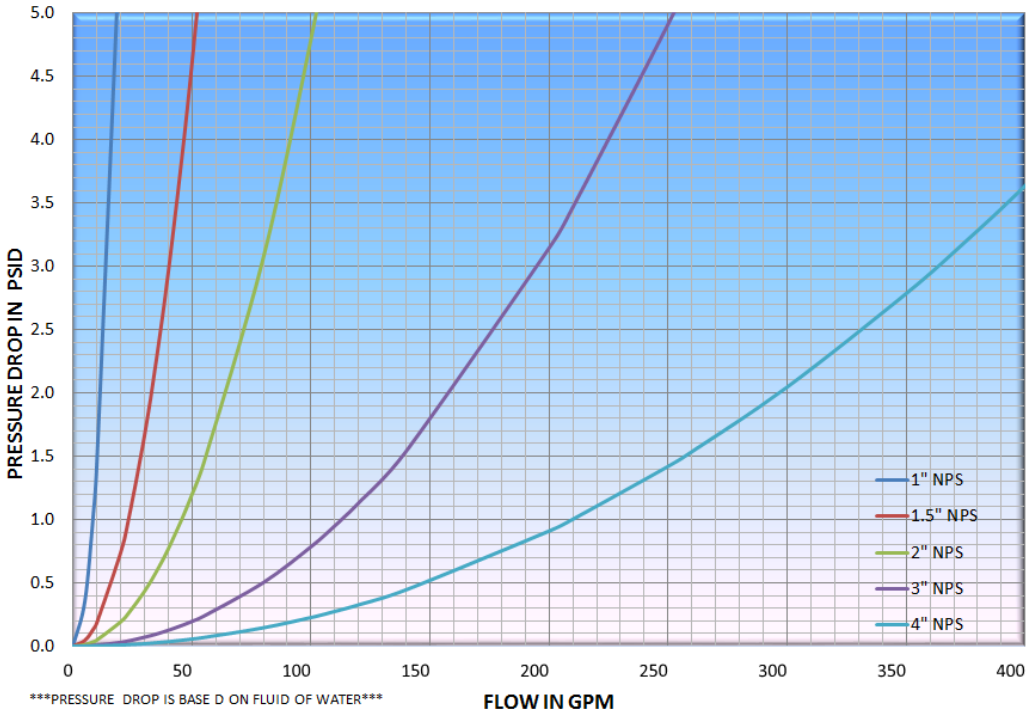
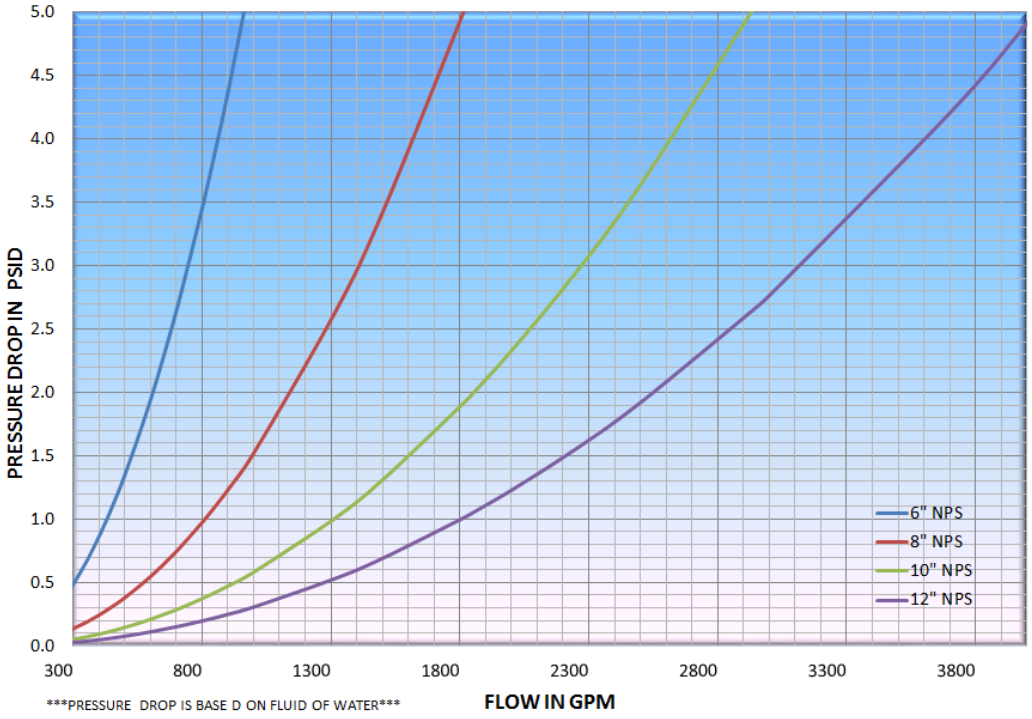
TEMPORARY CONE & BASKET STRAINER

TCSFS & TBSFS MODEL

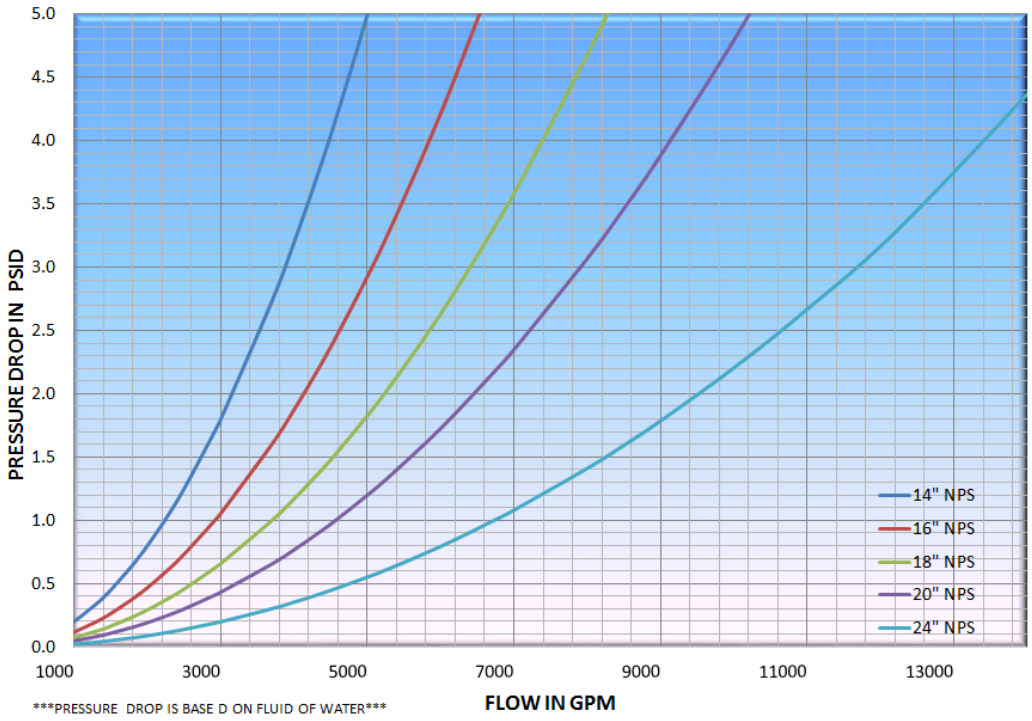
TCSFS & TBSFS CLEAN PRESSURE DROP FOR 1"-4" NPS CONNECTIONS



TCSFS & TBSFS CLEAN PRESSURE DROP FOR 6"-12" NPS CONNECTIONS



TCSFS & TBSFS CLEAN PRESSURE DROP FOR 14"-24" NPS CONNECTIONS



PRESSURE DROP IS BASE D ON FLUID OF WATER

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TEMPORARY BASKET STRAINER ORDERING GUIDE

TBSFS – 316SS – 3” – 150# – 200% – WAFER – 1/16” – 40 – I/O

Model
- ☐ **TBSFS** = Temporary Basket Strainer

Material
- ☐ **304SS** - 304 Stainless
- ☐ **316SS** - 316 Stainless
- ☐ **MONEL**
- ☐ **HASTELLOY**
- ☐ Other

Connection
- ☐ **1”**
- ☐ **1.5”**
- ☐ **2”**
- ☐ **2.5”**
- ☐ **3”**
- ☐ **4”**
- ☐ **5”**
- ☐ **6”**
- ☐ **8”**
- ☐ **10”**
- ☐ **12”**
- ☐ **14”**
- ☐ **16”**
- ☐ **20”**
- ☐ **24”**
- ☐ Other

Class
- ☐ **150#**
- ☐ **300#**
- ☐ **600#**
- ☐ **900#**
- ☐ **1500#**
- ☐ **2500#**
- ☐ Other

OA%
- ☐ **100%**
- ☐ **150%**
- ☐ **200%**
- ☐ **300%**
- ☐ Other

Con Type
- ☐ **WAFER**
- ☐ **LUG**
- ☐ Other

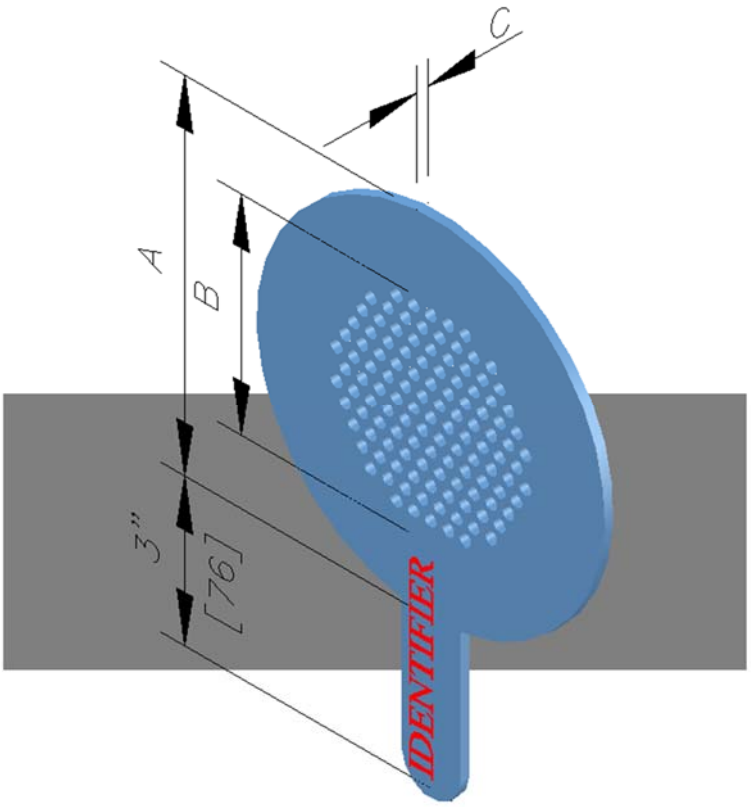
Perf
- ☐ **3/64”**
- ☐ **1/32”**
- ☐ **1/16”**
- ☐ **3/32”**
- ☐ **1/8”**
- ☐ **5/32”**
- ☐ **3/16”**
- ☐ Other

Mesh
- ☐ **Blank** = None
- ☐ **10MESH**
- ☐ **20MESH**
- ☐ **30MESH**
- ☐ **40MESH**
- ☐ **50MESH**
- ☐ **60MESH**
- ☐ **80MESH**
- ☐ **100MESH**
- ☐ **120MESH**
- ☐ Other

Flow
- ☐ **I/O** - In/Out
- ☐ **O/I** - Out/In
- ☐ **BI** - Bi-directional

TEMPORARY PLATE STRAINER

TPSFS MODEL



TYPICAL APPLICATIONS

Oil and Gas
Chemical Process
Steam
Water
Essentially any process fluid

MATERIAL OF CONSTRUCTION

304/316 Stainless Steel
Carbon Steel
Monel
Hastelloy
Other

RATINGS

ANSI Class 150
ANSI Class 300
ANSI Class 600
ANSI Class 900
ANSI Class 1500
ANSI Class 2500
Other

END CONNECTIONS

Wafer
Lug
RTJ
Other

SIZES

1"(DIN25) to 24"(DIN600)
Larger sizes available upon request.

FEATURES

-Mesh lining from 10-120 mesh. Larger opening also available.

-Flow direction from in/out, out/in and bi-directional.

-Perforation from 3/64" to 3/8". Larger openings available upon request.

FSFS

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TEMPORARY PLATE STRAINER DATA SHEET

NOTES

1. Alternative screens, mesh liners, thicker gauge and material available upon request. Please contact FSI.
2. Dimensions shown are subject to change. Contact FSI for certified drawing when required.
3. Dimensions shown using 1/8" perf and no mesh.
4. Changing in perforation size will affect the Open Area percentage.

SIZE	A								B		C		WEIGHT	
	150/300#		600#		900#		1500#				THICKNESS		LB	KG
1"	2-1/2	(64)	2-3/4	(70)	3	(76)	3	(76)	3/4	(19)	1/8	(3)	0.5	(0.2)
1.5"	3-1/4	(83)	3-5/8	(92)	3-3/4	(95)	3-3/4	(95)	1-1/4	(32)	1/8	(3)	0.5	(0.2)
2"	4	(102)	4-1/4	(108)	5-1/2	(140)	5-1/2	(138)	1-3/4	(44)	1/8	(3)	0.5	(0.2)
2.5"	4-3/4	(121)	5	(127)	6-3/8	(162)	6-3/8	(162)	2-1/4	(57)	1/8	(3)	1.0	(0.5)
3"	5-1/4	(133)	5-3/4	(146)	6-1/2	(165)	6-3/4	(171)	2-3/4	(70)	1/8	(3)	1.0	(0.5)
4"	6-3/4	(172)	7-1/2	(191)	8	(203)	8-1/8	(206)	3-3/4	(95)	1/8	(3)	2.0	(0.9)
6"	8-5/8	(219)	10-3/8	(264)	11-1/4	(286)	11	(279)	5-3/8	(137)	1/8	(3)	3.0	(1.4)
8"	10-7/8	(276)	12-1/2	(318)	14	(356)	13-3/4	(349)	7-3/8	(187)	1/8	(3)	5.0	(2.3)
10"	13-1/4	(337)	15-5/8	(397)	17	(432)	17	(432)	9-3/8	(238)	1/8	(3)	7.0	(3.2)
12"	16	(406)	17-7/8	(454)	19-1/2	(495)	20-3/8	(518)	11	(279)	1/8	(3)	11.0	(5.0)
14"	17-3/8	(441)	19	(483)	20-3/8	(518)	22-5/8	(575)	12-1/4	(311)	1/8	(3)	12.0	(5.5)
16"	10-1/8	(511)	21-7/8	(556)	22-1/2	(572)	25-1/8	(638)	14	(356)	1/8	(3)	16.0	(7.3)
18"	21-1/4	(540)	23-3/4	(603)	25	(635)	27-5/8	(702)	15-3/4	(400)	1/8	(3)	20.0	(9.1)
20"	23-1/2	(597)	26-5/8	(676)	27-3/8	(695)	29-5/8	(752)	17-1/2	(445)	1/8	(3)	26.0	(11.8)
24"	27-7/8	(708)	30-7/8	(784)	32-7/8	(835)	35-3/8	(899)	21-1/4	(540)	1/8	(3)	30.0	(13.6)

-All dimensions shown in inches with millimetres in brackets beneath.

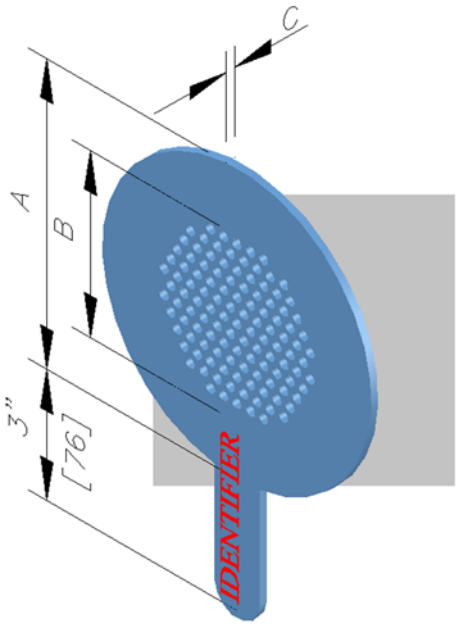
The Open Area Ratio calculated as follows:

OA% = (Screen area x free area %) x 100 / (Cross sectional area of sch.std pipe)

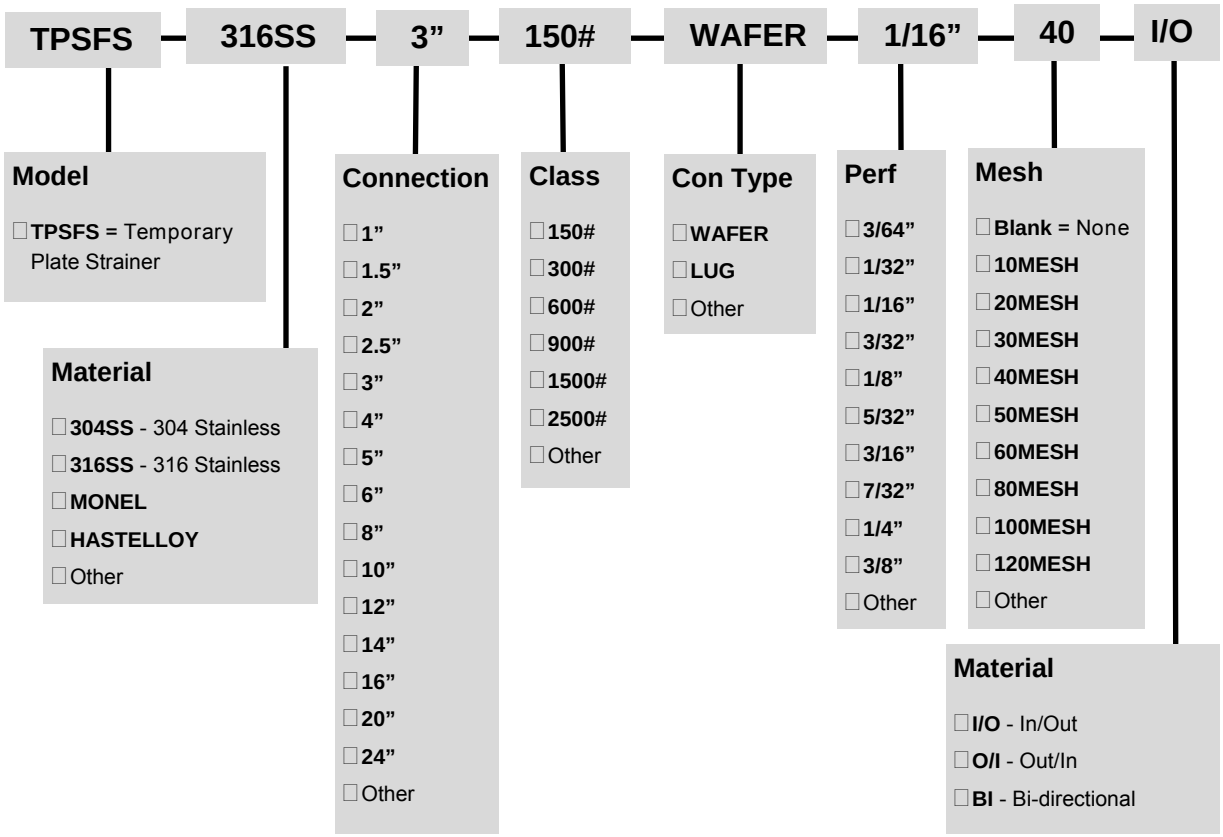
[1]STANDARD SCREEN

SIZE	*SCREEN*	*THICKNESS*	*MATERIAL*
1" - 8"	1/8" Perf	22 Gauge	304SS
10"-24"	1/8" Perf	16 Gauge	304SS

TPSFS are designed to fit between Wafer Flat Faced Smooth, RF Flanges. Standard class 150# up to 2500#. Other custom sizes and connections are available upon request.



TEMPORARY PLATE STRAINER ORDERING GUIDE



FSFS

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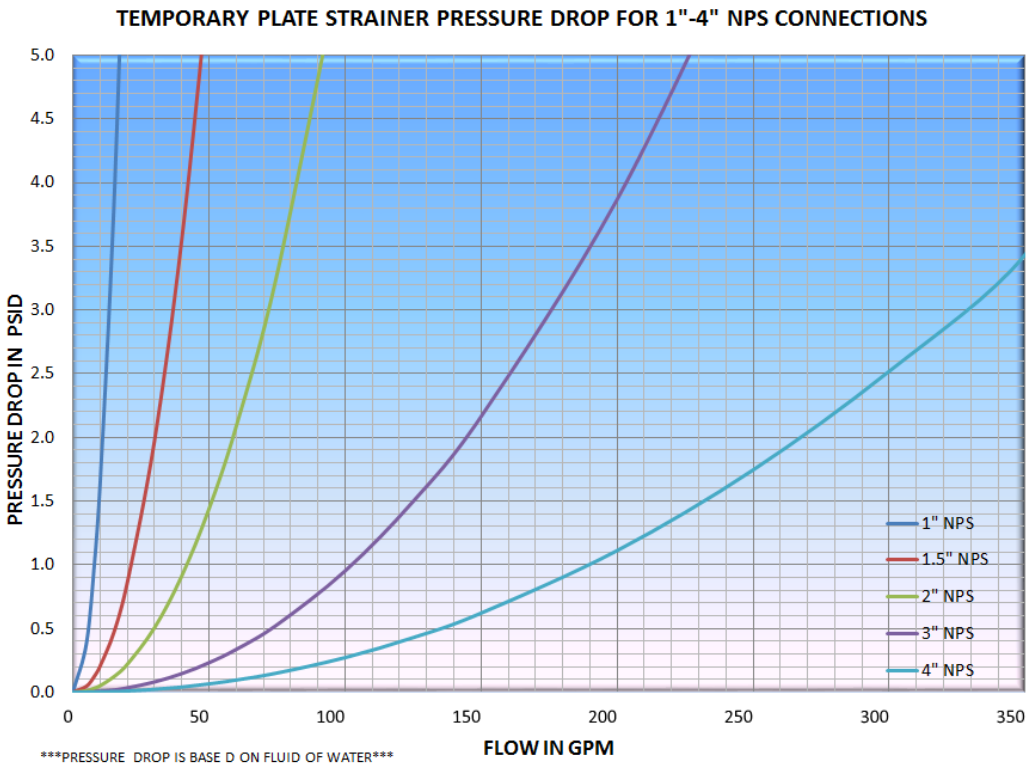
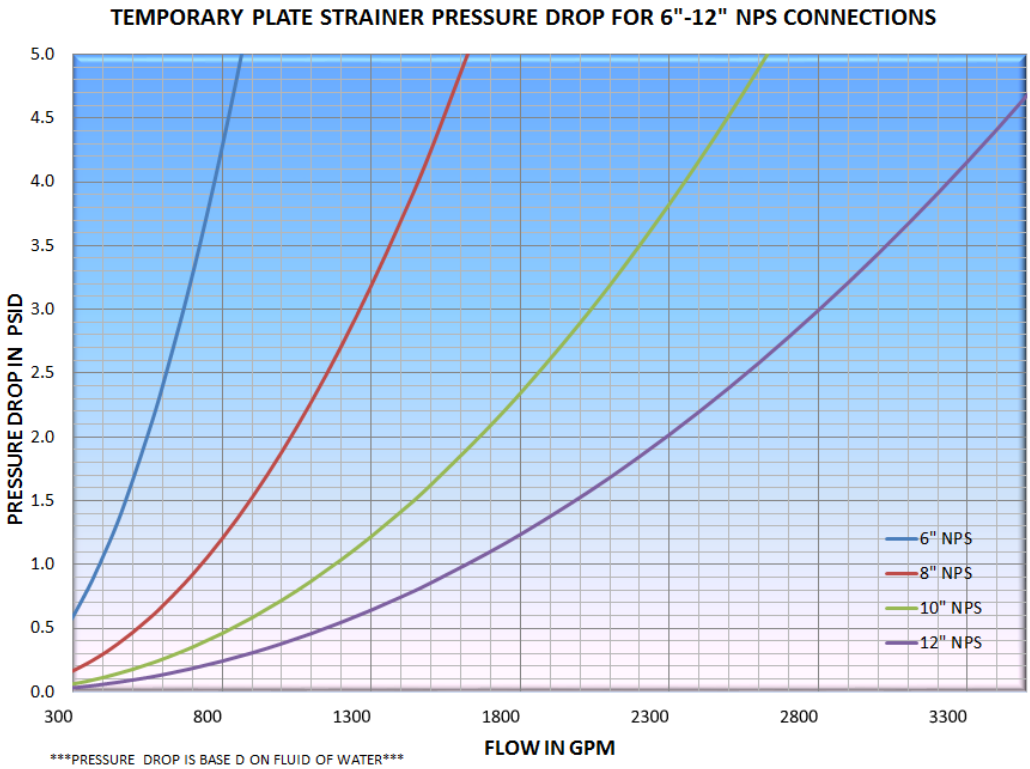
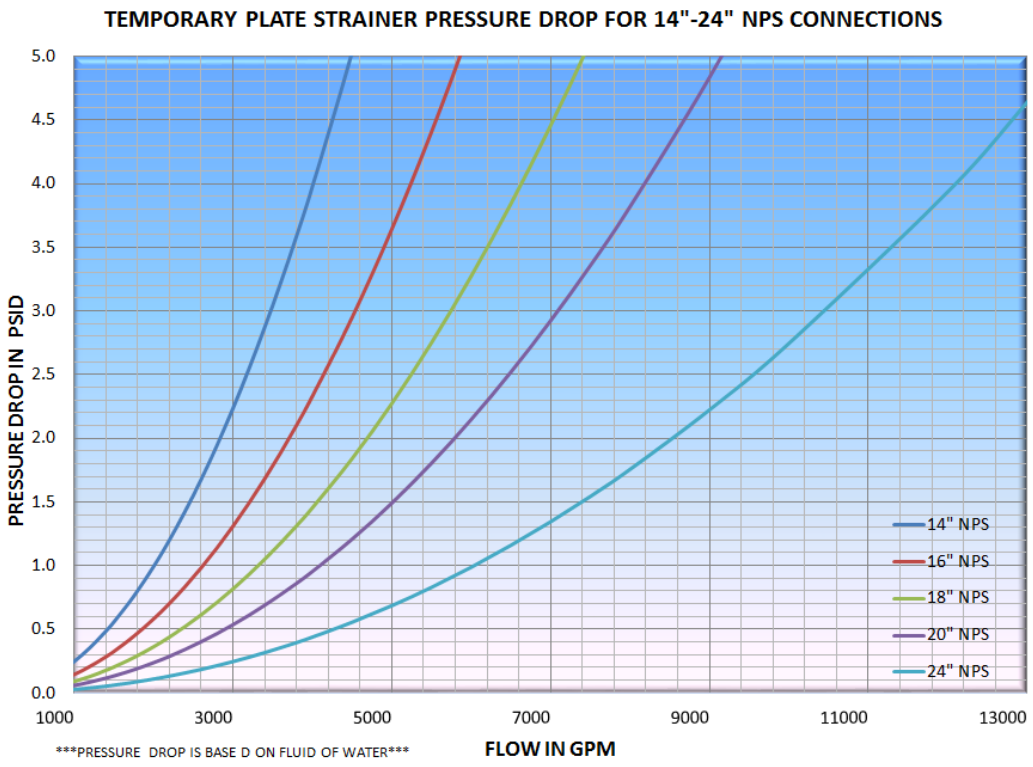
TEMPORARY PLATE STRAINER

TPSFS MODEL






TEMPORARY PLATE STRAINER PRESSURE DROP FOR 14"-24" NPS CONNECTIONS
PRESSURE DROP IN PSID
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1000
3000
5000
7000
9000
11000
13000
FLOW IN GPM
14" NPS
16" NPS
18" NPS
20" NPS
24" NPS
PRESSURE DROP IS BASE D ON FLUID OF WATER

FILTER SOLUTIONS INC

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CCFS SERIES

CARBON CANISTER HOUSING

STRAINER MODELS

CCFS1 to CCFS5: Single round to 5 round Carbon Canister Housing

APPLICATIONS

Groundwater Remediation
Wastewater Treatment
Process Water Treatment
Glycol Purification and Recycling
Chemical or Product Purification
Corn and Cane Sugar Decolourization
Juice Decolourization/Deodorization
Amine Purification
Solvent Recovery
Industrial Oil Purification
Edible Oil Purification

CODE OF CONSTRUCTION

ASME Sect. VIII Div.1 - Pressure Vessel Code

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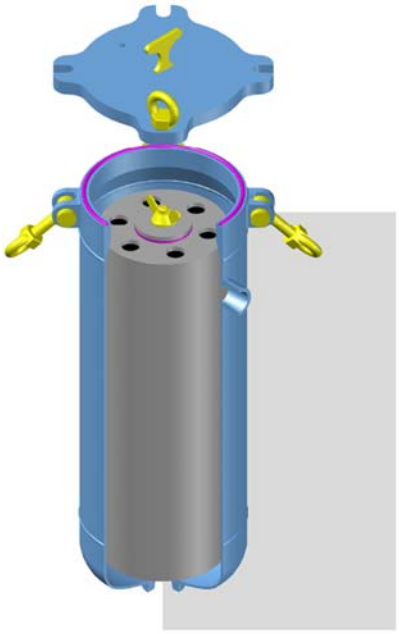
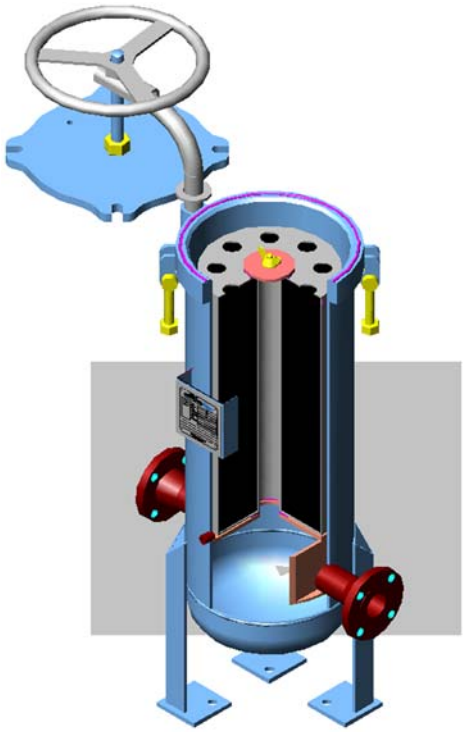
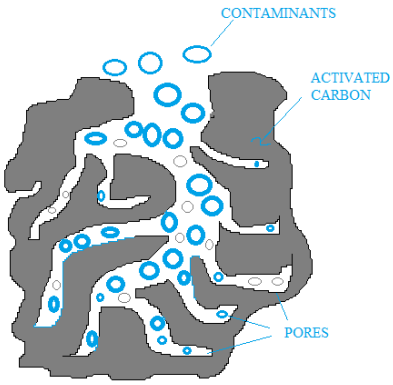
FSI's CCFS Activated Carbon Housing Series is designed to remove and capture contaminants, fouling and foaming agents, hydrocarbon and degradation products from process streams. CCFS housings comes in various sizes and material of construction and can be custom-built to accommodate all processes and applications.







ACTIVATED CARBON ADSORPTION ILLUSTRATION

HOUSING STANDARD SPECIFICATIONS

Design Code: ASME Section VIII, Division 1
Design Pressure: 150 PSIG / 1034 KPAG
Design Temperature: -20^{O}F/225^{O}F(-29^{O}C/107^{O}C)
M.O.C: CS, 304SS, 316SS and others
Closure: Swing Bolt with EPDM O-ring seal
Exterior Finish: (SS) Electro-polish
Exterior Finish: (CS) Blue Enamel

FEATURES

1. Available from very low to high flow ranges
2. All standard housings come with Swing Bolt Closures for quick and easy access.
3. Inline connection for minimal piping work.

HOUSING MODELS

CCFS720 - ONE HIGH 720 CANISTER HOUSING
CCFS740 - TWO HIGH 720 CANISTER HOUSING
CCFS1 - 1 ROUND 1122 CANISTER HOUSING
CCFS3 - 3 ROUND 1122 CANISTER HOUSING
CCFS5 - 5 ROUND 1122 CANISTER HOUSING

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STANDARD 720 CARBON CANISTER FILTER HOUSING SPECIFICATIONS

MODEL NUMBER	[2]HOUSING M.O.C	HOUSING SIZE	[2]INLET / OUTLET SIZE	[2]VENT	[2]DRAIN	[2]DESIGN PRESSURE	[2]DESIGN TEMP. RANGE	APPROX EMPTY WEIGHT		MAX. FLOW RATE		[1]PRESSURE DROP @ MAX FLOW RATE		[2]HOUSING EXTERNAL SURFACE FINISH		[2]INLET/OUTLET CONFIGURATION STYLE	[2]O-RING & CLOSURE STYLE	[2]REPLACEMENT ELEMENT (QTY) -SIZE
			N1/2	N3	N4	PSIG/KPAG	^{O}F / ^{O}C	LB	KG	GPM	LPM	PSID	KPAD	STAINLESS STEEL	C/S			
CCFS720	CS/ 304SS/ 316SS	8"	1"FNPT	1/4"FNPT	1/2"FNPT	150 PSIG / 1034 KPAG	-20 to 225^{O}F/ -29 to 107^{O}C	95	43	1	3.79	0.13	0.90	ELECTRO-POLISH	BLUE ENAMEL	STYLE 1	EPDM & SWING BOLT W/ HINGE	(1)6.75"O.D x 20.25"LG.
CCFS740		8"	1"FNPT	1/4"FNPT	1/2"FNPT			115	52	2	7.57	0.26	1.79			STYLE 1		(2)6.75"O.D x 40.25"LG.

STANDARD 1120 CARBON CANISTER FILTER HOUSING SPECIFICATIONS

MODEL NUMBER	[2]HOUSING M.O.C	HOUSING SIZE	[2]INLET / OUTLET SIZE	[2]VENT	[2]DRAIN	[2]DESIGN PRESSURE	[2]DESIGN TEMP. RANGE	APPROX EMPTY WEIGHT		MAX. FLOW RATE		[1]PRESSURE DROP @ MAX FLOW RATE		[2]HOUSING EXTERNAL SURFACE FINISH		[2]INLET/OUTLET CONFIGURATION STYLE	[2]CLOSURE STYLE	[2]REPLACEMENT ELEMENT (QTY)-SIZE
			N1/2	N3	N4/5	PSIG/KPAG	^{O}F / ^{O}C	LB	KG	GPM	LPM	PSID	KPAD	STAINLESS STEEL	C/S			
CCFS1-1122	CS / 304SS / 316SS	12"	2"-150#	1/4"FNPT	1/2"FNPT	150 PSIG / 1034 KPAG	-20 to 250^{O}F/ -29 to 121^{O}C	275	125	2	8	0.07	0.49	ELECTRO-POLISH	BLUE ENAMEL	STYLE 5	EPDM & SWING BOLT W/ DAVIT	(1)10.75"O.D x 22.25"LG.
CCFS1-1144		12"	2"-150#	1/4"FNPT	1/2"FNPT			320	145	4	15	0.14	0.99			STYLE 5		(2)10.75"O.D x 22.25"LG.
CCFS1-1166		12"	2"-150#	1/4"FNPT	1/2"FNPT			365	166	6	23	0.21	1.48			STYLE 5		(3)10.75"O.D x 22.25"LG.
CCFS3-1144		24"	2"-150#	1/2"FNPT	(2)1.5"FNPT			830	377	12	45	0.32	2.18			STYLE 5		(6)10.75"O.D x 22.25"LG.
CCFS3-1166		24"	2"-150#	1/2"FNPT	(2)1.5"FNPT			980	445	18	68	0.47	3.27			STYLE 5		(9)10.75"O.D x 22.25"LG.
CCFS5-1144		30"	2"-150#	1/2"FNPT	(2)1.5"FNPT			1050	477	20	76	0.49	3.38			STYLE 5		(10)10.75"O.D x 22.25"LG.
CCFS5-1166		30"	2"-150#	1/2"FNPT	(2)1.5"FNPT			1225	557	30	114	0.73	5.06			STYLE 5		(15)10.75"O.D x 22.25"LG.

GENERAL NOTES
1. Housing pressure drop is based on the flow of water through an open tube sheet and without canisters
2. See housing ordering guide for options
3. Housing Model: CCFS720/740 c/w C.S zinc plated adjustable legs

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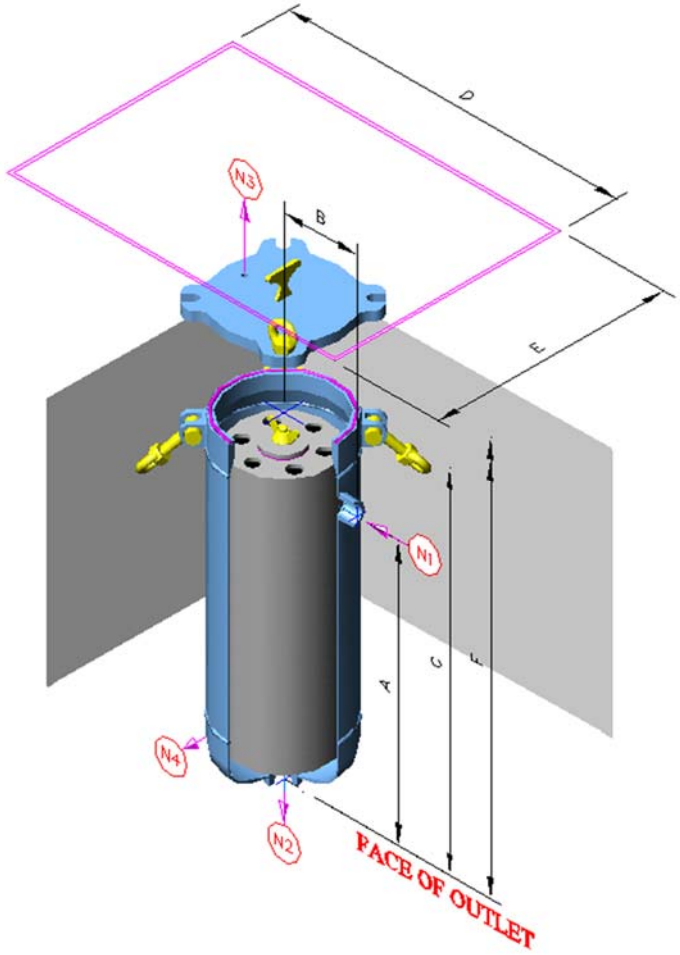
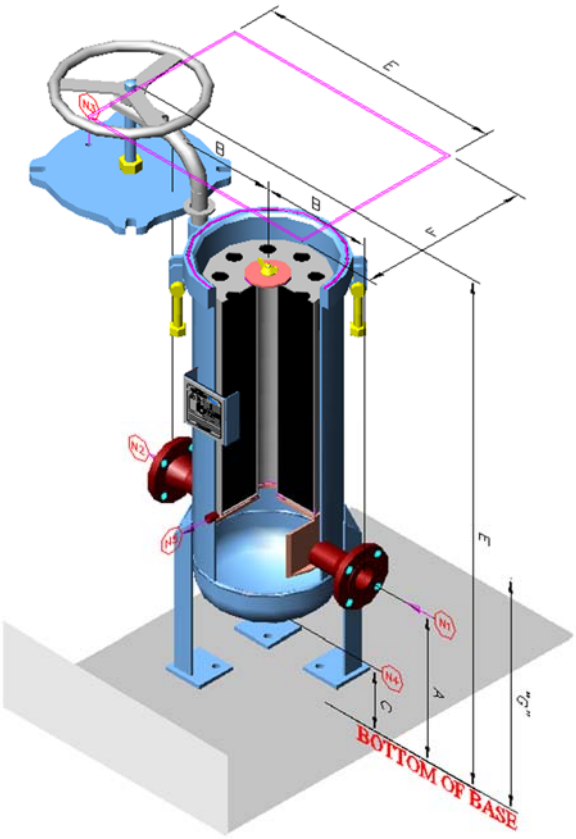
CCFS720/740 SERIES - CARBON CANISTER HOUSING DIMENSIONS



MODEL NUMBER	INLET C'L TO OUTLET FACE		VESSEL C'L TO INLET FACE		HOUSING (OAH)		HOUSING (OAL)		HOUSING (OAW)		ELEMENT REMOVAL CLEARANCE	
	A(IN)	A(mm)	B(IN)	B(mm)	C(IN)	C(mm)	D(IN)	D(mm)	E(IN)	E(mm)	F(IN)	F(mm)
CCFS720	20-7/16	519	5-1/2	140	27-3/8	695	11	279	10	254	44	1118
CCFS740	40-7/16	1027	5-1/2	140	47-3/8	1203	11	279	10	254	84	2134
Dimensions shown are for reference only. Consult FSI for certified drawing when required.												

CCFS1122 SERIES - CARBON CANISTER HOUSING DIMENSIONS



MODEL NUMBER	FLOOR TO C'L INLET/OUTLET		VESSEL C'L TO INLET/ OUTLET FACE		FLOOR TO DRAIN FACE		HOUSING (OAH)		HOUSING (OAL)		HOUSING (OAW)		ELEMENT REMOVAL CLEARANCE	
	A(IN)	A(mm)	B(IN)	B(mm)	C(IN)	C(mm)	D(IN)	D(mm)	E(IN)	E(mm)	F(IN)	F(mm)	G(IN)	G(mm)
CCFS-1-1122	15	381	11-3/8	289	6-3/16	157	56	1422	23	584	15	381	64	1626
CCFS-1-1144	15	381	11-3/8	289	6-3/16	157	76	1930	23	584	16	406	84	2134
CCFS-1-1166	15	381	11-3/8	289	6-3/16	157	96	2438	23	584	17	432	104	2642
CCFS-3-1144	18	457	17	432	6	152	83	2108	34-1/4	870	28	711	88	2235
CCFS-3-1166	18	457	17	432	6	152	103	2616	34-1/2	876	28	711	108	2743
CCFS-5-1144	20	508	20	508	6-1/2	165	87	2210	40-1/2	1029	36	914	90	2286
CCFS-5-1166	20	508	20	508	6-1/2	165	107	2718	40-1/2	1029	36	914	110	2794
Dimensions shown are for reference only. Consult FSI for certified drawing when required.														

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CCFS720 SERIES CARBON CANISTER HOUSING ORDERING GUIDE

CCFS — 740 — 316SS — 1”-150#FL — ST1 — UM — 1

Housing Series
- ☐ **CCFS** = Carbon Canister Series

Number of Elements
- ☐ **720** = (1)6.75”O.D x 20”LG.
- ☐ **740** = (2)6.75”O.D x 20”LG.
- ☐ Other

Housing Material
- ☐ **304SS** - 304 Stainless
- ☐ **316SS** - 316 Stainless
- ☐ **CS** - Carbon Steel
- ☐ Other

Inlet/Outlet - Type
- ☐ **1” FNPT**
- ☐ **2” FNPT**
- ☐ **1”-150#FL**
- ☐ **2”-150#FL**
- ☐ Other

Configuration
- ☐ **ST1** = Style 1
- ☐ **ST2** = Style 2
- ☐ **ST3** = Style 3
- ☐ Other

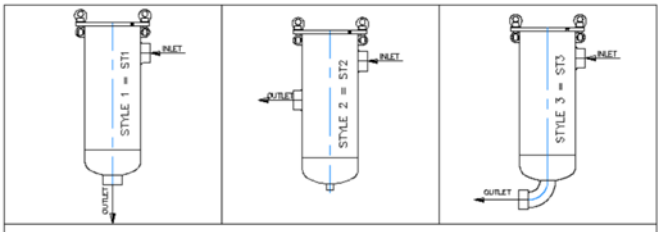
Code Stamping
- ☐ **NC** = Non-Code
- ☐ **U** = U Stamp
- ☐ **UM** = UM Stamp
- ☐ Other

CRN
- ☐ **Blank** = None
- ☐ **BC** = 1
- ☐ **AB** = 2
- ☐ **SK** = 3
- ☐ **MB** = 4
- ☐ **ON** = 5
- ☐ **QC** = 6
- ☐ **NB** = 7
- ☐ **NS** =8
- ☐ **PEI** = 9
- ☐ **NF** = 0
- ☐ Other

HOUSING OPTIONS
(Consult FSI)

Pressure Class: Up to 2500# ANSI Flange
Code Stamping: ASME "U" ,"UM" and National Board Stamp
CRN Registration: All the applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or special requirement
Sour Service: Nace MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
Housing Material: Hastelloy, Alloy 20 and other
Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
Adjustable Leg: Stainless Steel option
Connection: Add and up size
Configuration Style: All available styles and other such as duplex, Triplex etc.
Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
Coating: Ext / Internal with special paint.
O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other

HOUSING CONFIGURATION



OTHERS CONFIGURATIONS
-DUPLEX
-TRIPLEX
-QUADPLEX
THE ABOVE CAN BE CONNECTED IN SERIES OR PARALLEL AND SERIES/ PARALLEL.

CCFS1122 SERIES CARBON CANISTER HOUSING ORDERING GUIDE

CCFS — **1-1122** — **CS** — **2”-150#FL** — **ST1** — **UM** — **1**

Housing Series

☐ **CCFS** = Carbon Canister Series

Number of Elements

☐ **1-1122** = (1)11”x22”LG.
☐ **1-1144** = (2)11”x22”LG.
☐ **1-1166** = (3)11”x22”LG.
☐ **3-1144** = (6)11”x22”LG.
☐ **3-1166** = (9)11”x22”LG.
☐ **5-1144** = (10)11”x22”LG.
☐ **5-1166** = (15)11”x22”LG.
☐ Other

Housing Material

☐ **304SS** - 304 Stainless
☐ **316SS** - 316 Stainless
☐ **CS** - Carbon Steel
☐ Other

Inlet/Outlet - Type

☐ **1” FNPT**
☐ **2” FNPT**
☐ **1”-150#FL**
☐ **2”-150#FL**
☐ Other

Configuration

☐ **ST1** = Style 1
☐ **ST2** = Style 2
☐ **ST3** = Style 3
☐ **ST4** = Style 4
☐ **ST5** = Style 5
☐ Other

Code Stamping

☐ **NC** = Non-Code
☐ **U** = U Stamp
☐ **UM** = UM Stamp
☐ Other

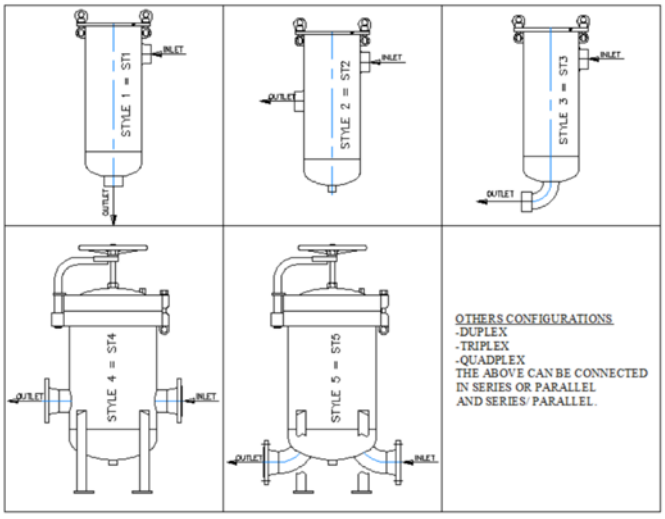
CRN

☐ **Blank** = None
☐ **BC** = 1
☐ **AB** = 2
☐ **SK** = 3
☐ **MB** = 4
☐ **ON** = 5
☐ **QC** = 6
☐ **NB** = 7
☐ **NS** =8
☐ **PEI** = 9
☐ **NF** = 0
☐ Other

HOUSING OPTIONS
(Consult FSI)

Pressure Class: Up to 2500# ANSI Flange
Code Stamping: ASME "U" ,"UM" and National Board Stamp
CRN Registration: All the applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or special requirement
Sour Service: Nace MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
Housing Material: Hastelloy, Alloy 20 and other
Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
Adjustable Leg: Stainless Steel option
Connection: Add and up size
Configuration Style: All available styles and other such as duplex, Triplex etc.
Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
Coating: Ext / Internal with special paint.
O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other

HOUSING CONFIGURATION



CCFS

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COFS SERIES

GAS & LIQUID COALESCER, FILTER SEPARATOR

HOUSING MODELS

CGFS - Gas Coalescer
CGSFS - Gas Filter Separator
CLSFS - Liquid Coalescer Separator

APPLICATIONS

Glycol Dehydrators
Amine Plants
Natural Gas
Gas Storage Facilities
Refrigeration Plants
Turbine Suction
Compressor Discharge

COFS

CODE OF CONSTRUCTION

ASME Sect. VIII Div.1 - Pressure Vessel Code

LIQUID APPLICATIONS

Jet Fuel/Kerosene
Gasoline, Diesel, and other fuels
Removal of emulsified water from Hydrocarbon fluids
Protection of Catalysts, Exchangers and Equipment

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GAS COALESCER

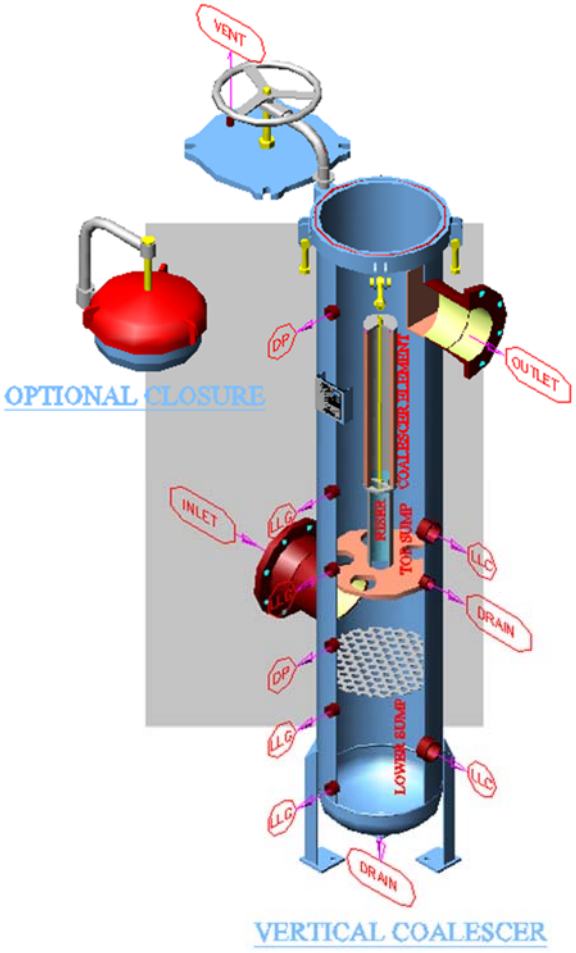
FSI'S CGFS Gas Coalescer Housing is designed with a vertical configuration in order to utilize reverse flow, thereby maximizing efficiency. The function of the first stage, the lower Knockout Stage, is to remove bulk liquids and heavy solid contaminants. The function of the second stage, the upper Element Coalescing Stage, is the removal of finer liquid droplets and solid contaminants as low as 0.3 microns in size.

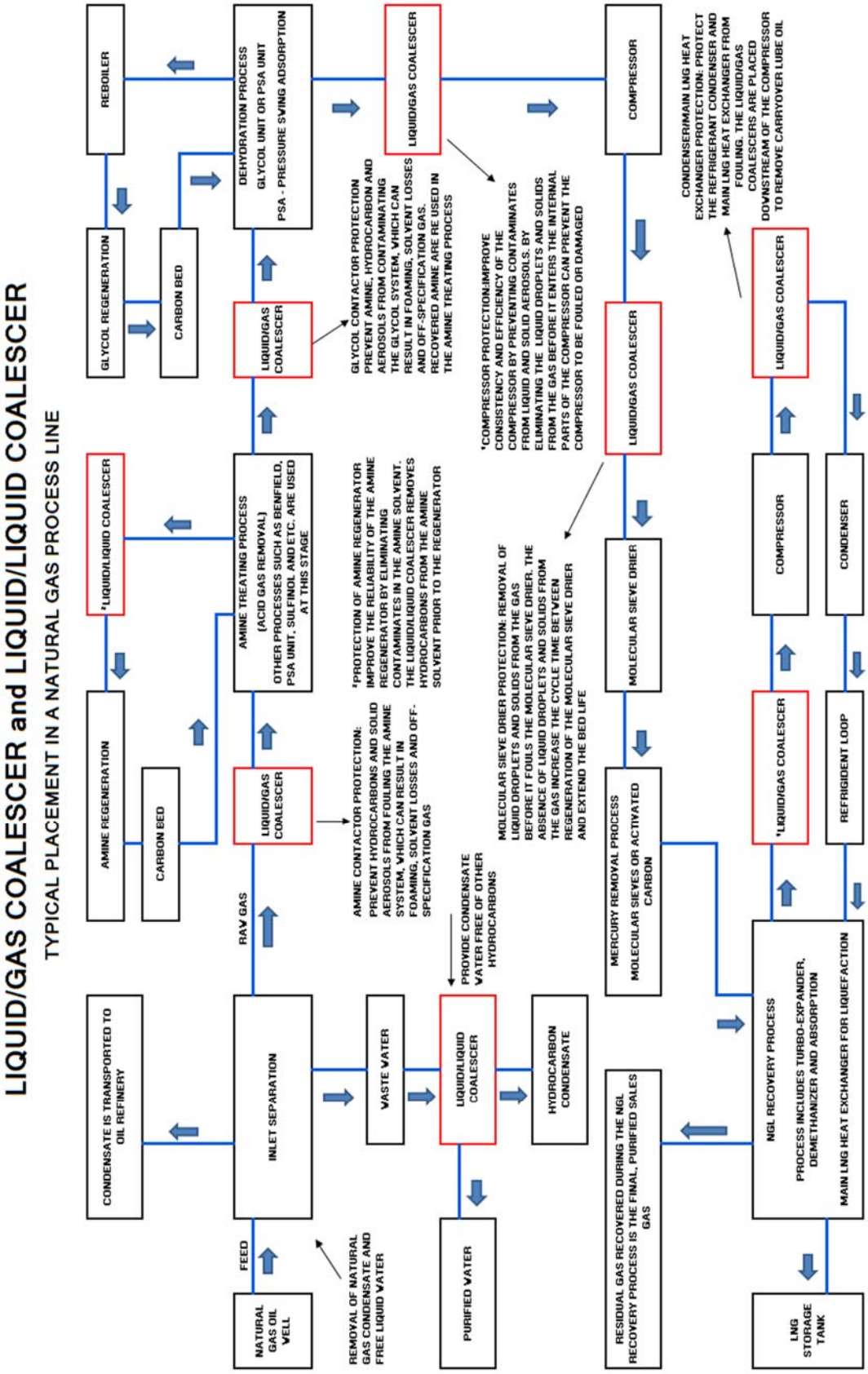
KNOCKOUT STAGE

As wet gas enters the inlet of the Coalescer housing, the gas stream is turned upward. Gravitation force reduces the stream velocity, permitting larger droplets and solids to fall into the lower sump. The lower section also collects the liquids below the high velocity zone protecting the coalescer element from direct impingement and from flooding.

ELEMENT STAGE

The element stage of the coalescer unit is fitted with pleated cartridges or depth cartridges. The gas stream flows from inside the element outward, resulting in a reduction in gas velocity through the media of the element. Decreasing the gas stream velocity increases the transit time, allowing for the aerosol particles to collide and form droplets .The coalesced liquid droplets drain through the outer layer of the element and collect in the top sump.
What remains is dry clean gas.




LIQUID/GAS COALESCER and LIQUID/LIQUID COALESCER
TYPICAL PLACEMENT IN A NATURAL GAS PROCESS LINE
REBOILER
GLYCOL REGENERATION
CARBON BED
DEHYDRATION PROCESS
GLYCOL UNIT OR PSA UNIT
PSA - PRESSURE SWING ADSORPTION
LIQUID/GAS COALESCER
LIQUID/GAS COALESCER
GLYCOL CONTACTOR PROTECTION
PREVENT AMINE, HYDROCARBON AND
AEROSOLS FROM CONTAMINATING
THE GLYCOL SYSTEM, WHICH CAN
RESULT IN FOAMING, SOLVENT LOSSES
AND OFF-SPECIFICATION GAS.
RECOVERED AMINE ARE RE USED IN
THE AMINE TREATING PROCESS
*LIQUID/LIQUID COALESCER
AMINE REGENERATION
CARBON BED
AMINE TREATING PROCESS
(ACID GAS REMOVAL)
OTHER PROCESSES SUCH AS BENFIELD,
PSA UNIT, SULFINOL AND ETC. ARE USED
AT THIS STAGE
*PROTECTION OF AMINE REGENERATOR
IMPROVE THE RELIABILITY OF THE AMINE
REGENERATOR BY ELIMINATING
CONTAMINATES IN THE AMINE SOLVENT.
THE LIQUID/LIQUID COALESCER REMOVES
HYDROCARBONS FROM THE AMINE
SOLVENT PRIOR TO THE REGENERATOR
*COMPRESSOR PROTECTION:IMPROVE
CONSISTENCY AND EFFICIENCY OF THE
COMPRESSOR BY PREVENTING CONTAMINATES
FROM LIQUID AND SOLID AEROSOLS. BY
ELIMINATING THE LIQUID DROPLETS AND SOLIDS
FROM THE GAS BEFORE IT ENTERS THE INTERNAL
PARTS OF THE COMPRESSOR CAN PREVENT THE
COMPRESSOR TO BE FOULED OR DAMAGED
COMPRESSOR
CONDENSER/MAIN LNG HEAT
EXCHANGER PROTECTION: PROTECT
THE REFRIGERANT CONDENSER AND
MAIN LNG HEAT EXCHANGER FROM
FOULING. THE LIQUID/GAS
COALESCERS ARE PLACED
DOWNSTREAM OF THE COMPRESSOR
TO REMOVE CARRYOVER LUBE OIL
LIQUID/GAS COALESCER
LIQUID/GAS COALESCER
AMINE CONTACTOR PROTECTION:
PREVENT HYDROCARBONS AND SOLID
AEROSOLS FROM FOULING THE AMINE
SYSTEM, WHICH CAN RESULT IN
FOAMING, SOLVENT LOSSES AND OFF-
SPECIFICATION GAS
RAW GAS
PROVIDE CONDENSATE
WATER FREE OF OTHER
HYDROCARBONS
MOLECULAR SIEVE DRIER PROTECTION: REMOVAL OF
LIQUID DROPLETS AND SOLIDS FROM THE GAS
BEFORE IT FOULS THE MOLECULAR SIEVE DRIER. THE
ABSENCE OF LIQUID DROPLETS AND SOLIDS FROM
THE GAS INCREASE THE CYCLE TIME BETWEEN
REGENERATION OF THE MOLECULAR SIEVE DRIER
AND EXTEND THE BED LIFE
MOLECULAR SIEVE DRIER
MERCURY REMOVAL PROCESS
MOLECULAR SIEVES OR ACTIVATED
CARBON
*LIQUID/GAS COALESCER
COMPRESSOR
CONDENSER
REFRIGIDENT LOOP
CONDENSATE IS TRANSPORTED TO
OIL REFINERY
INLET SEPARATION
WASTE WATER
LIQUID/LIQUID
COALESCER
HYDROCARBON
CONDENSATE
NGL RECOVERY PROCESS
PROCESS INCLUDES TURBO-EXPANDER,
DEMETHANIZER AND ABSORPTION
MAIN LNG HEAT EXCHANGER FOR LIQUEFACTION
RESIDUAL GAS RECOVERED DURING THE NGL
RECOVERY PROCESS IS THE FINAL, PURIFIED SALES
GAS
LNG
STORAGE
TANK
FEED
NATURAL
GAS OIL
WELL
REMOVAL OF NATURAL
GAS CONDENSATE AND
FREE LIQUID WATER
PURIFIED WATER

COFS

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TYPICAL APPLICATIONS

CONSIDERATIONS

The Coalescer is primarily used in applications where fine mists are encountered in processes involving evaporation, condensation, cooling or flashing. The Coalescer is also typically placed within a process line to provide protection for process equipment and facilities from aerosol particles (mist), liquid hydrocarbons and other contaminants. Failure to remove the liquids from the gas stream before it enters the inlet of the process equipment can jeopardize the operation and efficiency of the equipment. Another function of a coalescer is to recover fluids from the gas stream that can be used or re-injected into the process line for support or assistance of process equipment i.e. lubes oil.

EQUIPMENTS

Screw & Reciprocating Compressors
Amine Contactors
Glycol Contactors
Catalysts and Mole Sieve Towers
Gas Turbines
Metering Stations
Burner Nozzles
Molecular Sieve Beds
Heat Exchangers
Recovery equipment for lube oil downstream of a compressor
Removal equipment for oil, condensate and water
Removal equipment for particulate and aerosols

HOUSING STANDARD SPECIFICATION

Designed to ASME Pressure Vessel Code, Section VIII, Division 1
Pressure Class: 150# to 600#
Design Temperature: -20°F to 225°F (-29°C to 107°C)
Configuration: Vertical
M.O.C: Carbon Steel
Housing Diameter: 8" to 54" NPS
Inlet/Outlet Size: 2" to 24" RFWN
Closure Access: Swing Bolts with EPDM O-ring Seal
Connections: level control, high/low liquid level, vent, drains, DP port.
Leg Supports
Exterior coating: Blue enamel.

HOUSING OPTIONS

Pressure Class: 900# and above
Design Temperature: above 225°F (107°C)
Closure Access: Q.O.C, ANSI Bolted type and other CRN
Registration: Any applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or required specification
Sour Service: NACE MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
M.O.C: CS LT, 304SS, 316SS and other
O-Ring: Buna-N, Viton, Silicon, T.E.V and other
Exterior coating: special paint selected for application or per specification.

INQUIRY AND ORDER INFORMATION

Minimum info for Housing Sizing
Gas volumetric flow rate
Gas specific gravity or molecular weight
Gas operating pressure range
Gas operating temperature range
Contaminants to be filtered
Amount of free and entrained liquid

Minimum info for Vessel pricing inquiry
Design Pressure
Design Temperature
Corrosion Allowance requirement
Material of Construction requirement
NDE requirement
Sweet or Sour design.

Optional Instrumentation
Liquid Level Control
Liquid level Gauge
Drain Valve
Differential Pressure Gauge
Pressure Relief Valve
Pressure Gauge
Temperature Indicator

GAS COALESCER HOUSING DESIGNATION

CGFS	5R	536	CS	8	18	1440	U
Gas Coalescer Housing Series	Number of Elements	Element Type	Housing M.O.C	Inlet/Outlet (NPS)	Housing Diameter in (Inches)	Design Pressure in (PSIG)	ASME Code Stamping

HOUSING STANDARD SPECIFICATION

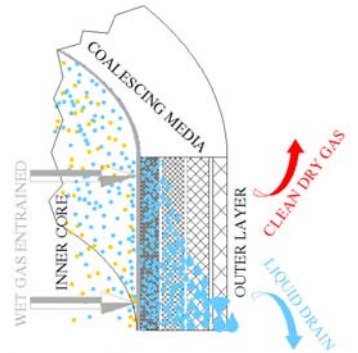
The Pleated Micro Fiberglass Coalescer Element is designed to efficiently coalesce liquid droplets and to remove solid particulates down to 0.3 microns. Element construction consists of end caps, perforated cores, filter media, an outer cover, and an outer drain layer to facilitate uniform drainage of liquids. The coalescer element is available in various sizes and configuration to custom fit any application.

ELEMENT DATA

Material of Construction	Min./Max temperature	Change Out Differential	Burst Pressure	Lowest Available Rating	Outer Diameter	OAL Length	Sealing method
Pleated Micro Fiberglass	-60°F/ 300°F	15 PSID	75 PSID	0.3 micron	4.5", 5.5, 6"	Up to 40"	D.O.E or S.O.E

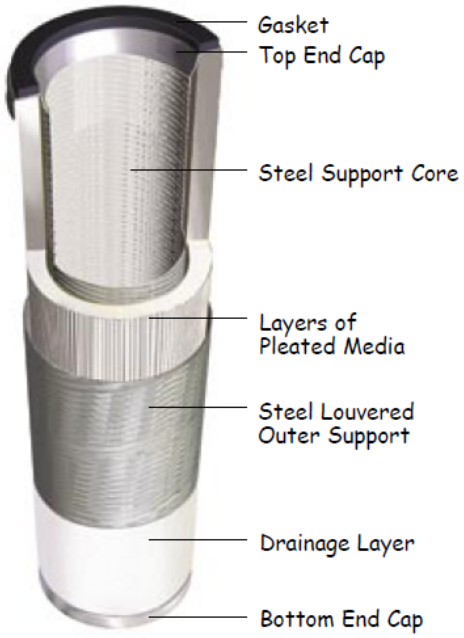
UNDERSTANDING COALESCING

To coalesce means to grow or to unite as one body. A coalesce aids the process of bonding droplets together to form a droplet that is big enough to be settled by gravitational force. The growth of droplets is achieved by catching liquids with entrained particles within the matrix of the coalescer element and merging them together by mechanisms which facilitate collisions between particles.



COALESCER ELEMENT OPERATING PRINCIPLE

COALESCER ELEMENT CROSS SECTION



COFS

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FILTER SEPARATOR

FSI's CGSFS Gas Filter Separator Housing is designed with Vertical and Horizontal double barrel configuration typically for solid and liquid removal in relatively low liquid loading applications. The Separator design consists of three stages; the knockout stage, the element stage (filtration/coalescing stage) and the separation stage (mesh pads/vane packs).

KNOCKOUT STAGE

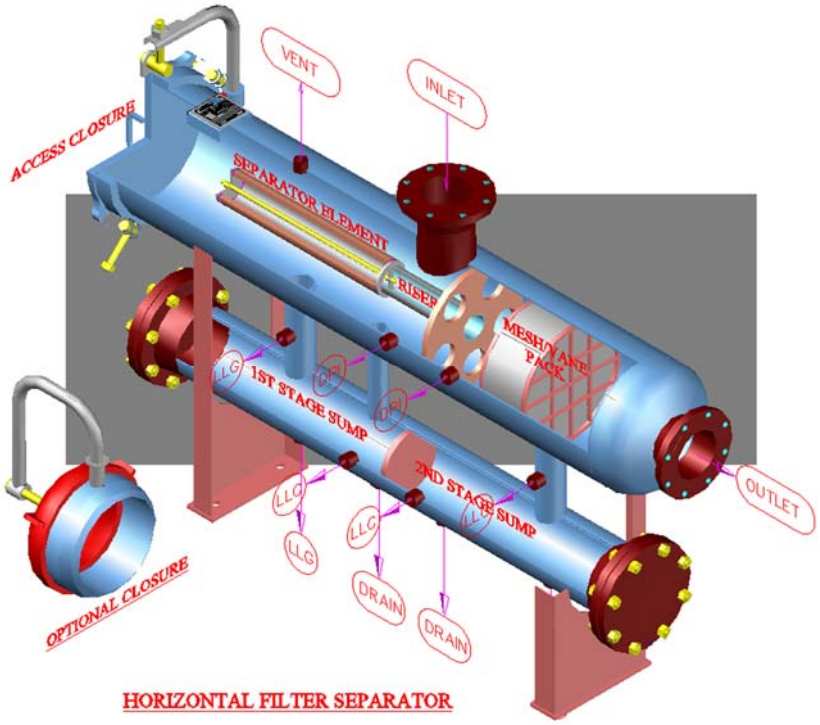
As gas enters the inlet nozzle, it collides with the element support posts (aka “risers”). This collision causes any free water and heavier contaminants to drop out of the gas stream and collect in the first stage sump. The length of the risers is vital in ensuring that the gas stream does not collide directly with the elements.

ELEMENT STAGE

The elements’ primary function is to filter fine to medium solid contaminants and also provide the coalescing of small liquid droplets from the gas stream. Droplets will enter and be removed in the final stage of the separator. The flow direction of a filter separator is from outside to inside.

SEPARATION STAGE

The coalesced droplets pass through the filter riser and are carried into the Separation Stage, where a mist extractor or vane pack section will remove final liquid droplets from the gas stream. Liquid droplets drain into the second stage sump. The nature of the contaminant associated with the gas stream will determine the devices used in the separation stage.



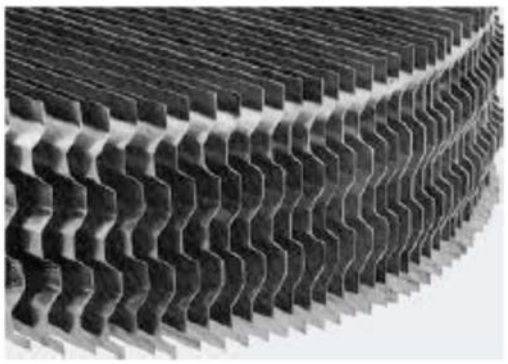
HORIZONTAL FILTER SEPARATOR

MESH PAD MIST EXTRACTOR

Knitted Mesh pads are of varying thickness and density depending upon the particle size to be removed and desired efficiency of removal. Typically, various grades of stainless steel are used. Nonstandard materials are also available for special applications. Minimal pressure drop and cost effectiveness are two of the benefits of using wire mesh. Wire mesh is not recommended for sticky, fouling contaminants or for highly corrosive service.

VANE MIST EXTRACTOR

Vane pack mist eliminators are used in the separation stage. Vane packs are typically custom designed to suit the process conditions. A vane pack eliminator consists of an array of closely spaced corrugated plates that force the gas stream to follow its winding path. The design of the vane pack creates a very tortuous path for the gas to pass through. Typically, various grades of stainless steel are used. Some benefits associated with using a vane pack include, minimal pressure drop, compact design and long life. Sticky and fouling contaminates are best suited to a vane pack mist eliminator.



TYPICAL APPLICATIONS

Glycol Dehydrators
Amine Plants
Natural Gas Compressors
Gas Storage Facilities
Refrigeration Plants
Metering Stations
Turbine Suction
Fuel Gas
Compressor Discharge

TYPICAL CONTAMINANTS

Sand
Water
Corrosion compounds
Liquid hydrocarbons
Abrasives contaminants
Sticky fouling contaminants
Waxes and asphaltenes

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FILTER SEPARATOR HOUSING DESIGNATION

CGSFSH	7R	336	CS	8	18	1440	U
Horizontal Filter Separator Series	Number of Elements	Element Type	Housing M.O.C	Inlet/ Outlet (NPS)	Housing Diameter in (Inches)	Design Pressure in (PSIG)	ASME Code Stamping
CGSFSV	3R	336	CS	6	12	150	UM
Vertical Filter Separator Series	Number of Elements	Element Type	Housing M.O.C	Inlet/ Outlet (NPS)	Housing Diameter in (Inches)	Design Pressure in (PSIG)	ASME Code Stamping

HOUSING STANDARD SPECIFICATIONS

Designed to ASME Pressure Vessel Code, Section VIII, Division 1
Pressure Class: 150# to 600#
Design Temperature: -20°F to 225°F (-29°C to 107°C)
Configuration: Vertical / Horizontal
M.O.C: Carbon Steel
Housing Diameter: 8" to 54" NPS
Inlet/Outlet Size: 2" to 24" RFWN
Access Closure: Swing Bolt EPDM O-ring Seal
Connections: level control, high/low liquid level, vent, drains, DP port.
Leg / Saddle Support
Lower Barrel Sump (horizontal configuration only)
Exterior coating: Blue enamel.

HOUSING OPTIONS

Pressure Class: 900# and above
Design Temperature: above 225°F (107°C)
Access Closure: Q.O.C, ANSI Bolted type and other CRN
Registration: All the applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or required specification
Sour Service: NACE MR-103 & MR-0175 Compliance Corrosion
Allowance: 1/16"[1.6mm] to 1/4"[6mm]
M.O.C: CS LT, 304SS, 316SS and other
O-Ring: Buna-N, Viton, Silicon, T.E.V and other
Exterior coating: special paint selected for application or per specification
Final Stage: Vane or Mesh Pad Mist Extractor

INQUIRY AND ORDER INFORMATION

Minimum info for Housing Sizing
Gas volumetric flow rate
Gas specific gravity or molecular weight
Gas operating pressure range
Gas operating temperature range
Contaminants to be filtered
Amount of free and entrained liquid

Minimum info for Vessel pricing inquiry
Design Pressure
Design Temperature
Corrosion Allowance requirement
Material of Construction requirement
NDE requirement
Sweet or Sour design.

Optional Instrumentation
Liquid Level Control
Liquid level Gauge
Drain Valve
Differential Pressure Gauge
Pressure Relief Valve
Pressure Gauge
Temperature Indicator

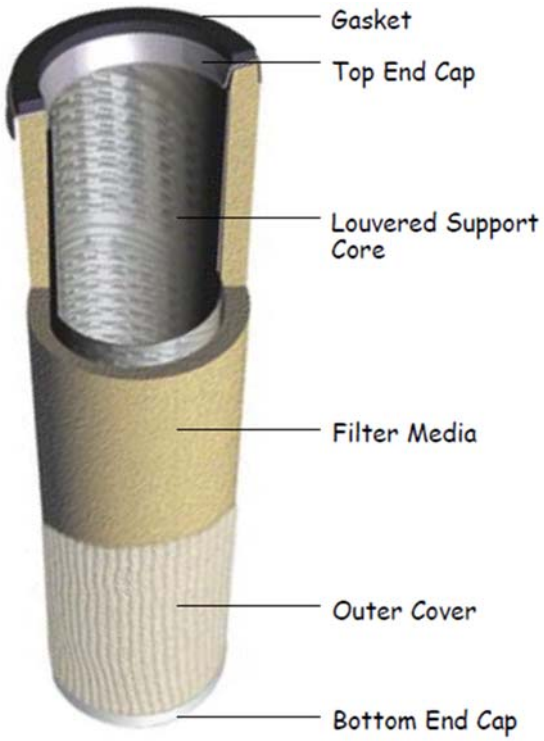
ELEMENT DATA

Material of Construction	Min./Max temperature	Change Out Differential	Burst Pressure	Lowest Available Rating	Outer Diameter	OAL Length	Sealing method
Molded fiberglass	-60°F/275°F	15 PSID	75 PSID	1 micron	3.5", 4.5", 5.5"	Up to 72"	D.O.E or S.O.E

SEPARATOR ELEMENT

Molded fiberglass Gas Separator Elements are designed to efficiently coalesce free liquids for second stage removal while delivering high solid holding capacity. Element construction consists of end caps, perforated cores, filter media, and an outer cover to protect the element and the operator during installation. Gas Separator Elements available in various size and configurations to custom fit any application.

GAS SEPARATOR ELEMENT CROSS SECTION



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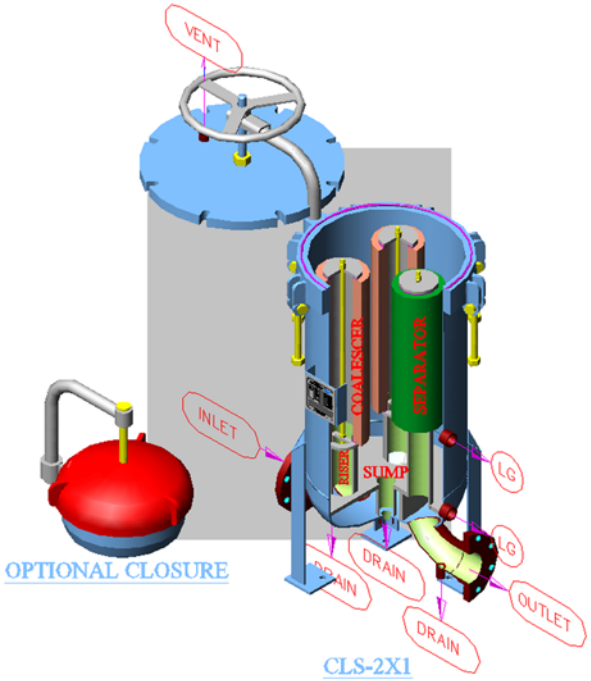
LIQUID COALESCER/SEPARATOR

FSI's CLSFS Liquid Coalescer/Separator Housing is designed to remove contaminant and emulsify water from hydrocarbon fluid in the process stream. The housing design consists of two stages; the coalescing stage and the water separation stage.

1st COALESCING STAGE

As the emulsified water/hydrocarbon fluid flows inside the element outward, the small water droplets adhere to fibreglass strands and coalesced into larger water droplets. The large water droplets are then carried to the outside surface of the coalescer element and settle into the bottom of vessel or sump by gravitational force. The coalescer element also acts as a particulate filter and removes unwanted contaminants. The coalescer element is designed with inside/outside flow direction to minimize surface velocity and help prevent the water droplets from breaking up and being carried downstream.



2nd SEPARATOR STAGE

Separator elements are employed in the second stage, their outer surface made from hydrophobic material and their sole function is to repel water droplets, while allowing hydrocarbon fluids to freely pass through.

Typical Applications

- Jet Fuel/Kerosene, Gasoline, Diesel, and other fuels
- Wide variety of Hydrocarbons and Intermediates
- Lube Oil, Hydraulic Oil, Heat Transfer Fluids
- Removal of Dispersed Water, Haze Removal
- Protection Of Catalysts, Exchangers and Equipment

THINGS TO CONSIDER

Liquids have a higher probability of being separated when the mixture is immiscible, specific gravities differ and there are lower concentrations of surface active agents. In order to determine whether or not coalescing will work, take a sample of the mixture , if it separates within a 2 hour period coalescing will most likely work; if after 24 hours the mixture hasn't separated then coalescing will not likely work. Coalescing decreases its performance when interfacial tension significantly decreases due to surfactants. Surfactants commonly added are detergent dispersants (automotive gasoline), corrosion inhibitors (pipeline, lube and hydraulic oils) or can simply occur naturally (diesel fuel) When there are significantly high levels of containments, FSI recommend a pre-filter to be installed upstream of the coalescer to protect and extend the life of the coalescer elements.

HOUSING STANDARD SPECIFICATIONS

Designed to ASME Pressure Vessel Code, Section VIII, Division 1
Pressure Class: 150#
Design Temperature: -20°F to 225°F (-29°C to 107°C)
Configuration: Vertical
M.O.C: Carbon Steel
Housing Diameter: 8" to 48" NPS
Inlet/Outlet Size: 2" to 10" RFWN
Access Closure: Swing Bolts EPDM O-ring Seal
Connections: level control, high/low liquid level, vent, drains, DP port.
Leg Support
Boot Sump: Horizontal configuration only
Exterior coating: Blue enamel.

HOUSING OPTIONS

Pressure Class: 300# and above
Design Temperature: above 225°F (107°C)
Configuration: Horizontal
Access Closure: Q.O.C, ANSI Bolted type and other
CRN Registration: Any applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or required specification
Sour Service: NACE MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
M.O.C: CS LT, 304SS, 316SS and other
O-Ring: Viton, Silicon, T.E.V, Buna-N and others
Exterior coating: special paint selected for application or per specification

INQUIRY AND ORDER INFORMATION

Minimum info for Housing Sizing
Fluid Volumetric Flow Rate
Fluids
Fluid Density
Fluid Viscosity
Contaminant (PPM)
% of Water Concentration
Interfacial Tension (ITF) Water Removal Efficiency

Minimum info for Vessel pricing inquiry
Design Pressure
Design Temperature
Corrosion Allowance requirement
Material of Construction requirement
NDE requirement

Optional Instrumentation
Level Control
Level Gauge
Drain Valve
Differential Pressure Gauge
Pressure Relief Valve
Pressure Gauge
Temperature Indicator
Sump Heater

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LIQUID COALESCER/SEPARATOR ORDERING GUIDE

CLSFS — 1X1 — CS — 2”-150#FL — STV — UM — 1

Housing Series

- ☐ **CLSFS** = Liquid Coalescer Separator Housing

Number of Coalescer by Separator

- ☐ **1x1** = 1 Cla’r by 1 Separator
- ☐ **2x1** = 2 Cla’r by 1 Separator
- ☐ **5x4** = 5 Cla’r by 4 Separator
- ☐ **10x8** = 10 Cla’r by 8 Separator
- ☐ **15x12** = 15 Cla’r by 12 Separator
- ☐ Other configurations are available. Consult FSI

Housing Material

- ☐ **304SS** - 304 Stainless
- ☐ **316SS** - 316 Stainless
- ☐ **CS** - Carbon Steel
- ☐ Other

Inlet/Outlet - Type

- ☐ **2”-150#FL**
- ☐ **3”-150#FL**
- ☐ **4”-150#FL**
- ☐ **6”-150#FL**
- ☐ **8”-150#FL**
- ☐ **10”-150#FL**
- ☐ Other

Configuration

- ☐ **STV** = Vertical
- ☐ **STH** = Horizontal

Code Stamping

- ☐ **NC** = Non-Code
- ☐ **U** = U Stamp
- ☐ **UM** = UM Stamp
- ☐ Other

CRN

- ☐ **Blank** = None
- ☐ **BC** = 1
- ☐ **AB** = 2
- ☐ **SK** = 3
- ☐ **MB** = 4
- ☐ **ON** = 5
- ☐ **QC** = 6
- ☐ **NB** = 7
- ☐ **NS** =8
- ☐ **PEI** = 9
- ☐ **NF** = 0
- ☐ Other

MAGNETIC SERIES

MAGNETIC FILTRATION

APPLICATIONS

Glycol DehydratorsOil and Gas Industry
Adhesives and Resins
Water & Waste Water
Pharmaceutical and Cosmetics
Chemical Industry
Oil and Gas Industry
Food and Beverages
Petroleum Industry
Power Industry
Pulp & Paper Industry
Paints, Coating and Ink
All Process Fluids

CODE OF CONSTRUCTION

ASME Sect. VIII Div.1 -
Pressure Vessel Code

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MAGNETIC FILTRATION -

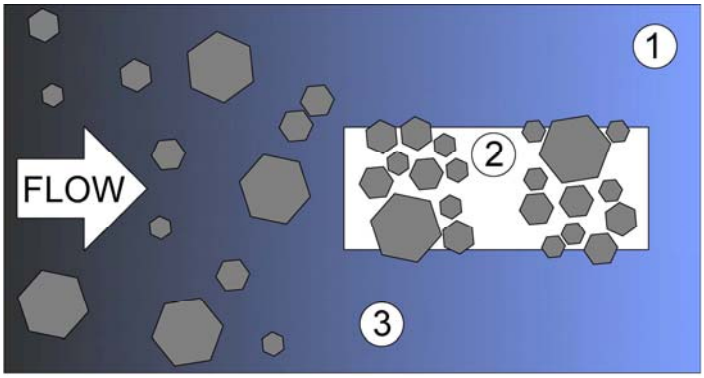
HIGH EFFICIENCY, HIGH CAPACITY

- 12,000 Gauss Magnet Rating.
- High Intensity Rare Earth Neodymium Iron Boron Magnets. The **STRONGEST** Magnets available in the world.
- Large and sub-micron ferrous particles are retained.
- Magnetic cores pull ferrous material away from the filter media resulting in minimal flow restriction.
- Reduces the amount of consumable media used while increasing fluid quality.
- Stainless steel cores protect the magnetic assembly and isolate it from the flow stream.
- Reusable and Maintenance free during their expected ten (10) year plus lifespan.
- Routine inspection allows for indication of equipment wear of upstream equipment. Magnetic filtration can be used as a predictive maintenance tool.

***Top Left**: Close up of saturated core. **Bottom Left**: Core tube assembly installed in P2 bag filter. **Right**: Standard P2 bag core tube saturated with ferrous material.*

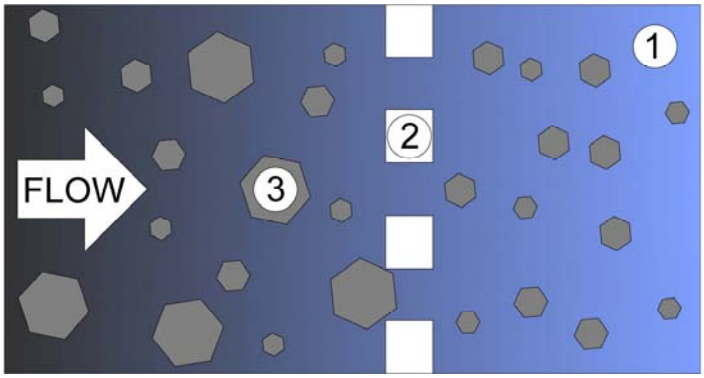
MAGNETIC vs. MEDIA FILTRATION

Magnetic Filtration



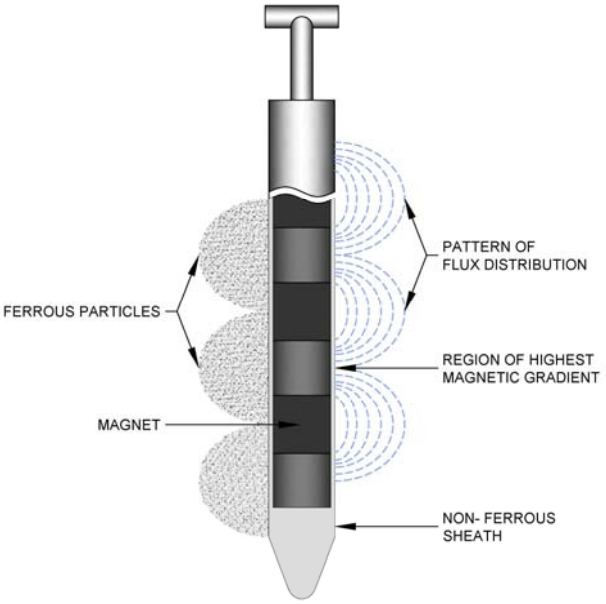
1. All ferrous particle sizes are attracted to the magnetic core and retained.
2. Once a dense layer of contaminant is collected it can be easily disposed of or recycled and the magnetic core reused. Virtually no fluid is retained.
3. Proprietary core magnet configuration ensures a strong magnetic field resulting in heavy collection rates.

Media Filtration



1. Only particles larger than the media filtration rating are retained. Smaller particles pass downstream and remain in the fluid stream.
2. Once the pressure drop reaches an unacceptable value media disposal is required.
3. As contaminant is collected the pressure drop across the media increases resulting in decreased flow rates.

HOW IT WORKS



Magnetic filters work by producing a magnetic field or loading zone that collect ferrous particles. The magnets are arranged inside a non-ferrous core to form a magnetic field that has a non uniform flux density or magnetic strength. Particles are most effectively separated when there is a strong magnetic gradient from low to high. The higher the magnetic gradient, the stronger the attracting magnetic force acting on particles drawing them toward the loading zones.

The magnetic force acting on a particle is proportional to the volume of the particle, but is disproportional to the diameter of the particle. The magnetic force on a particle varies with the cube of the particle's diameter. For example a two (2) micron particle is eight times more attracted to a magnetic field than a one (1) micron particle.

FILTER SOLUTIONS INC. uses magnets that have a flux density (magnetic strength) of 12,000 gauss (Compared to a ordinary refrigerator magnet of 80 gauss). Magnets are arranged in a non-ferrous tube to produce a large magnetic force and a resulting large magnetic gradient. The result is a magnetic assembly that successfully collects and removes ferrous material from a media stream in high collection volumes.

BLACK POWDER AND PIPELINES

Black Powder is a contaminant found in pipelines transporting natural gas, hydrogen condensates, and liquefied petroleum gas (LPG). It is, in most cases, a solid ferrous (magnetic) iron oxide or iron sulphide contaminant of various particle size distribution that can cause a range of problems. These include product and equipment contamination, erosion wear in compressors, instrument and filter clogging, erosion and sealing problems for valves, and equipment flow restriction and plugging.

Typical sources of black powder are:

- Pipe Mill Scale resulting from the pipe manufacturing process through the high temperature oxidation of steel.
- Flash rust formed from the presence of water during the pipeline hydro-test, or water moisture found in wet gas.
- Internal pipeline corrosion that is microbial induced when sulfate reducing bacteria (SRB) colonizes on a pipeline wall allowing for localized pitting corrosion, or that caused by Sour Gas (H2S) and it's reaction with steel.
- The presence of oxygen, hydrogen sulfide and carbon dioxide have also been linked to creating favourable conditions for the corrosion of carbon steel pipe.

FILTER SOLUTIONS INC. manufactures magnetic filtration and separation equipment that removes Black Powder from pipelines down to sub-micron levels.

Our magnetic equipment installed before pumps, turbines, compressors and refineries offers long term equipment protection while improving gas or liquid hydrocarbon quality.

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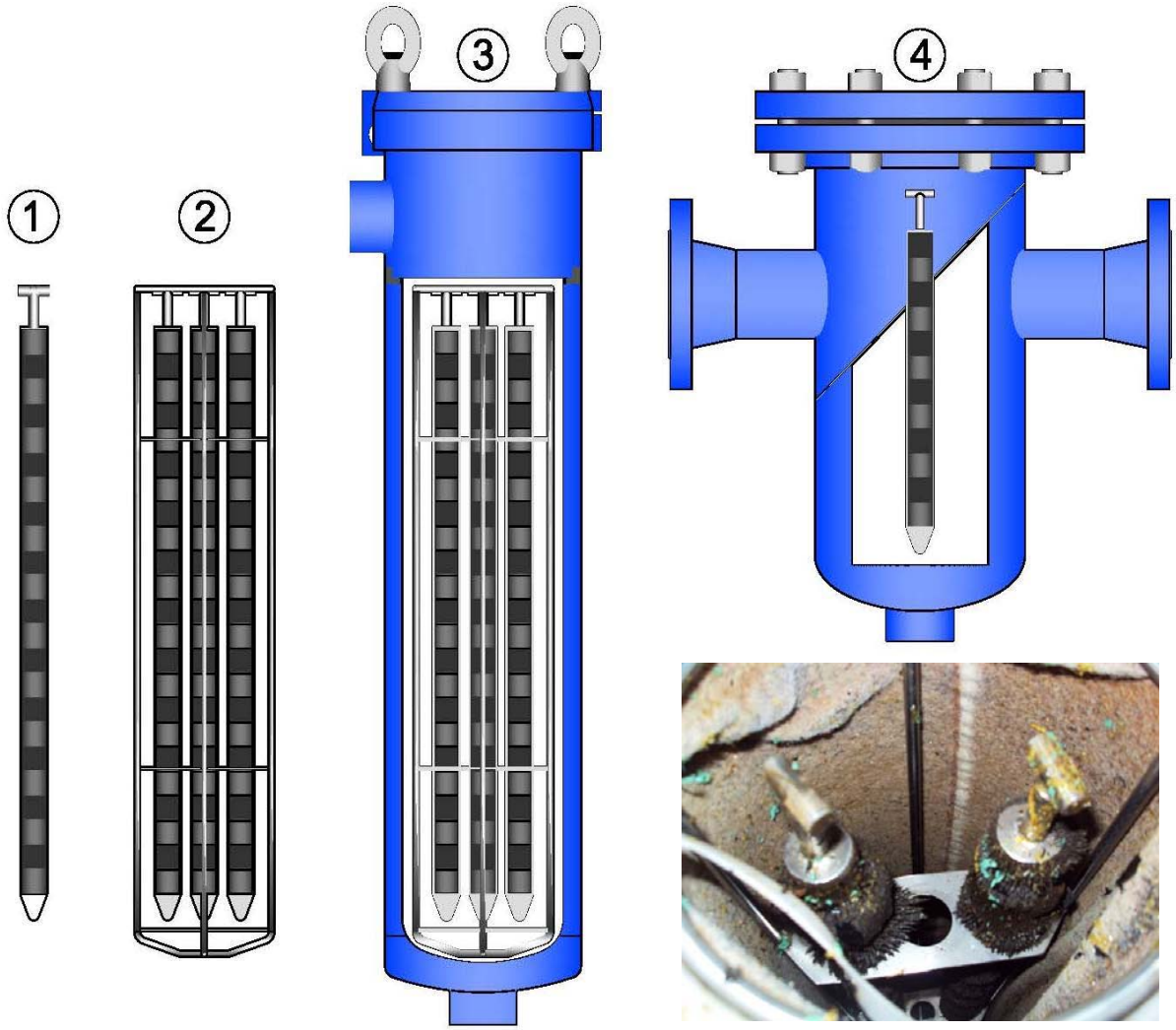
STANDARD PRODUCTS



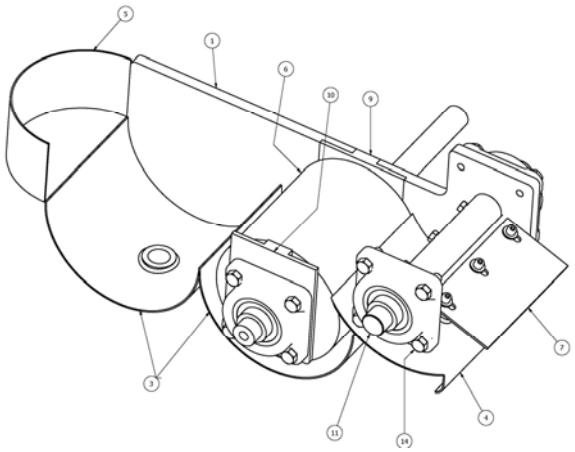
1. **FILTER SOLUTIONS INC.** manufactures magnetic core tubes in various lengths and configurations. Core tube ends can be supplied with various connection details including lift handles, straight or tapered threads, magnetic base stands and others.
2. Magnetic core tubes can be supplied with racks that allow drop in installation into standard P1 and P2 bag filter baskets among other sizes. Racks can be provided to hold between one (1) and five (5) magnetic core tubes. These racks support the core tubes and, due to the high magnetic strength, act to safely retain the magnet in the fluid stream. The racks also ensure separation between the disposable bag and core tubes allowing for a uninterrupted flow path.
3. Complete bag filter assemblies can be supplied with core tubes and racks installed at the factory. **FILTER SOLUTIONS INC**. manufactures a complete line of bags, cartridges and filters housings.
4. Strainer assemblies and baskets can be supplied with removable magnetic cores. As well, **FILTER SOLUTIONS INC**. frequently retrofits existing strainer baskets with magnetic assemblies and/or can manufacture new baskets for existing housings that incorporate our magnetic filtration technology.

CUSTOM SOLUTIONS

FILTER SOLUTIONS INC. welcomes custom designs from our clients. Our **ASME U-Stamp** certification ensures you will receive quality magnetic filtration solutions.

Magnetic Coolant Rollers

FILTER SOLUTIONS INC. has designed and tested a magnetic coolant roller. Contaminated fluid is dumped into the basin where a rotating magnetic assembly collects the ferrous contaminant and discharges it into a discharge basin. Collected ferrous contaminant is automatically scrapped into a customer supplied collection container for recycling while clean coolant can be drained from the basin and reused.



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FILTER SOLUTIONS INC

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FILTER ELEMENTS SERIES

FILTER MEDIA

Polypropylene
Polyester
Fiberglass
Stainless Steel
Nylon 6,6
Teflon
Polyphenaline Sulfide

APPLICATIONS

All process fluids

ELEMENTS SERIES

Bag
Pleated Cartridge
Melt Blown Cartridge
String Wound Cartridge
Pleated Bag
Hi-Flow Cartridge
High Temperature Element
Gas Coalescer Element
Gas Separator Element
Liquid Coalescer Element
Carbon Canister Element

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FILTER BAGS

- High solids collection capacity with solids being contained in bag for easy disposal.
- Interior of vessel remains clean after bag removal. This reduces filter clean up time while minimizing filter downtime.
- Welded or sewn construction. Silicon Free.
- Bags are available with ring (*metal or plastic*) or molded plastic tops. Other bag sealing mechanisms are available.
- Multi-layer **EXTENDED LIFE BAGS** are available for increased dirt holding capacity. *(2x the capacity of a standard felt bag)*
- Multi-layer **PLEATED BAGS** are available for the ***highest dirt holding capacity in the industry***. (*Up to 20x the capacity of a standard felt bag*)
- **OIL ABSORB BAGS** are available to remove trace amounts of oil and petroleum based products from paints, coatings and other fluids.

SPECIFICATIONS

FILTER GRADES:
Standard filters grades are 0.5 to 800 microns including 0.5, 1, 3, 5, 10, 15, 25, 50, 75, 100, 150, 200, 250, 300, 400, 600, 800 µm. Other filter grades are available.

BAG SIZES (In-Stock)
#1, #2, #3, #4, #5, #6, #7, #8, #9, #12, C1, C2 and RP Bags. Custom Bags are available. *See Bag Dimensional Information (Page 95)*

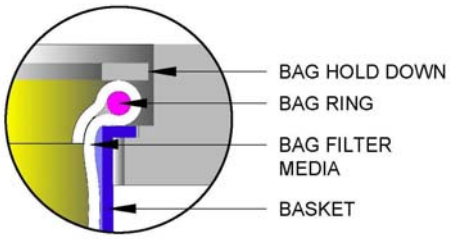
AVAILABLE BETA RATINGS:
2 To 5000

RECOMMENDED BAG SIZING DIFFERENTIAL PRESSURE:
Bag Only: 1.0 PSID (*0.06 BAR*) Max. Recommended in Clean Condition.
System, including housing, bag, bag retainer basket Max. Recommended: 2.0 PSID (*0.14 BAR*) in Clean Condition.
See Bag Pressure Drop Curve (Page 96)

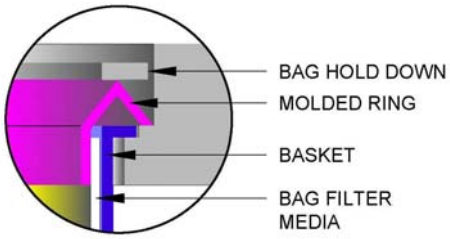
RECOMMENDED CHANGE-OUT DIFFERENTIAL PRESSURE:
25 PSID (*1.7 BAR*)

MAXIMUM TEMPERATURE RATING:
See Material Selection Guide (Page 94)

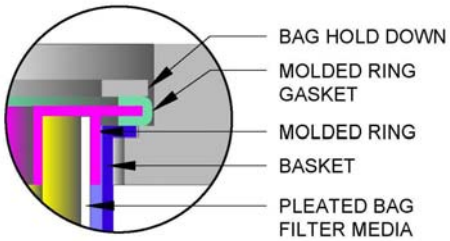
BAG MEDIA:
Polyester Felt, Polypropylene Felt, Polyester Multifilament, Nylon Monofilament Mesh, Polypropylene Microfiber, Polyester Microfiber, Oil Removal, Oilex, Cellulose, K-Media, Microglass and others.
** Bags constructed from FDA materials are available. FDA bags are manufactured of materials that comply with FDA requirements for food contact per CFR Title 21. Please consult factory.*



BAG WITH RING TOP



BAG WITH MOLDED TOP



PLEATED BAG

APPLICATIONS

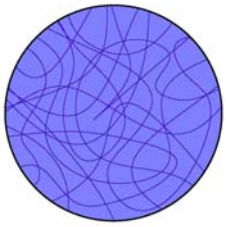
PAPER
- Clay Slurry
- Coatings
- Fresh water
- White water
- Showers
- Starch
- Water
- Additives
- Cooling Water
- Dyes
- Pump Seals

FOOD
- Peanut Butter
- Corn Syrup
- Lard
- Dextrose
- Chocolates
- Jelly
- Juices
- Milk Sugar
- Edible Oils
- Soybean
- Concentrate
- City and Well
- Water
- Tea Liquor
- Extracts

PETROLEUM
- Amine
- Crude
- Feedstock
- Pump Seals
- Water
- Fuel Oil
- Motor Oil
- Hydraulic Oil
- Synthetic
- Lubricants
- Completion Fluids
- Injection Fluids
- Cooling Tower Water

CHEMICAL
- Acetic Acid
- Brine
- Calcium Carbonate
- Ethylene
- Glycol
- Herbicides
- Hydrochloric Acid
- Polymers
- Resins
- Sulphuric Acid

BAG STYLES



FELT

FELT FILTER BAGS:

Felt filter bags are made from synthetic fibers of polypropylene or polyester. The gradient density fiber structure with the proper combination of fiber diameter, weight and thickness result is a economical depth type filter media. Bags are supplied with a glazed finish to reduce fiber migration.

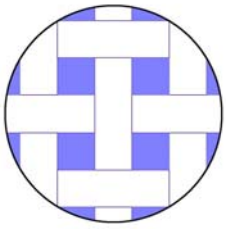
Felt Filter Bags have a nominal micron rating and are available in micron ratings from 1 to 200 µm. Filter efficiency is between 50% and 95% depending on micron rating.

MULTIFILAMENT MESH

MULTIFILAMENT MESH BAGS:

Polyester multifilament mesh bags are suitable for surface filtration. This disposable fabric is woven from threads made of small fibers twisted together. Bags made from this material are low cost and are considered disposable.

Multifilament Bags are available in micron ratings from 100 to 800 µm. Filter efficiency is between 80% and 95% depending on micron rating.

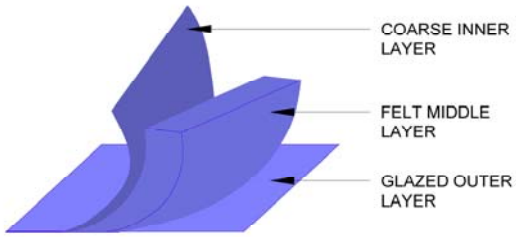


MONOFILAMENT MESH

MONOFILAMENT MESH BAGS:

Nylon Monofilament mesh bags have a woven fabric with evenly spaced holes. Each thread is a single filament resulting in excellent strength characteristics. Monofilament bags and considerably easier to clean then multifilament bags.

Multifilament Bags are available in micron ratings from 25 to 800 µm. Filter efficiency is about 90% or more.



EXTENDED LIFE

EXTENDED LIFE BAGS:

Extended life bags are constructed from 100% polypropylene or polyester felt. They are a specially designed filter bag with a coarse inner layer and a middle layer of felt constructed with finer fibers, more pores and thicker media. The outside layer is glazed, by melting fibers together, to form a tight, secure downstream matrix which prevents fiber migration.

Extended life bags are available in micron ratings from 1 to 200 µm and have over 2x the capacity of a standard felt bag.

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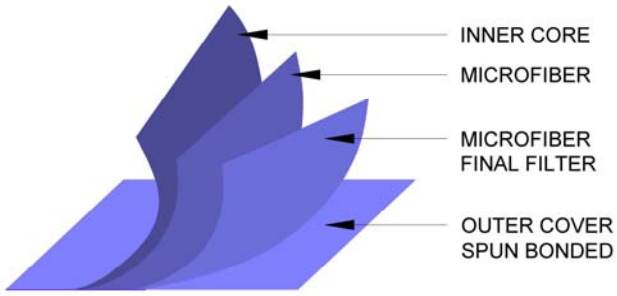
BAG STYLES



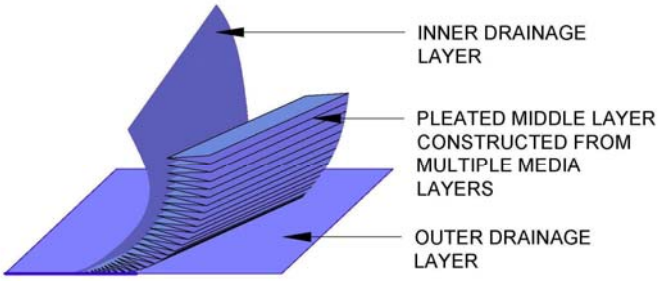
MICROFIBER OIL ABSORPTION

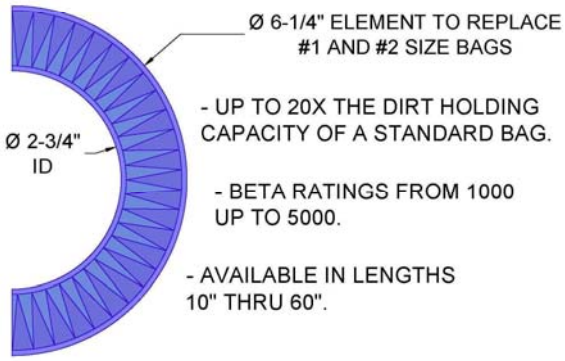
MICROFIBER OIL ABSORB BAGS:

Microfiber filter bags are constructed from polypropylene and provide high efficiency and high contaminant holding capacity.

Polypropylene microfiber repels water yet it will absorb up to 25 times its own weight in oil and other petrochemicals. It is the ideal solution for removing trace contaminants from water based products.

Microfiber oil absorption bags are available in micron ratings from 1-100 µm. Filter efficiency is 95% or more.





PLEATED BAGS:

Pleated bag elements have high flow capacity, high efficiency and inside to outside flow. By increasing the surface area through pleating and incorporating multiple layers of media the pleated bag design provides far longer life and superior dirt holding capacity when compared to a standard non-pleated bag.

Pleated bags are supported at both ends with one end being flanged and the other end being capped. The filtering media is then attached to the ends and core via a thermal bond to prevent any possibility of by-pass at media sealing points. Outer supports in polypropylene or tinned steel prevent fiber migration while integral flange seals ensure easy replacement of standard #1 and #2 sized bags.

A wide array of filter media is available in the pleated bag design to suit each individual application. A 100% pure polypropylene element is available making incineration an option for disposal.

Pleated filter bags are available in micron ratings from 0.5-40 µm. Filter efficiency is 90% or more.

BAG COMPATIBILITY

MATERIAL	COMPATIBILITY WITH							
	ORGANIC SOLVENTS	ANIMAL, VEGETABLE & PETRO OILS	MICRO-ORGANISMS	ALKALIES	ORGANIC AGENTS	OXIDIZING AGENTS	MINERAL ACIDS	TEMPERATURE LIMITATIONS °F / (°C)
POLYESTER	Excellent	Excellent	Excellent	Good	Good	Good	Good	300°F / (149°C)
POLYPROPYLENE	Excellent	Excellent	Excellent	Excellent	Excellent	Good	Good	200°F / (93°C)
NYLON	Excellent	Excellent	Excellent	Good	Fair	Poor	Poor	325°F / (163°C)

BAG SIZES

BAG SIZE	DIAMETER IN/(MM)	LENGTH IN / (MM)	SURFACE AREA FT^2 / (CM^2)	VOLUME USGAL / (LITRE)	INSTALL IN THE FOLLOWING MANUFACTURER'S BRANDS
#1	7.06/(179)	16.50/(420)	2.0/(1858)	2.1/(7.9)	Fits all standard length housings manufactured by **FILTER SOLUTIONS**, Eaton, FSI, GAF, Pentair, Rosedale, Strainrite and others.
#2	7.06/(179)	32.00/(813)	4.4/(4088)	4.6/(17.4)	Fits all double length housings manufactured by **FILTER SOLUTIONS**, Eaton, FSI, GAF, Pentair, Rosedale, Strainrite and others.
#3	4.13/(105)	8.00/(203)	0.5/(465)	0.5/(1.9)	Fits housings manufactured by **FILTER SOLUTIONS**, Eaton, FSI, Pentair, Rosedale Model 4-6 and others.
#4	4.13/(105)	14.00/(356)	1.0/(929)	1.0/(3.8)	Fits housings manufactured by **FILTER SOLUTIONS**, Eaton, FSI Model FS-35, Pentair, Rosedale Model 4-12 and others.
#7	5.63/(143)	15.00/(381)	1.3/(1208)	1.3/(4.9)	Fits housings manufactured by **FILTER SOLUTIONS**, Pentair, Rosedale Model 6-12 and others.
#8	5.63/(143)	21.00/(533)	2.0/(1858)	1.5/(5.7)	Fits housings manufactured by **FILTER SOLUTIONS**, Pentair, Rosedale Model 6-18 and others.
#9	5.63/(143)	32.00/(813)	3.4/(3159)	2.8/(10.6)	Fits housings manufactured by **FILTER SOLUTIONS**, Pentair, Rosedale Model 6-30 and others.
#11	8.38/(213)	16.50/(420)	2.9/(2695)	3.0/(11.3)	Fits housings manufactured by **FILTER SOLUTIONS**, Rosedale Model LLC-8-30 and others.
#12	8.38/(213)	32.00/(813)	5.6/(5203)	6.0/(22.7)	Fits housings manufactured by **FILTER SOLUTIONS**, Rosedale Model LLC-8-30 and others.
#C1	7.31/(186)	16.50/(419)	2.0/(1858)	2.6/(9.8)	Fits all Commercial Parker Filters standard length housings.
#C2	7.31/(186)	32.00/(813)	4.4/(4088)	5.0/(19.1)	Fits all Commercial Parker Filters standard length housings.
#PC1	9.00/(229)	20.00/(508)	2.5/(2323)	4.9/(18.6)	Fits Cuno Model PC1 housings.
#PC2	9.00/(229)	30.00/(762)	5.0/(4645)	7.4/(27.9)	Fits Cuno Model PC2 housings.
#RP1	8.00/(203)	30.00/(762)	3.5/(3252)	5.7/(21.70)	Fits Ronningen Petter Size #1
#RP2	8.00/(203)	40.00/(1016)	4.7/(4366)	7.7/(28.96)	Fits Ronningen Petter Size #2

BAG MICRON RATINGS

MICRON AVAILABILITY		MICRON RATING µM																			
TYPE	**MATERIAL**	**0.5**	**1**	**2**	**3**	**5**	**10**	**15**	**20**	**25**	**40**	**50**	**75**	**100**	**150**	**200**	**250**	**300**	**400**	**600**	**800**
FELT	POLYESTER		■	■	■	■	■	■	■	■		■	■	■	■	■					
	POLYPROPYLENE		■	■	■	■	■			■		■		■							
	NYLON					■	■			■		■		■							
MULTIFILAMENT MESH	POLYESTER													■	■	■	■	■	■	■	■
MONOFILAMENT MESH	NYLON									■		■	■	■	■	■	■	■	■	■	■
	POLYPROPYLENE														■	■	■	■	■	■	■
EXTENDED LIFE MICROFIBER	POLYESTER					■	■			■		■		■							
	POLYPROPYLENE					■	■			■		■		■							
OIL ABSORB	POLYPROPYLENE		■			■	■			■											
PLEATED	VARIOUS	■	■	■		■	■	■	■		■										

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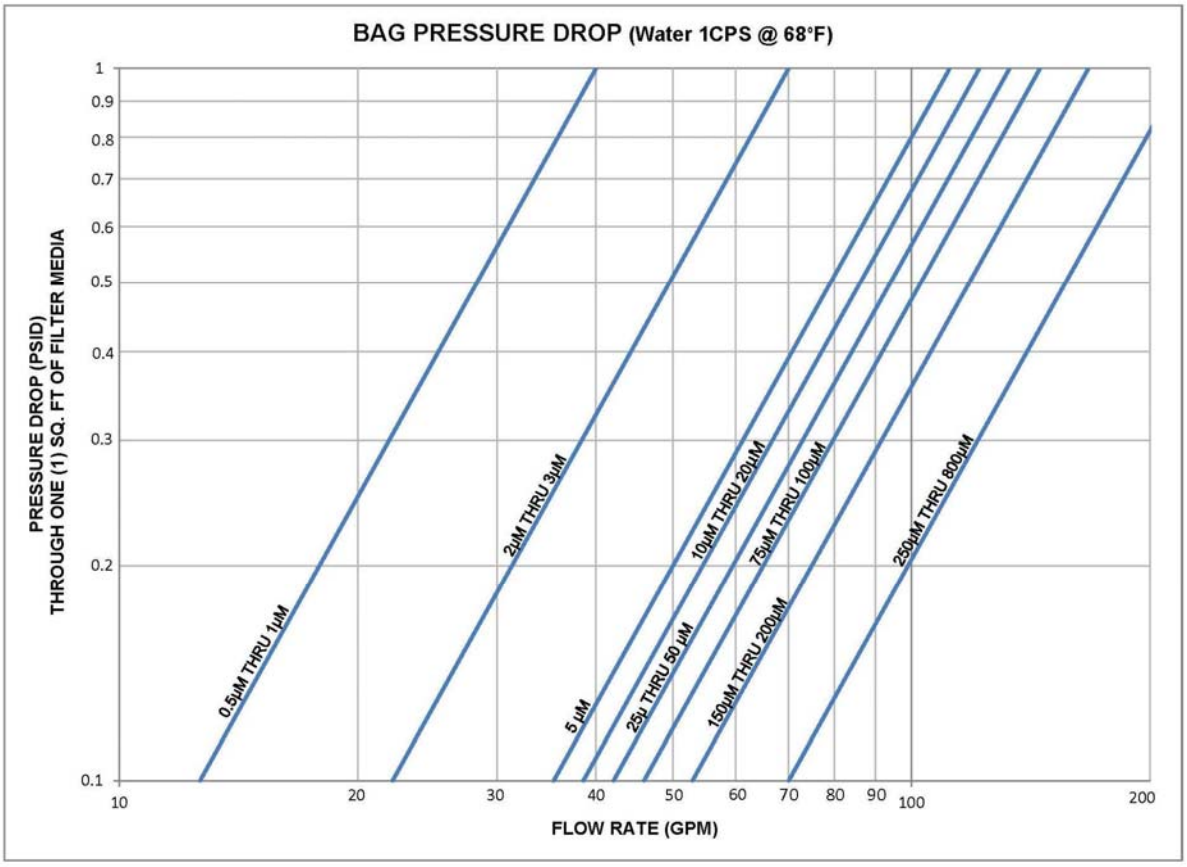
BAG PRESSURE DROPS



BAG SIZE CORRECTION	
BAG SIZE	MULTIPLY BY
#1	0.11
#2	0.05
#3	0.46
#4	0.23
#5	0.14
#7	0.18
#8	0.15
#10	0.08
#11	0.08
#12	0.04

BAG STYLE CORRECTION	
BAG STYLE	MULTIPLY BY
BASIC FELT	1
BASIC MESH	1
EXTENDED LIFE	15
MICRO-FIBER	15
PLEATED	15
PLEATED MICRO-GLASS	25

VISCOSITY CORRECTION	
VISCOSITY CPS	MULTIPLY BY
50	4.5
100	8.3
200	16.6
400	27.7
800	50
1000	56.2
1500	77.2
2000	113.6
4000	161
6000	250
8000	325
10000	430

EXAMPLE PROCEDURE:

Based on water flow at 80 GPM calculate the clean pressure drop through a #2 size 100µm (approx. 90% efficient) extended life bag.

Step 1: Using the above chart the pressure drop (psid/sq. ft.) of 100µm Filter Media at 80 GPM is **0.3** psid/Sq.

Step 2: For a #2 size bag the correction factor is 0.05. (**0.3 x 0.05 = 0.015 psid**)

Step 3: For a extended life bag the bag style correction factor is 15. (**0.015 x 15 = 0.225 psid**)

Step 4: Multiply the value obtained in step 3 by the Specific Gravity of the Fluid (Water = 1.0). (**0.225 x 1.0 = 0.225 psid**)

Step 5: Multiply the value obtained in step 4 by the viscosity correction factor (Water = 1.0). (**0.225 psid x 1.0 = 0.225 psid**)

The predicted pressure drop is 0.23 psid thru the bag.

The above chart is based on public information provided by filter media manufacturer's. Filter Solutions does not warrant the accuracy of the above information. User's should perform their own tests to determine final suitability . The above information is to be used as a guide only.

ORDERING GUIDE

The example shown below is a polyester felt bag, 25 micron filtration, standard bag finish, size 2 with a carbon steel ring and bag handle.

NON-PLEATED BAGS (EXAMPLE PE-25-P-2-S-H)

PE-25	P	2			S	H
MATERIAL—NOMINAL MICRON RATING	**BAG FINISH OR COVER**	**BAG SIZE**			**BAG STYLE**	**OPTIONS**
PE = Felt, Polyester Microns: 1,3,5,10,15,25,50,75,100,150,200 PO = Felt, Polypropylene Microns: 1,3,5,10,25,50,100 NMO = Mesh, Monofilament Nylon Microns: 25,50,75,100,150,200,250,300,400,600,800 PMO = Mesh, Monofilament Polypropylene Microns: 150,200,250,300,400,600,800 PEM = Mesh, Multifilament Polyester Microns: 100,150,200,250,300,400,600,800 POXL = Extended Life, Polypropylene Microns: 5,10,25,50,100 PEXL = Extended Life, Polyester Microns: 5,10,25,50,100 FOS = Oil Absorb Microns: 1,5,10,25 OLX = Oilex Microns: 1,5,10,25	P = None (Standard) G = Fiber free glazed PEM = Polyester multifilament mesh cover NMO = Nylon multifilament mesh cover C = Cerex spun bonded nylon cover.	**Symbol** 1 2 3 4 5 7 8 9 11 12 C1 C2 PC1 PC2 RP1 RP2	**Dia. (in.)** 7-1/16” 7-1/16” 4-1/8” 4-1/8” 4” 5-5/8” 5-5/8” 5-5/8” 8-3/8” 8-3/8” 7-5/16” 7-5/16” 9” 9” 8” 8”	**Length (in.)** 16-1/2” 32” 8” 14” 24” 15” 21” 32” 16-1/2” 32” 16-1/2” 32” 20” 30” 30” 40”	S = Carbon steel plated ring SS = Stainless steel ring PP = Polypropylene ring P = Polypropylene flange PE = Polyester flange N = Nylon flange DS = Draw string DST = Draw strap RP = Ronnigen-Petter C = Commercial ring SP = 7” Plastic Internal Ring R = Tie On	H = Handle HH = Heavy duty handle W = Weld WW = Weld Side and Bottom D = Dap Sealant on stiching

ORDERING GUIDE

The example shown below is a pleated polypropylene bag to replace a standard length #2 size bag, 2 micron filtration at 99% efficiency, Buna-N flanged bag seal with polypropylene end caps.

PLEATED BAGS (EXAMPLE JCX-P-732-02-C-B-F-P)

CX	P	732			02	C	B	F	P
BAG TYPE	**MEDIA**	**BAG SIZE (Replace #1 and #2 size bags)**			**MICRON RATING**	**EFFICIENCY**	**SEAL**	**SEAL TYPE**	**END CAPS**
JCX = Pleated	P = Polypropylene E = Polyester N = Nylon G = Microglass C = Cellulose K = K-Media	**Symbol** 716 724 726 728 730 732	**Dia. (in.)** 7-1/16” 7-1/16” 7-1/16” 7-1/16” 7-1/16” 7-1/16”	**Length (in.)** 16” 24” 26” 28” 30” 32”	00 = 0.5 µm 01 = 1.0 µm 02 = 2.0 µm 05 = 5.0 µm 10 = 10.0 µm 15 = 15.0 µm 20 = 20.0 µm 40 = 40.0 µm	A = 99.98% B = 99.9% C = 99% D = 98% E = 95% F = 90% G = 99.5%	B = Buna V = Viton N = Neoprene S = Silicon T = Teflon E = EPR	O = O-ring F = Flange Gasket	P = Polypropylene M = Galvanized Metal

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WOUND FILTER CARTRIDGES

- Precision winding patterns ensure filtration ratings that are accurate and result in high retention efficiency.
- In-house state-of–the-art production machinery ensures repeatable and consistent high quality products.
- Various fiber and core materials are available to suit a broad range of applications.
- Suitable for both liquid and gas filtration.
- Cost effective and proven versus melt blown, spun-bond and resin bonded cartridges.
- Available in standard 2-1/2" diameter and others.
- Many different cartridge sealing options and end configurations are available.

SPECIFICATIONS

FILTER GRADES:
0.5 to 150 microns including 0.5, 1, 3, 5, 10, 15, 20, 25, 30, 40, 50, 75, 100, 150 µm

LENGTHS:
9.75" to 40" including 9-3/4" (*248 mm*), 10" (*254 mm*), 19-1/2" (*495 mm*), 20" (*508 mm*), 29-1/4" (*743 mm*), 29-1/2" (*749 mm*), 30" (*762 mm*), 40" (*1016 mm*)

OUTSIDE DIAMETER:
Standard: 2-1/2" (*64 mm*) OD Nominal, Optional: 1-3/4" (*44 mm*), 2" (*51 mm*), 2-3/8" (*60 mm*), 2-1/2" (*64 mm*), 2-5/8" (*67 mm*), 2-3/4" (*70 mm*), 3" (*76 mm*), 3-1/2" (*89 mm*), 4" (*102 mm*), 4-1/4" (*108 mm*) OD Nominal

INSIDE DIAMETER:
Standard: 1" (*25 mm*) ID Nominal
Optional: 1.56" (*40 mm*) ID Nominal - Wildcat

RECOMMENDED CHANGE-OUT DIFFERENTIAL PRESSURE:
30 PSID (*2.1 BAR*)

MAXIMUM TEMPERATURE RATING:
See Material Selection Guide (Page 2)

FILTER MEDIA:
Bleached Cotton, FDA Bleached Cotton*, Natural Cotton, Rayon, Fiberglass, Polypropylene, FDA Polypropylene*, Polyester.
** FDA Bleached Cotton and FDA Polypropylene filters are manufactured of materials that comply with FDA requirements for food contact per CFR Title 21.*

CENTER CORE:
Tin Plated Steel, Polypropylene, 304 Stainless Steel, 316 Stainless Steel.

CORE COVER (Optional):
Covers made from materials such as polypropylene, nylon and polyester can be installed to control the migration of fibers.

END MODIFIERS (Optional):
Various end modifiers are available to suit individual installation applications.

APPLICATIONS

- **Chemicals:** polishing of chemical solutions, solvents, acids, bulk industrial chemicals, monomers, process and cooling water.
- **Air & Gas:** instrument air, compressed air, most gases including hydrogen, nitrogen, freon, helium and most other corrosive gases.
- **Photographic:** chemicals, emulsions, wash & rinse water.
- **Pre-filtration**
- **Water and Wastewater, Process Water**
- **Food and Beverage**
- **Other:** mining, deep well disposal, plating solutions, cleaning fluids, lubricating oils, plating solutions, cleaning solutions, adhesives, paint, ink and coatings.

MATERIAL SELECTION GUIDE

FILTER MEDIUM	COTTON (1)	POLYPROPYLENE (1)	RAYON	FIBERGLASS	POLYESTER
MAX. TEMPERATURE					
with metal core	300°F (149°C)	200°F (93°C)	300°F (149°C)	750°F (399°C)	250°F (121°C)
With polypropylene core	140°F (60°C)	140°F (60°C)	140°F (60°C)	140°F (60°C)	140°F (60°C)
COMPATIBLE WITH					
Potable Liquids, Water	Excellent	Excellent	Good	Poor	Good
Organic Solvents	Excellent	Good	Excellent	Excellent	Excellent
Oils	Excellent	Fair	Excellent	Excellent	Good
Organic Acids	Good	Excellent	Good	Excellent	Good
Alkalies	Good	Excellent	Good	Poor	N/R
Oxidizing Agents	Fair	Poor	Fair	Excellent	Good
Steam, Non-Continuous	N/R	Fair	N/R	N/R	Fair
Strong Inorganic Acids	N/R	Excellent	Poor	Excellent	Fair
Dilute Inorganic Acids	Fair	Excellent	Fair	Excellent	Good
Microorganism Resistance	Poor	Excellent	Poor	Excellent	Excellent

N/R = Not Recommended
NOTE 1: When using FDA grades please contact Filter Solutions to verify that the product conforms to your national legislation and/or regional authority requirements for water and food contact use.

ORDERING GUIDE

WOUND CARTRIDGES (EXAMPLE C20A30P--)

The example shown below is a bleached cotton cartridge, 20 micron filtration, 2-1/2" (64 mm) OD, 30" Long with a Polypropylene core. No Options selected.

C	20	A	30	P	-	-
MEDIA	**MICRON RATING**	**OD DIAMETER (INCH)**	**LENGTH**	**CORE MATERIAL**	**CORE COVER (Optional)**	**MODIFIERS (Optional)**
C = Bleached Cotton **CC = FDA Bleached Cotton** **CN = Natural Cotton** **R = Rayon** **G = Fiberglass** **P = Polypropylene** **PP = Polypropylene** **FDAPE = Polyester**	0.5 1 3 5 10 **20** 25 30 40 50 75 100 150	T = 1.50" (*38 mm*) *R = 1.75" (44 mm)* *B = 2.00" (51 mm)* *F = 2.38" (60 mm)* ***A** = 2.50" (64 mm)* *S = 2.63" (67 mm)* *D = 2.75" (70 mm)* *E = 3.00" (76 mm)* *J = 3.50" (89 mm)* *L = 4" (102 mm)* *Q = 4-1/4" (108 mm)*	975 = 9-3/4" (*248 mm*) *10 = 10" (254 mm)* *195 = 19-1/2" (495 mm)* *20 = 20" (508 mm)* *2925 = 29-1/4" (743 mm)* *295 = 29-1/2" (749 mm)* ***30** = 30" (762 mm)* *40 = 40" (1016 mm)*	T = Tin Plated Steel **P** = Polypropylene A = 304 Stainless Steel S = 316 Stainless Steel C = Tin Wildcat	**No Symbol** = None V = Specified Cover	**No Symbol** = None PE = Poly Extender S = Poly Spring E = S.S. Core Extender

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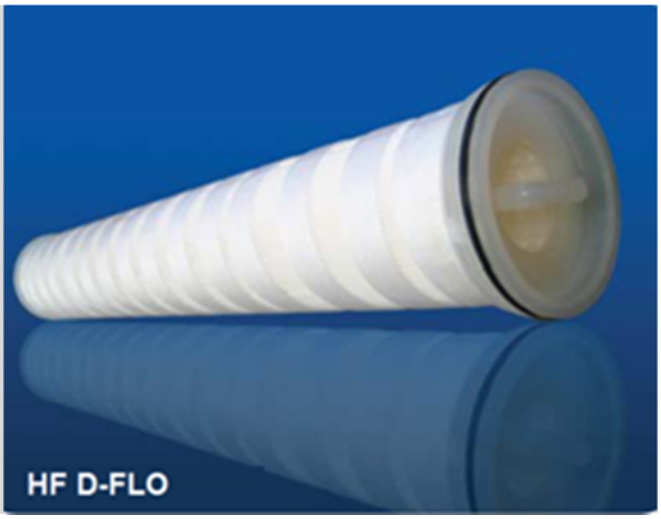
HIGH PERFORMANCE

CARTRIDGE ELEMENTS

Product Description: High performance pleated high flow filter element 6"O.D up to 60" length high capacity filter element optimized for high flow rates.
Product Name: HF D-FLO
Rated Efficiency: 99.98% Absolute (β=5000)
Lowest Micron Rating: 0.45 µ
Type: Pleated media
Flow Direction: Inside to Outside
Length: 40-60in (1016-1524mm)
Outside Diameter: 6 in. (152mm)
M.O.C: Polypropylene, Polyester , Nylon 6,6 and Microfiberglass
Outer Cage: Polypropylene wrap, CS or SS Outer shell
Maximum D.P: 35 psi (2.41 bar) at 68°F/20°C
Application: Food and Beverage, Syrups and Flavorings, Amines, Glycol, Chemical, Acids and Caustic, Coolant Water and Process Water, Salt Water Injection/Produced Water, Hydrocarbons and Fuels.
Feature: Long life and superior dirt holding.



ORDERING GUIDE

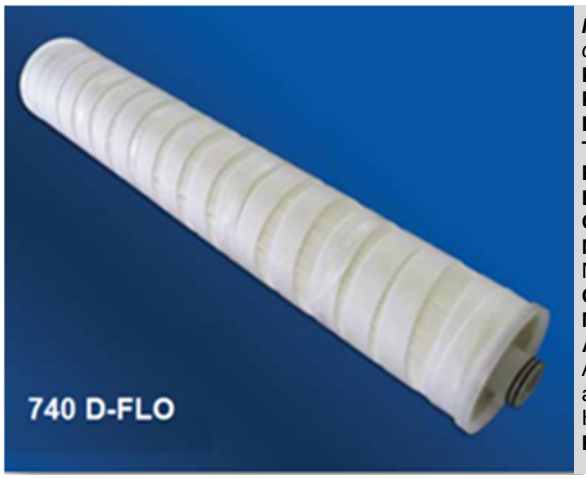
The example shown below is a high performance pleated high flow filter element, 20 micron filtration, 6" (152 mm) OD, 40" Long with a Buna-N seal, polypropylene media, and optional carbon steel outershell.

(EXAMPLE HF D-FLO-20-6-40-B-PP-CSO)

HF D-FLO	20	6	40	B	PP	CSO
SERIES	**MICRON RATING**	**OD DIAMETER (INCH)**	**LENGTH**	**SEALING MATERIAL**	**MEDIA**	**MODIFIERS (Optional)**
HF D-FLO = **High Performance Pleated High Flow Element**	0.45 0.8 1 2 5 6 10 20 50 70 100	6 = 6" (152 *mm)*	40 = 40" (1016 *mm)* *60 = 60" (1524 mm)*	B = Buna-N E = EPDM V = Viton T = TEV S = Silicon	PP = Polypropylene PE = Polyester N = Nylon 6,6 MG = Microfiberglass	No Symbol = None PO = Polypropylene Outerwrap NO = Nylon Outerwrap CSO = Carbon Steel Outershell SSO = Stainless Steel Outershell

HIGH PERFORMANCE

CARTRIDGE ELEMENTS



***Product Description**: 740 Style High Capacity filter cartridges are optimized for high dirt loading.*
Product Name: 740 D-FLO
Rated Efficiency: 99.98% Absolute (β=5000)
Lowest Micron Rating: 0.45 µ
Type: Pleated media
Flow Direction: Outside to Inside
Length: 40in (1016mm) Custom length are available
Outside Diameter: 6 in. (152mm)
M.O.C: Polypropylene, Polyester , Nylon 6,6 and Microfiberglass
Outer Cage: Polypropylene wrap
Maximum D.P: 35 psi (2.41 bar) at 68°F/20°C
Application: Food and Beverage, Syrups and Flavorings, Amines, Glycol, Chemical, Acids and Caustic, Coolant Water and Process Water, Salt Water Injection/Produced Water, Hydrocarbons and Fuels.
Feature: Superior dirt holding.

ORDERING GUIDE

(EXAMPLE C-20-6-40-B-PP)

The example shown below is a 740 style high capacity bleached cotton filter cartridge, 20 micron filtration, 6" (152 mm) OD, 40" Long with a Buna-N seal and polypropylene media.

740 D-FLO	20	6	40	B	PP
SERIES	**MICRON RATING**	**OD DIAMETER (INCH)**	**LENGTH**	**SEALING MATERIAL**	**MEDIA**
740 D-FLO = **740 Style High Capacity Filter Cartridge**	0.5 1 3 5 10 15 20 25 30 40 50 75 100 150-200	6 = 6" (152 *mm*)	40 = 40" (1016 *mm*) *Custom lengths are available*	B = Buna-N E = EPDM V = Viton T = TEV S = Silicon	PP = Polypropylene PE = Polyester N = Nylon 6,6 MG = Microfiberglass

ELE

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LIQUID/GAS COALESCER

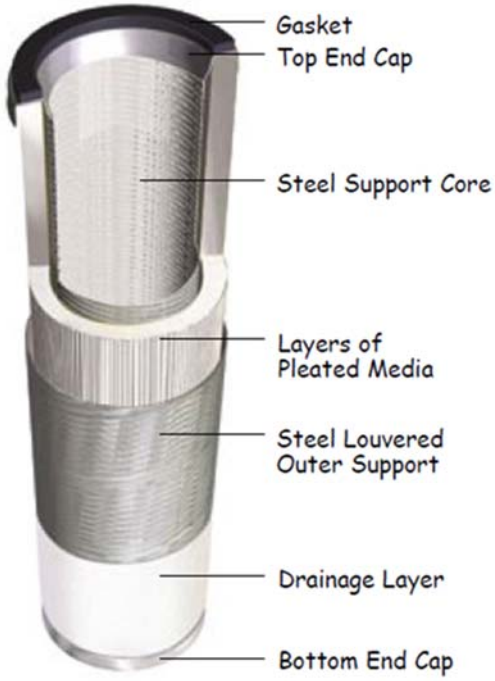
CARTRIDGE ELEMENTS

***Product Description**: Liquid/ Gas Coalescers are designed to remove aerosols and fine particulate contaminants from natural gas streams*

Products Name:
GCE- Gas Coalescer Element

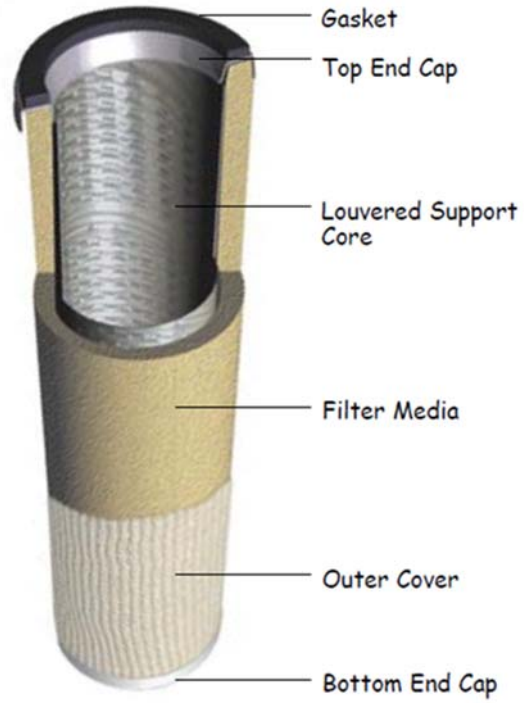
Application:
Liquid removal in a natural gas processing facility
Compressor discharge lube oil removal
Fuel gas purification
Protection gas turbines
Formation protection during gas flooding
Catalyst bed protection
Protecting Dehydration and Amine Systems

Specifications:
Removes Aerosol sized droplets and particulate down to 0.3 µ
Maximum Temperature: 300°F(149^{O}C)
Recommended change-out: 15psid (1barg)
Media: Pleated Micro Fiberglass
Outside diameter: Up to 6in(152mm), nominal
Length: up to 40in(1016mm), nominal
S.O.E with threaded base or D.O.E with end cap.
Flow Inside to Outside
Custom size and configuring available upon request
Custom materials for various applications are available upon request



GAS SEPARATOR

CARTRIDGE ELEMENTS



***Product Description**: Gas Separator element is designed to efficiently coalesce free liquids for second stage removal while delivering high solids holding capacity.*

Products Name:
GSE- Gas Separator Element

Application:
Glycol Dehydrators
Amine Plants
Natural Gas Compressors
Gas storage facilities
Refrigeration Plants
Metering Stations
Turbine Suction
Fuel Gas
Compressor Discharge

Specifications:
Removes particulate down to 1µ
Maximum Temperature: 275°F(135^{O}C)
Recommended Change-out: 15psid(1bard)
Media: Molded Fiberglass
Outside diameter: Up to 5.5in(140mm) nominal
Length: up to 72in(1830mm) nominal
D.O.E with end cap.
Flow Outside to Inside
Custom size and configuring available upon request
Custom materials for various applications are available upon request

HYDROCARBON COALESCER AND SEPARATOR

CARTRIDGE ELEMENTS

***Product Description**: Liquid Coalescers/ Separators are designed to remove dispersed and free water from hydrocarbons.*

Products Name:
LCE- Hydrocarbon Coalescer Element
LSE- Hydrocarbon Separator Element

Application:
Jet Fuel/Kerosene, Gasoline, Diesel, and other fuels
Wide variety of Hydrocarbons and Intermediates
Lube Oil, Hydraulic Oil, Heat Transfer Fluids
Removal of Dispersed Water, Haze Removal
Protection of Catalysts, Exchangers and Equipment

Performance:
Removal Micron Rating: down to 0.3µ Water Droplets
Water Removal Efficiency: Up to 99.99%
100% removal of solids and liquids larger than 3µ
Removes water down to 10ppm, depending on application

Specifications:
Maximum Temperature: 200°F
Recommended Change-out: 12-15 psid
Inlet water concentration: up to 3% water (30,000 ppm)

LC Series Hydrocarbon Coalescers
Outside diameter: Up to 6 inches, nominal
Length: up to 56 inches, nominal
Flow Inside to Outside

LS Series Hydrocarbon Separators
Outside diameter: Up to 6 inches, nominal
Length of Separator: Up to 44 inches, nominal.
Media: Teflon Coated Mesh Media
Flow Outside to Inside

Sealing Mechanism
S.O.E with threaded base or D.O.E with end cap.

*Please contact NPT if you have any questions about your elements selections.

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ACTIVATED CARBON

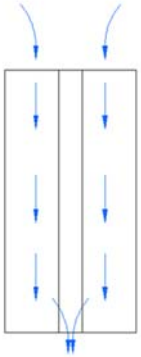
CARBON ELEMENTS

FSI's activated carbon products are specifically designed to attend to the toughest applications the oil and gas industry have to offer. By using only the highest quality materials and the most robust designs, FSI guarantees a finished product second to none.

NVF SERIES ACTIVATED CARBON CANISTERS

FSI's Vertical Flow Activated Carbon Canisters increase fluid contact by eliminating the potential bypass in using the relatively thin bed available in a radial flow configuration. FSI's NVF 1120 and 1122 canisters outlast the radial flow design by 30%.

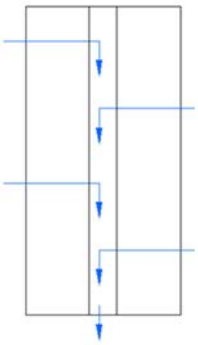
Dimensions			
Model	**ID**	**OD**	**OAL**
NVF1120	2.06"	10.75"	20.5"
NVF1122	2.06"	10.75"	22.25"
NVF636	1.5"	6"	36"



NRF SERIES ACTIVATED CARBON CANISTERS

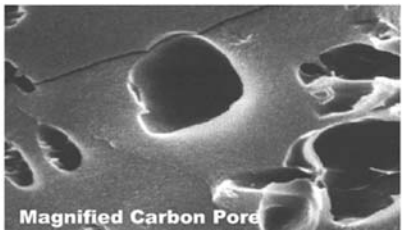
NPT's Radial Flow Activated Carbon Canisters present a greater superficial area to the process fluid, lowering velocity to better deal with high solids contamination.

Dimensions			
Model	**ID**	**OD**	**OAL**
NRF1120	2.06"	10.75"	20.5"
NRF1122	2.06"	10.75"	22.25"
NRF720	1.5"	6.63"	20"



BULK ACTIVATED CARBON

FSIs Activated Carbon is specially selected to maximize performance in gas processing applications where the target contaminants are long chain hydrocarbon molecules. Used in all of FSIs Carbon Canisters, it is also available in bulk form, in 44 lb bags, and 880 lb super sacks.



COMPARISON COAL BASED & LIGNITE BASED ACTIVATED CARBON		
PARAMETER	**COAL BASED ACTIVATED CARBON**	**LIGNITE BASED ACTIVATED CARBON**
> 8 MESH	5% MAX	5% MAX
< 30 MESH	5% MAX	5% MAX
APPARENT DENSITY	21-23 LB/FT^3	24 LB/FT^3
BACKWASH AND DRAINED DENSITY	20 LB/FT^3	21.5 LB/FT^3
HARDNESS NUMBER	90	60
pH WATER EXTRACT	8-8.5	4.5
MOISTURE AS PACKED	5% MAX	12% MAX
IODINE NUMBER	1000 (mg/g) min.	500 (mg/g) min.
MOLASSES NUMBER	400	400
TOTAL ASH CONTENT	12%	20%

** Note: Above properties in consideration of particles of same size*

HARDNESS

The hardness number is a standard test recognized by ASTM to determine the hardness of a given carbon. The leading lignite based carbon manufacturer does not use a specification per the ASTM standard test method and instead use a non-standard abrasion resistance test. Should an ASTM hardness number be tested on the leading lignite based activated carbon, a value of 60 should be expected. Therefore, the FSI activated carbon hardness number of 90 is significantly harder translating to less particle attrition and carbon fine generation during transportation, replacement, and use. Always remember to use an accepted rinsing procedure reducing procedure for the best service possible from your FSI activated carbon product. In the right quantity, coal fines can contribute to foaming issues. Don't forget air can also be a potent contributor!

PORE STRUCTURE

While most carbon is used in water treatment, the primary function of FSI carbon in oil and gas applications is to remove long chain hydrocarbons. The molasses number is a good indicator for predicting how well an activated carbon will adsorb higher molecular weight organics. The leading lignite based carbon manufacturer uses a non-standard molasses test used by no other company, while the FSI molasses number is based on a more standard test. A molasses de-coloring efficiency (DE) of 85 converts to a molasses number of approximately 400. As both the FSI and leading lignite carbon manufacturer have a molasses number of approximately 400, one would expect similar performance in adsorbing higher molecular weight organics. The iodine number is an excellent parameter to determine the overall surface area of activated carbons, but it also is a great indicator of how well a carbon will adsorb organics. FSI activated carbon has a minimum iodine number of 1000, while the leading lignite based 8X30 mesh carbon is approximately 500. Our activated carbon has an iodine number, double to that of the leading lignite based 8X30 mesh allowing for superior adsorption capability.

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WHAT ELSE WILL I FIND IN MY ACTIVATED CARBON?

The leading lignite based activated carbon manufacturer acid washes their carbon with hydrochloric acid and rinses it. As a result, an acidic residual remains on the carbon leaving a typical pH value of 4.5. Because FSI's activated carbon is not acid washed, it will not decrease the pH of an Amine stream. Total ash content measures the non-carbon portion of an activated carbon. As the ash content of the leading lignite based carbon is almost twice that of the FSI's carbon, there is a much higher potential that compounds within this ash may dissolve within the fluid being treated. In addition to the above non-carbon contaminants, FSI's activated carbon contains 7% less water than the leading lignite based activated carbon. Less water translates to more carbon in every shipment.

OPERATING CONDITIONS

Factors affecting carbon performance include temperature and contact time in addition to the type of carbon and the targeted contaminant. The maximum recommended operating temperature for carbon is generally 120 deg. F, exceeding 150 deg. F can greatly reduce capacity in hydrocarbon capture levels. Similarly, high rates of flow or reduced contact time diminish the ability of the carbon to capture and retain contaminants. Unnecessary abrasion can also be an additional side effect. A carbon unit should always be protected upstream and down by adequate particulate filtration to prevent fouling of the bed and to prevent any carbon fines from entering the system. In a properly designed system, the carbon unit should not develop any significant differential pressure over time.

*Please contact FSI if you have any questions about your activated carbon application.

WEDGE WIRE SCREENS

General Data
Standard Wound
External Axial
Inverted Wrap
Internal Axial
Reverse Formed

WW

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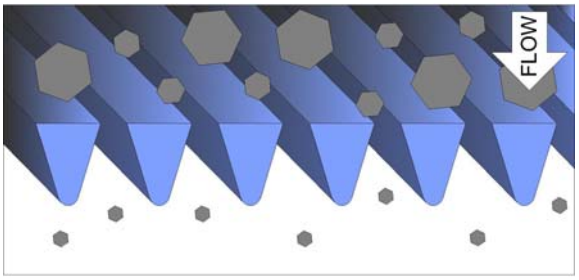
- **Wedge wire** screens are manufactured by resistance welding vee-shaped wire on support rods. The distance between the vee-shaped wire is controlled accurately, as it forms the slot through which the filtrate flows. Welding is performed in a continuous rolled motion to join the wire and the rods. The welding process welds the continuous length of the wire to the rods as it circulates.
- The **Vee-shaped** opening results in only two contact points between the retained particles and the slot. This minimizes clogging and increases backwashing efficiency.



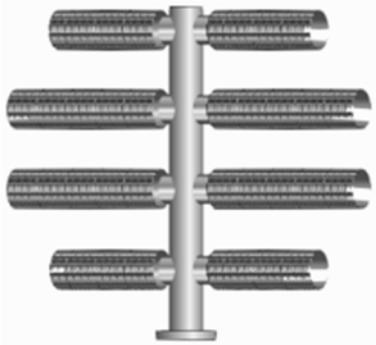
FEATURES

- Screens are available in slot sizes from 0.001 in. (25µm) up to 1 in. (25 mm).
- The most common material of construction is 300 series stainless steel, however many exotic alloys are available such as 321SS, 347SS, Duplex SS, Alloy 20, Hastelloy C-76, Alloy B-3, Titanium, Monel 400, etc.
- Screen diameters from 0.787 in. (20 mm) and larger.

INDUSTRY APPLICATIONS

INDUSTRY	APPLICATIONS
• Water and waste water	• Separating
• Pulp and paper	• Filtering
• Chemical	• Media retention
• Petrochemical	• Sizing
• Water Supply	• Dewatering
• Mineral and aggregate processing	• Classifying
• Plastics extrusion	• Straining
• Machine coolant filtration	• Drying
• Architectural applications	• Water Intake
• Water Well	• Fish diversion
• Construction	• Backwashing
• Drilling	• Centrifuges
	• Floor Grating

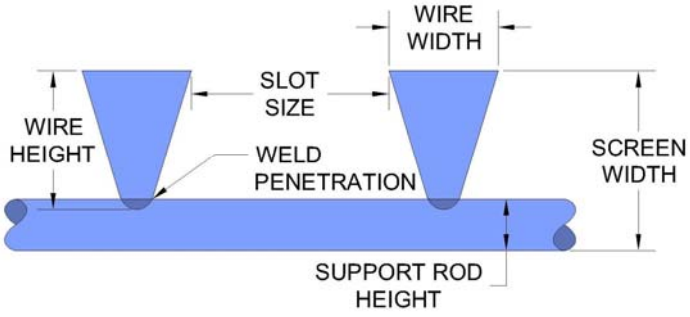
CUSTOM SOLUTIONS



Wedge wire products manufactured by Filter Solutions include:

- Flat Screens
- Support Grids
- Candle Filters
- Cartridges
- Nozzles
- Resin Traps
- Screen Lateral Systems
- Fractal Collectors and Distributors
- Sieve Bends and Boxes
- Cylindrical Baskets
- Conical Baskets
- Pressure Screens
- Screw Press Screens
- And much more…..

CONSTRUCTION DETAILS



$$\text{OPEN AREA (\%)} = \frac{\text{SLOT SIZE X 100}}{\text{SLOT SIZE + WIRE WIDTH}}$$

Screens can be made in various different configurations, including cylindrical, flat, or curved.

Many different variations of wire and rod sizes and slot size (opening) can be chosen to develop the exact screen of your choice. A wide range of wire and rod shapes make it possible to achieve the optimum balance of strength, open area, abrasion resistance and filtration efficiency.

STANDARD WOUND

External circumferential wire and axial internal support rods.

BENEFITS

- Flow Outside to Inside
- Economical
- Suitable for most applications
- Precision openings

APPLICATIONS

- Resin Traps
- Nozzles
- Header laterals
- Candle Filters

EXTERNAL AXIAL

Re-rolled construction. External axial wire with internal circumferential support rods.

BENEFITS

- Flow Outside to Inside
- Facilitates cleaning with an external axial-movement scraper

APPLICATIONS

- Automatic Filters

WW

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INVERTED WRAP

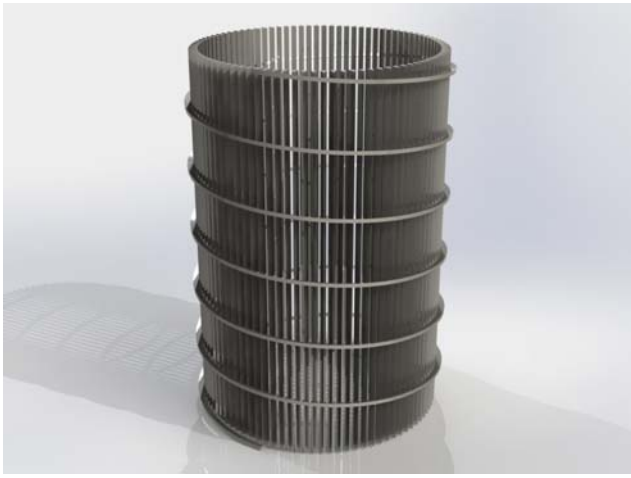
External circumferential inverted wire and axial internal support rods.

BENEFITS

- Flow Outside to Inside
- Economical

APPLICATIONS

- Backwashing automatic strainers



INTERNAL AXIAL

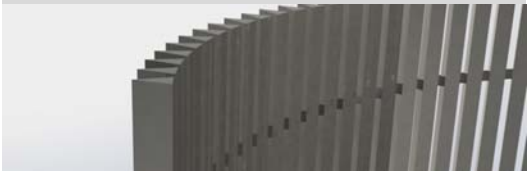
Wire based construction. Internal axial wire with external circumferential support rods.

BENEFITS

- Flow Outside to Inside
- Smooth internal screen surface
- Facilitates cleaning with an internal axial-movement scrapper.

APPLICATIONS

- Dewatering systems
- Baskets
- Systems with an internal rotor or screw



REVERSE FORMED

Re-rolled construction. Internal circumferential wire with external axial support rods.

BENEFITS

- Flow Outside to Inside
- Smooth internal screen surface
- Custom inner diameters can be manufactured

APPLICATIONS

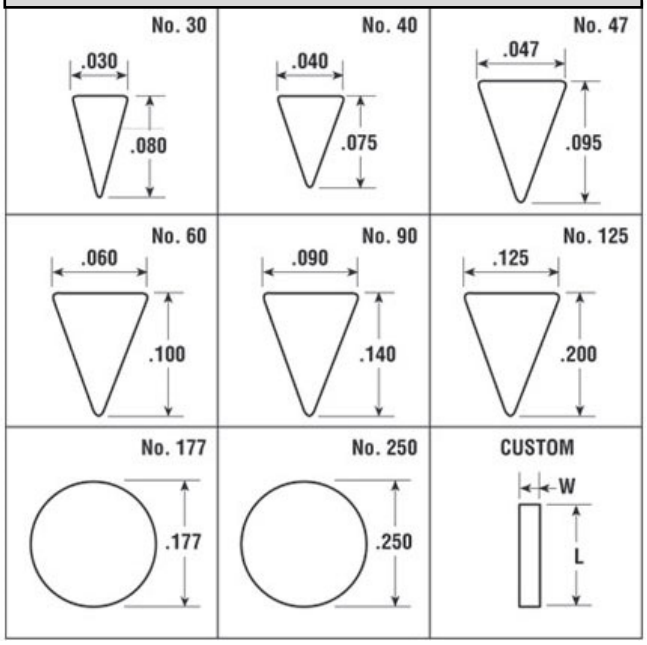
- Strainer and Filter baskets
- Screw Press

SCREEN SELECTION CHART

The below chart outlines common screen diameter, wrap wire and support rod combinations to produce a screen that will fit over a ASME B36.10M standard pipe.

PIPE SIZE	NOMINAL SCREEN OD (IN.)	WRAP WIRE	SUPPORT ROD
1/2"	1.375	60	60
3/4"	1.470	60	60
1"	1.750	60	60
1-1/4"	2.050	60	60
1-1/2"	2.375	60	60
2"	2.875	60	60
2-1/2"	3.500	60	90
3"	4.000	60	90
4"	5.250	60	90

WIRE AND ROD PROFILES



SLOT OPENING CONVERSION

U.S. MESH	INCHES	MICRONS	MILLI-METERS
3	.265	6730	6.73
3-1/2	.223	5660	5.66
4	.187	4760	4.76
5	.157	4000	4.00
6	.132	3360	3.36
7	.111	2830	2.83
8	.0937	2380	2.38
10	.0787	2000	2.00
12	.0661	1680	1.68
14	.0555	1410	1.41
16	.0469	1190	1.19
18	.0394	1000	1.00
20	.0331	841	.84
25	.0280	707	.71
30	.0232	595	.59
35	.0197	500	.50
40	.0165	420	.42
45	.0138	354	.35
50	.0117	297	.297
60	.0098	250	.250
70	.0083	210	.210
80	.0070	177	.177
100	.0059	149	.149
120	.0049	125	.125
140	.0041	105	.105
170	.0035	88	.088
200	.0029	74	.074
230	.0024	63	.063
270	.0021	53	.053
325	.0017	44	.044
400	.0015	37	.037

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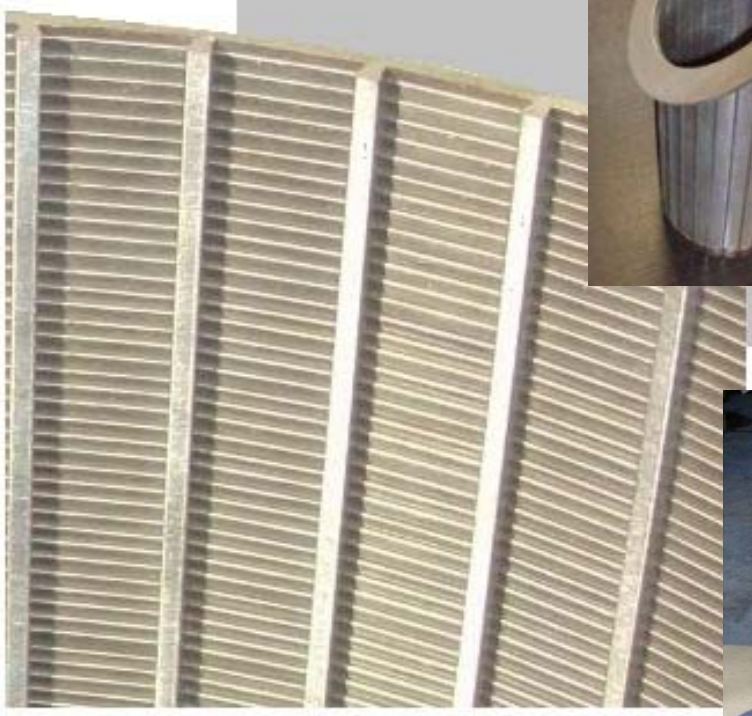

GENERAL INFO

GEN

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CONSIDERATION FOR SELECTING THE RIGHT HOUSING AND ELEMENT

INITIAL COST	
FLOW RATE	The flow rate will determine the size of the housing required
HOUSING PRICE	The size and type of filter housing will determine the price of the housing
HOUSING SIZE	The housing size is based on the flow rate of the process stream
THE NUMBER OF ELEMENTS REQUIRED	The number of elements required is directly associated with the size of the housing and the flow rate
PRICE PER ELEMENT	The price per element determines the total cost of replacement per every change out
DIRT LOADING CAPACITY PER ELEMENT	The dirt loading capacity per element determines the frequency of change out required
NOMINAL OR ABSOLUTE RATINGS	Depending on the filter efficiency one wishes to acquire, a nominal or absolute ratings must be determined
CHANGEOUT TIME REQUIRED	The total dirt loading capacity will establish the amount of change out required at a given time
OPERATING COST	
LABOUR COST FOR CHANGE OUT	The labour cost associated with every change out
DISPOSAL COST	The disposal cost is based on the jurisdiction and type of waste (hazardous/non hazardous) being disposed

BAG, CARTRIDGE AND HIGH FLOW COMPARISON

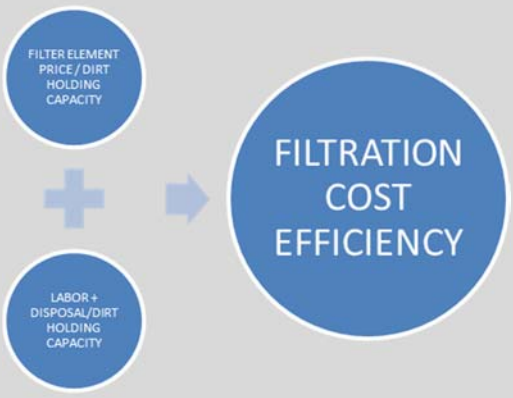
	FLOW RATE	HOUSING		ELEMENT			DIRT LOADING		
	GPM	HOUSING DIA	*HOUSING PRICE RATOI	# OF ELEMENT	COST PER UNIT	***TOTAL COST	DIRT LOADING PER ELEMENT	TOTAL DIRT LOADING CAPACITY	**CHANGEOUT TIME
BAG	300	18"	1.5	3 (P2)	$5	$15.00	1 LB	3 LBS	
CARTRIDGE	300	16"	2	24 (3H)	$10	$240.00	1 LB	24 LBS	
HIGH FLOW	300	8"	1	1 (660HF)	$300	$300.00	20 LBS	20 LBS	

*All material of contruction is based on 316 Stainless Steel and pricing is based on NPT's general pricing

**Change out requirement is based on fluid contamination @ 10 ppm

***Element unit price is based on NPT's general pricing

FILTRATION COSST EFFICIENCY



Filtration Cost Efficiency is based on the direct cost, indirect cost and total cost with removing one pound of solids from a process stream, disregarding equipment depreciation. Direct cost is the price of the filter element (P) and the indirect cost is the labor price during change out operation and the cost for disposal of the filtered waste. The lowest "E" value represents the lowest total cost of filtration.

$$E = P/H + L/H + D/H$$

Filter price and dirt holding capacity are key components in operating cost. The association between filter price and dirt holding capacity can be described by the formula Alpha Factor.

E = FILTRATION COST EFFICIENCY
H = DIRT HOLDING CAPACITY IN POUNDS
L = LABOR COST PER FILTER ELEMENT
P = FILTER ELEMENT PRICE
D = DISPOSAL COST PER FILTER ELEMENT

ALPHA FACTOR (A) = FILTER ELEMENT PRICE (P) / DIRTHOLDING CAPACITY (H)

$$E = A + (L+D)/H$$

The indirect costs shown in the equation are reduced as the dirt holding capacity of the filter increases. Therefore, the Alpha Factor becomes the dominant number in the equation. The lowest Alpha Factor results in the lowest filtration cost

FILTER HOUSING INQUIRY CHECKLIST

Please have the information listed below ready to provide when placing an inquiry to allow us to better serve your filtration requirements.

1. Type of filter housing (Bag, Cartridge, Hi-Flow etc...)_____
2. Operating/Design pressure (PSI or KPA)_____
3. Operating/Design temperature (^{o}C or ^{o}F)_____
4. Corrosion allowance (in or mm)_____
5. Code of construction (ASME Section 1 or others)_____
6. NDE requirement (RT,MT,UT others)_____
7. Housing material of construction (CS,SS, others)_____
8. Nozzle connection sizes/rating (NPS/DIN)_____
9. Flow rate (GPM or LPM)_____
10. Service fluid _____
11. Fluid Density (lb/ft^3 or kg/m^3)_____
12. Fluid Viscosity (cP or cSt) _____
13. Desired particulate retention size (micron)_____
14. Nature/Type of contaminant (Solid, Gels etc...)_____
15. Dirt loading concentration (PPM) _____
16. Clean pressure drop requirement (PSI or KPA)_____
17. Additional requirements_____
18. Company contact information_____

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STRAINER HOUSING INQUIRY CHECKLIST

Please have the information listed below ready to provide when placing an inquiry to allow us to better serve your filtration requirements.

1. Type of strainer (Basket, T-Strainer, Y-Strainer others)_____
2. Operating/Design pressure (PSI or KPA)_____
3. Operating/Design temperature (^{o}C or ^{o}F)_____
4. Corrosion allowance (in or mm)_____
5. Code of construction (ASME Section 1, B31.3 others)_____
6. NDE requirement (RT,MT,UT others)_____
7. Housing material of construction (CS,SS, others)_____
8. Basket material of construction(304SS,3016SS, others)_____
9. Nozzle connection sizes/rating (NPS/DIN)_____
10. Mesh/Perforation size required(# / in or mm)_____
11. Basket open area ratio(%)_____
12. Flow rate (GPM or LPM)_____
13. Service fluid _____
14. Fluid Density (lb/ft^3 or kg/m^3)_____
15. Fluid Viscosity (cP or cSt) _____
16. Nature/Type of contaminant (Solid, Gels etc...)_____
17. Clearance limitation (in or mm)_____
18. Clean pressure drop requirement (PSI or KPA)_____
19. Additional requirements_____
20. Company contact information_____

FILTER ELEMENTS INQUIRY CHECKLIST

Please have the information listed below ready to provide when placing an inquiry to allow us to better serve your filtration requirements.

1. Service fluid to be filtered_____
2. Nature/Type of contaminant (Solid, Gels etc...)_____
3. Operating temperature (^{o}C or ^{o}F)_____
4. Chemical compatibility issues_____
5. Filtration efficiency (Nominal or Absolute)_____
6. Desired particulate retention size (micron)_____
7. Dirt loading concentration (PPM) _____
8. Maximum Clean pressure drop (PSI or KPA)_____
9. Fluid Density (lb/ft^3 or kg/m^3)_____
10. Fluid Viscosity (cP or cSt) _____
11. Other relevant information _____
12. Company contact information_____

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A/SA 182F 304 PRESSURE/TEMPERATURE RATINGS

CLASS	150 lb	300 lb	400 lb	600 lb	900 lb	1500 lb	2500 lb
MAX. HYDROSTATIC TEST PRESSURE, PSIG	412.5	1080	1440	2160	3240	5400	9275
TEMPERATURE, F	**MAXIMUM ALLOWABLE NON-SHOCK PRESSURE PSIG**						
(-)20 to 100	275	720	960	1440	2160	3600	
200	230	600	800	1200	1800	3000	
300	205	540	720	1080	1620	2700	
400	190	495	660	995	1490	2485	
500	170	465	620	930	1395	2330	
600	140	435	580	875	1310	2185	
650	125	430	575	860	1290	2150	
700	110	425	565	850	1275	2125	
750	95	415	555	830	1245	2075	
800	80	405	540	805	1210	2015	
850	65	395	530	790	1190	1980	
900	50	390	520	780	1165	1945	
950	35	380	510	765	1145	1910	
1000	20	320	430	640	965	1605	

A/SA 182F 316 PRESSURE/TEMPERATURE RATINGS

CLASS	150 lb	300 lb	400 lb	600 lb	900 lb	1500 lb	2500 lb
MAX. HYDROSTATIC TEST PRESSURE, PSIG	412.5	1080	1440	2160	3240	5400	9275
TEMPERATURE, F	**MAXIMUM ALLOWABLE NON-SHOCK PRESSURE PSIG**						
(-)20 to 100	275	720	960	1440	2160	3600	
200	235	620	825	1240	1860	3095	
300	215	560	745	1120	1680	2795	
400	195	515	685	1025	1540	2570	
500	170	480	635	955	1435	2390	
600	140	450	600	900	1355	2255	
650	125	445	590	890	1330	2220	
700	110	430	580	870	1305	2170	
750	95	425	570	855	1280	2135	
800	80	420	565	845	1265	2110	
850	65	420	555	835	1255	2090	
900	50	415	555	830	1245	2075	
950	35	385	515	775	1160	1930	
1000	20	350	465	700	1050	1750	

A/SA 105 and A/SA 350LF2 CL.1 PRESSURE/ TEMPERATURE RATINGS

CLASS	150 lb	300 lb	400 lb	600 lb	900 lb	1500 lb	2500 lb
MAX. HYDROSTATIC TEST PRESSURE, PSIG	427.5	1110	1485	2220	3330	5557.5	9255
TEMPERATURE, F	**MAXIMUM ALLOWABLE NON-SHOCK PRESSURE PSIG**						
(-)20 to 100	285	740	990	1480	2220	3705	6170
200	260	675	900	1350	2025	3375	5625
300	230	655	875	1315	1970	3280	5470
400	200	635	845	1270	1900	3170	5280
500	170	600	800	1200	1795	2995	4990
600	140	550	730	1095	1640	2735	4560
650	125	535	715	1075	1610	2685	4475
700	110	535	710	1065	1600	2665	4440
750	95	505	670	1010	1510	2520	4200
800	80	410	550	825	1235	2060	3430
850	65	270	355	535	805	1340	2230
900	50	170	230	345	515	860	1430
950	35	105	140	205	310	515	860
1000	20	50	70	105	155	260	430

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CONVERSION FACTORS

FROM	MULTIPLY BY FACTOR	TO GET
Atmospheres	14.7	PSI
Barrels of Oil	42	Gallons
Centimeters	0.03281	Feet
Centimeters	0.3937	Inches
Centipoises	0.01	Poises
Centistokes	0.01	Stokes
Cubic Centimeters	0.06102	Cubic Inches
Cubic Centimeters	0.0002642	Gallons (liq)
Cubic Feet	7.4805	Gallons (liq)
Cubic Feet	1728	Cubic Inches
Cubic Feet/minute	7.4805	Gallons Per Minute
Cubic Inches	0.004329	Gallons
Cubic Inches	16.387	Cubic cm.
Cubic Inches	0.0005787	Cubic Feet
Cubic Meters	264.17	Gallons (liq)
Cubic Meters	35.3147	Cubic Feet
Feet	30.48006	Centimeters
Feet	0.3048006	Meters
Feet of Water	0.4335	PSI
Feet of Water	0.882674	Inches of Hg
Feet/minute	0.01136	Miles Per Hour
Feet/second	0.681818	Miles Per Hour
Gallons	3,785.41	Cubic cm.
Gallons	231	Cubic Inches
Gallons	0.83267	Gallons (imp.)
Gallons	0.13368	Cubic Feet
Gallons/minute	0.13368	Cubic Feet/Minute
Inches	0.0254	Meters
Inches of Hg	1.13292	Feet of Water
Inches of Hg	0.491153	PSI
Kilograms	2.2046	Pounds (avdp.)
Kilograms/sq. cm.	14.2233	PSI
Kilograms/sq. mm	1,422.33	PSI
Liters	0.264172	Gallons
Meters	3.2808	Feet
Poise	100	Centipoise
Pounds of Water	0.11985	Gallons
PSI	2.036	Inches of Hg
PSI	2.307	Feet of Water
Square Inches	6.5416	Square cm.

This Chart contains general information and is a general guide only

DECIMAL EQUIVALENTS

Decimal Equivalents of Fractions	
Inches	**Decimals**
1/64	0.015625
1/32	0.03125
3/64	0.046875
1/16	0.0625
5/64	0.078125
3/32	0.09375
7/64	0.109375
1/8	0.125
9/64	0.140625
5/32	0.15625
11/64	0.171875
3/16	0.1875
13/64	0.203125
7/32	0.21875
15/64	0.234375
1/4	0.25
17/64	0.265625
9/32	0.28125
19/64	0.296875
5/16	0.3125
21/64	0.328125
11/32	0.34375
23/64	0.359375
3/8	0.375
25/64	0.390625
13/32	0.40625
27/64	0.421875
7/16	0.4375
29/64	0.453125
15/32	0.46875
31/64	0.484375
1/2	0.5
33/64	0.515625
17/32	0.53125
35/64	0.546875
9/16	0.5625
37/64	0.578125
19/32	0.59375
39/64	0.609375
5/8	0.625
41/64	0.640625
21/32	0.65625
43/64	0.671875
11/16	0.6875
45/64	0.703125
23/32	0.71875
47/64	0.734375
3/4	0.75
49/64	0.765625
25/32	0.78125
51/64	0.796875
13/16	0.8125
53/64	0.828125
27/32	0.84375
55/64	0.859375
7/8	0.875
57/64	0.890625
29/32	0.90625
59/64	0.921875
15/16	0.9375
61/64	0.953125
31/32	0.96875
63/64	0.984375

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Decimal Equivalents of US Mesh Ratings		
US Mesh	**Micron**	**Inches**
2	10360	0.407
3	6860	0.27
4	5160	0.208
5	4040	0.159
8	2460	0.097
10	1910	0.075
12	1520	0.06
14	1300	0.051
20	872	0.034
30	513	0.02
40	384	0.015
50	282	0.011
60	231	0.009
80	180	0.0075
100	141	0.0055
120	118	0.0046
150	105	0.0041
200	74	0.0029
250	62	0.0024
300	46	0.0018
325	44	0.0017
400	39	0.0015
550	25	0.0009
800	15	0.0006
1250	10	0.0004
-	5	0.0002

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Standard SS Sheet Metal Gauges	
Gauge	**Thickness**
7	0.1875"(4.76mm)
8	0.1719"(4.37mm)
9	0.1563"(3.97mm)
10	0.1406"(3.57mm)
11	0.1250"(3.18mm)
12	0.1094"(2.78mm)
13	0.094"(2.4mm)
14	0.0781"(1.98mm)
15	0.07"(1.8mm)
16	0.0625"(1.59mm)
17	0.056"(1.4mm)
18	0.0500"(1.27mm)
19	0.044"(1.1mm)
20	0.0375"(0.95mm)
21	0.034"(0.86mm)
22	0.031"(0.79mm)
23	0.028"(0.71mm)
24	0.025"(0.64mm)
25	0.022"(0.56mm)
26	0.019"(0.48mm)
27	0.017"(0.43mm)
28	0.016"(0.41mm)
29	0.014"(0.36mm)
30	0.013"(0.33mm)
31	0.011"(0.28mm)

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WATER AND SUSPENDED SOLID CONVERSIONS

PRESSURE TO HEAD OF WATER	
PSI	HEAD (FT)
1	2.31
2	4.61
3	6.92
4	9.23
5	11.53
6	13.84
7	16.15
8	18.45
9	20.76
10	23.07
20	46.13
30	69.20
40	92.27
50	115.33
60	138.40
70	161.47
80	184.53
90	207.60
100	230.67
200	461.33
300	692.00
400	922.66
500	1153.33
600	1384.00
700	1614.66
800	1845.33
900	2075.99
1000	2306.66

HEAD OF WATER TO PRESSURE	
FEET HEAD	PSI
1	0.43
2	0.87
3	1.30
4	1.73
5	2.17
6	2.60
7	3.03
8	3.47
9	3.90
10	4.34
20	8.67
30	13.01
40	17.34
50	21.68
60	26.01
70	30.35
80	34.68
90	39.02
100	43.35
200	86.71
300	130.06
400	173.41
500	216.76
600	260.12
700	303.47
800	346.82
900	390.18
1000	433.53

SUSPENDED SOLID CONVERSION		
PPM	%	Lbs./1000 Gal.
10,000	1.0000	83.4540
8,000	0.8000	66.7632
6,000	0.6000	50.0724
4,000	0.4000	33.3816
2,000	0.2000	16.6908
1,000	0.1000	8.3454
800	0.8000	66.7632
600	0.0600	5.0072
400	0.0400	3.3382
200	0.0200	1.6691
100	0.0100	0.8345
80	0.0080	0.6676
60	0.0060	0.5007
40	0.0040	0.3338
20	0.0020	0.1669
10	0.0010	0.0835
8	0.0008	0.0668
6	0.0006	0.0501
4	0.0004	0.0334
2	0.0002	0.0167
1	0.0001	0.0083

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BASKET PERFORATION OPEN AREA

Perforated Metal	
Hole Dia. x Hole Spacing	Percent Open Area
0.020"(0.51mm) x 0.043"(1.1mm)	20
0.027"(0.69mm) x 0.066"(1.7mm)	17
0.033"(0.84mm) x 0.077"(2.0mm)	20
0.045"(1.1mm) x 0.086"(2.2mm)	28
0.057"(1.4mm) x 0.121"(3.1mm)	25
0.062"(1.6mm) x 3/32"(2.4mm)	41
0.094"(2.4mm) x 5/32"(4.0mm)	33
0.100"(2.5mm) x 5/32"(4.0mm)	37
1/8"(3.2mm) x 3/16"(4.8mm)	40
5/32"(4.0mm) x 3/16"(4.8mm)	63
3/16"(4.8mm) x 1/4"(6.4mm)	51
1/4"(6.4mm) x 3/8"(9.5mm)	40
5/16"(7.9mm) x 7/16"(11mm)	47
3/8"(9.5mm) x 1/2"(13mm)	51
7/16"(11mm) x 19/32"(15mm)	49
1/2"(13mm) x 11/16"(17mm)	48
5/8"(16mm) x 13/16"(21mm)	54
3/4"(19mm) x 1"(25mm)	51
1"(25mm) x 1-3/8"(35mm)	48

Staggered pattern only

CHEMICAL RESISTANCES

CHEMICAL RESISTANCE OF METALS									CHEMICAL RESISTANCE OF ELASTOMER GASKET				
CHEMICAL	NICKEL	INCONEL	MONEL METAL	TYPE 304 S.S.	TYPE 316 S.S.	TYPE 347 S.S.	CARPENTER "20" S.S.	HASTELLOY "B"OR"C"	NEOPRENE	BUNA-N	SILICONE	(T.E.V) TEFLON ENCAPSULATED WITH VITON	VITON
ACETONE	G	G	G	G	G	G	G	G	G	X	F	G	X
ACETYLENE	G	N/A	G	G	G	G	G	G	G	G	N/A	N/A	G
BEER	G	G	G	G	G	G	N/A	G	G	X	N/A	G	X
BUTANE	N/A	N/A	G	G	G	G	G	G	G	Y	N/A	N/A	Y
ETHERS	G	G	G	G	G	G	G	G	X	Y	X	G	Y
ETHYLENE, GLYCOL	G	G	G	G	G	G	G	G	G	G	N/A	G	G
FORMALDEHYDE	G	G	G	Y	Y	Y	G	G	G	G	N/A	G	G
GASOLINE, SOUR	G	G	Y	G	G	G	G	G	F	G	X	G	G
GASOLINE, REFINED	G	G	G	G	G	G	G	G	F	G	X	G	G
GLYCERIN, GLYCEROL	G	G	G	G	G	G	G	G	G	G	N/A	G	G
HYDROGEN GAS, COLD	G	G	G	G	G	G	G	G	G	G	G	N/A	G
HYDROGEN PEROXIDE	Y	Y	Y	G	G	Y	G	G	G	N/A	G	N/A	N/A
LUBRICATING OILS, REFINED	G	G	G	G	G	G	G	G	F	G	G	G	G
MERCURY	G	N/A	G	G	G	N/A	N/A	N/A	G	N/A	N/A	N/A	N/A
NATURAL GAS	G	G	G	G	G	G	G	G	G	G	N/A	N/A	G
PROPANE	G	G	G	G	G	G	G	G	G	G	N/A	N/A	G
SEWAGE (GAS)	Y	G	Y	G	G	N/A	N/A	N/A	G	G	G	N/A	G
SULFUR	G	G	G	Y	Y	Y	G	G	G	F	N/A	N/A	F
FRESH WATER	G	G	G	G	G	G	G	G	G	G	G	G	G
WHISKEY AND WINES	G	G	Y	G	G	N/A	G	N/A	G	G	N/A	G	G
NOTES: RESISTANCE RATING: G = GOOD; F = FAIR; Y = CAUTION (DEPENDS ON CONDITIONS); X = NOT RECOMMENDED; N/A = NOT APPLICABLE									**MIN/MAX OPERATING TEMPERATURE**				
									-60°F/ 300°F	-35°F/ 250°F	-60°F/ 400°F	-60°F/ 400°F	-15°F/ 400°F

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CHARACTERISTICS OF PARTICLE SIZE

COMMON PARTICAL SIZES			
PARTICLES NAME	PARTICLES SIZE RANGE (IN MICRON)	PARTICLES NAME	PARTICLES SIZE RANGE (IN MICRON)
FUME	0.001-1	CARBON BLACK	0.01-0.3
DUST	1-10,000	PULVERIZED COAL	3-500
MIST	0.001-10	PAINT PIGMENTS	0.1-5
SPRAY	10-10,000	FLOTATION ORES	10-200
CLAY	0.02-2	ZINC OXIDE FUME	0.01-0.3
SILT	2-20	INSECTICIDE DUSTS	0.5-10
FINE SAND	20-200	COLLOIDAL SILICA	0.02-0.05
COARSE SAND	200-2000	GROUND TALC	0.5-50
GRAVEL	2000-30,000 PLUS	SPRAY DRIED MILK	0.1-10
SMOG	0.001-2	PLANT SPORES	10-30
CLOUDS AND FOG	2-70	ALKALI FUME	0.1-5
MIST	70-200	POLLENS	10-100
DRIZZLE	200-500	AITKEN NUCLEI	0.005-0.2
RAIN	500-10,000	MILLED FLOUR	1-80
ROSIN SMOKE	0.01-1	ATMOSPHERIC DUST	0.001-20
FERTILIZER,GROUND LIMESTONE	10-1000	SEA SALT NUCLEI	0.03-0.5
OIL SMOKES	0.03-1	NEBULIZER DROPS	1-20
FLY ASH	1-200	HYDRAULIC NOZZLE DROPS	50-5000
TOBACCO SMOKE	0.01-1	COMBUSTION NUCLEI	0.01-0.1
COAL DUST	1-100	LUNG DAMAGING DUST	0.5-5
METALLURGICAL DUSTS AND FUMES	0.001-100	PNEUMATIC NOZZLE DROPS	10-100
AMMONIUM CHLORIDE FUME	0.1-3	RED BLOOD CELL DIAMETER (ADULTS)	7.5
CEMENT DUST	3-100	VIRUSES	0.003-0.05
SULFURIC CONCENTRATOR MIST	1-20	BACTERIA	0.3-30
BEACH SAND	90-2000	CONTACT SULFURIC MIST	0.3-3

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GENERAL DATA

COMMON MATERIAL

PRODUCT FORM	*CARBON STEEL*	*C/S LOW TEMP.*	*304 STAINLESS*	*316 STAINLESS*
PLATE (PRESSURE VES-SEL)	SA 516 70	SA 516 70N	SA 240 304	SA 240 316
PLATE (STRUCTURAL)	SA 36/44W	SA 516 70N	SA 240 304	SA 240 316
FORGING (FLANGE/CPL'G)	SA 105	SA 350LF2 CL.1	SA 182F 304	SA 182F 316
SEAMLESS PIPE	SA 106B/C	SA 333 GR.6	SA 312TP 304 SMLS	SA 312TP 316 SMLS
WELDED PIPE	SA 53E/B	N/A	SA 312TP 304 WLD	SA 312TP 316 WLD
B.W FITTINGS	SA 234WP B	SA 420 WPL6	SA 403WP 304 WLD	SA 403WP 316 WLD
BAR & ANGLE	SA 36/44W	SA 36/44W	SA 479 304	SA 479 316
BOLT/STUD	SA 193 B7	SA 193 B7M	SA-193 B8 CL.1	SA-193 B8 CL.2
NUT	SA 194 2H	SA 194 2HM	SA 194-8	SA 194-8

BOLT SIZE & T.P.I

1/4"-20UNC
3/8"-16UNC
1/2"-13UNC
5/8"-11UNC
3/4"-10UNC
7/8"-9UNC
1" SIZE AND ABOVE ALL 8UN

C.S ALLOWABLE STRESS @ TEMPERATURE

MATERIAL SPECIFACTION	*ALLOWABLE STRESS @ <400°F*
SA 516 70	20000 PSI
SA 105 / 350LF2 CL.1	20000 PSI
SA 106C/ 234 WPC	20000 PSI
SA 106B/ 234 WPB/ 333 GR.6/ 420 PWL6	17100 PSI
SA 53E/B	14600 PSI
SA 36/44W	16600 PSI
SA 193 B7	25000 PSI

MATERIAL STRENGTH

MATERIAL SPEC'S & GRADE	*MINIMUM YIELD*	*MINIMUM YTENSILE*
SA 516 70	38 KSI	70 KSI
SA 105 / 350LF2 CL.1	36 KSI	70 KSI
SA 106C/ 234 WPC	40 KSI	70 KSI
SA 106B/ 234 WPB/ 333 GR.6/ 420 PWL6	35 KSI	60 KS
SA 53E/B	35 KSI	60 KSI
SA 36/44W	36 KSI	58 KSI
SA 193 B7	105 KSI	125 KSI
SA 193 B7M	80 KSI	100 KSI
304SS / 316SS	30 KSI	75 KSI
304LSS / 316LSS	25 KSI	70 KSI

WELDING PROCESS

GTAW: GAS TUNGSTEN ARC WELDING
GMAW: GAS METAL ARC WELDING
SMAW: SHIELDED METAL ARC WELDING
SAW: SUBMERGED ARC WELDING

NDE

RT=RADIOGRAPHY TESTING
UT=ULTRASONIC TESTING
MT-MAGNETIC PARTICLE TESTING
VI=VISUAL INPECTION
HT= HARDNESS TESTING
WFT=WET FLUORESCENT TESTING
LPT=LQUID PENETRANT TESTING
PMI: POSITIVE MATERIAL IDENTIFICATION

STAINLESS GRADE ALLOWABLE STRESS @ TEMP.

STAINLESS GRADE @ TEMPERATURE IN DEG. F	*ALLOWABLE STRESS IN PSI*
304SS @ UP TO 200	20000
304SS @ 250	19450
304SS @ 300	18900
304SS @ 325	18750
304SS @ 350	18600
304SS @375	18450
304SS @ 400	18100
316SS @ UP TO 300	20000
316SS @ 325	19825
316SS @ 350	19650
316SS @ 375	19475
316SS @ 400	19300

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SURFACE PREPARATION

CARBON STEEL: SSPC-SP6 OR PEEN BLAST

STAINLESS STEEL: BEAD BLAST OR ELECTRO POLISH

CODES

B31.3 TEST PRESSURE: 1.5 x DESIGN PRESSURE

ASME SECT. VIII DIV.1 TEST PRESSURE: 1.3 x DESIGN PRESSURE

PWHT: 1150°F +/- 25°F

IMPACT TEST EXEMPTION: CS: UG-20(f) UCS-66(a) & (b)

SST:UHA-51(d)

FITTING CRN: <6 NPS OR <1.5 CU.FT

"UM VESSEL" PRESSURE & VOLUME LIMITATION

AT 250 PSI: Max. Vol 37GAL OR 5 CU.FT

AT 300 PSI: Max. Vol 22GAL OR 3 CU.FT

AT 600 PSI: Max. Vol 11GAL OR 1.5 CU.FT

DATA REPORT FORM

CRN FITTING HOUSING IS INSPECTED SHOP (MDR IS COC)

"UM" STAMPED VESSEL IS INSPECTED BY SHOP C.I (MDR IS U-3 FORM)

"U" STAMPED VESSEL IS INSPECTED BY A.I.A (MDR IS U-1 OR U-1A FORM)

COMMON SEALING MATERIAL

MAX OPERATING TEMP	*SEALING MATERIAL*
UP TO 700 °F	FLEXITALLIC
UP TO 250 °F	BUNA-ORING
UP TO 3000 °F	EPDM-ORING
UP TO 400 °F	VITON-ORING
UP TO 400 °F	SILICON

CRN DESIGNATION

TXXXX.1	BC=1
TXXXX.2	AB=2
TXXXX.3	SK=3
TXXXX.4	MB=4
TXXXX.5	ON=5
TXXXX.6	QC=6
TXXXX.7	NB=7
TXXXX.0	NL=0
TXXXX.C	ALL CANADIAN PROVINCE=C

CRN TXXXX.21345. THE 1ST REGISTERED IN PROVINCE IS ALBERTA SINCE THE DIGIT AFTER THE DECIMAL IS "2"

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PIPE AND B.W FITTING WALL THICKNESS CHART

Nominal Pipe Size	Pipe O.D	Schedule												
		*Light	20	30	**Std	40	60	***X-stg	80	100	120	140	160	XX-stg
0.5	0.840	0.083			0.109	0.109		0.147	0.147				0.188	0.294
0.75	1.050	0.083			0.113	0.113		0.154	0.154				0.219	0.308
1	1.315	0.109			0.133	0.133		0.179	0.179				0.250	0.358
1.25	1.660	0.109			0.140	0.140		0.191	0.191				0.250	0.382
1.5	1.900	0.109			0.145	0.145		0.200	0.200				0.281	0.400
2	2.375	0.109			0.154	0.154		0.218	0.218				0.344	0.436
2.5	2.875	0.120			0.203	0.203		0.276	0.276				0.375	0.552
3	3.500	0.120			0.216	0.216		0.300	0.300				0.438	0.600
3.5	4.000	0.120			0.226	0.226		0.318	0.318					0.636
4	4.500	0.120			0.237	0.237		0.337	0.337		0.438		0.531	0.674
5	5.563	0.134			0.258	0.258		0.375	0.375		0.500		0.625	0.750
6	6.625	0.134			0.280	0.280		0.432	0.432		0.562		0.719	0.864
8	8.625	0.148	0.250	0.277	0.322	0.322	0.406	0.500	0.500	0.594	0.719	0.812	0.906	0.875
10	10.750	0.165	0.250	0.307	0.365	0.365	0.500	0.500	0.594	0.719	0.844	1.000	1.125	1.000
12	12.750	0.180	0.250	0.330	0.375	0.406	0.562	0.500	0.688	0.844	1.000	1.125	1.312	1.000
14	14.000	0.250	0.312	0.375	0.375	0.438	0.594	0.500	0.750	0.938	1.094	1.250	1.406	
16	16.000	0.250	0.312	0.375	0.375	0.500	0.656	0.500	0.844	1.031	1.219	1.438	1.594	
18	18.000	0.250	0.312	0.438	0.375	0.562	0.750	0.500	0.938	1.156	1.375	1.562	1.781	
20	20.000	0.250	0.375	0.500	0.375	0.594	0.812	0.500	1.031	1.281	1.500	1.750	1.969	
24	24.000	0.250	0.375	0.562	0.375	0.688	0.969	0.500	1.219	1.531	1.812	2.062	2.344	
30	30.000	0.312	0.500	0.625	0.375			0.500						
36	36.000	0.312	0.500	0.625	0.375	0.750		0.500						
48	48.000			0.375			0.500							

* Light wall thicknesses are identical to stainless steel schedule 10S in sizes thru 12" and to Sch 10 in sizes 14" and larger

** Standard wall thicknesses are identical to Stainless steel schedule 40S in sizes thru 12"

*** Extra Strong wall thicknesses are identical to Stainless steel schedule 80S in sizes thru 12"

GLOSSARY

CODE REQUIREMENTS

Filter Solutions Inc. can guarantee compliance with NDE requirements and ASME Code. It's the policy of FSI to provide safe, reliable products which meet our customers' needs as well as all applicable FSI, industry and regulatory requirements. If you have requirements that extend beyond Code, contact us and we will make every effort to meet your needs.

A

Abrasion

The process of wearing away of material within a system which may lead to foreign materials entering the process fluid.

Absolute

An arbitrary term used to describe or define a degree of filtration. There are various methods used in the filtration industry to determine absolute ratings, which are not necessarily interchangeable. Generally, absolute means 100% removal of solids (glass beads) above a specified micron rating on a single pass. See nominal.

Absorb

To take up by cohesive, chemical or molecular action.

Absorbent

A filter medium that is similar to a sponge, drawing fluid and retaining it within its structure. In this Sense it can act as a filter to remove (adsorb) and retain fluid.

Acidity

The quality, state or degree of being acidic. In lubricating oils, acidity denotes the presence of acid-type constituents whose concentration is usually defined in terms of a neutralization number. The constituents vary in nature and may or may not markedly influence the behavior of the fluid.

Activated Carbon

Charcoal activated by heating to 1472-1652ºF a material of high adsorptive gases, vapors, organics, etc. Has a large internal surface area. Removes dissolved color, odor and taste from liquids or gases. Commonly used in the pharmaceutical industry to remove organic contaminants.

Activated Sludge

Biologically active floc from aeration and settling sewage and/or organic matter.

Additive

A supplementary material combined with a base material to provide special properties.

Adsorption

The attraction and/or the retention of particles by molec-ular attraction or electrostatic forces present between the particles and a filter medium. Also, the attraction of gasses, liquids or solids to surface areas of textile fibers, yarns, fabrics, or any similar type of material.

Adsorbent

Any material which adsorbs: i.e., the solid which attracts and holds on its surface the gas, vapor or liquid. Also, a filter medium primarily intended to hold it's soluble and insoluble contaminates on its surface by molecular adhesion — through no chemical change.

Aerobic Bacteria

Organisms requiring oxygen to live.

Aerosol

A dispersion of small liquid or solid particles suspended in air, gas or vapor.

Affluent (Influent)

Fluid entering the filter or filter system. Commonly described as influent, it is the opposite of effluent.

Agglomerate

A group of two or more particles combined, joined or clustered, by any means.

Aggregate

A relatively stable assembly of dry particles formed under the influence of physical forces.

Alkalinity

The capacity of water to neutralize acids, a property imparted by the water's content of carbonates, bicarbonates, hydroxides and occasionally borates, silicates and phosphates. It is expressed in milligrams per liter of equivalent calcium carbonate.

Anaerobic

Organism capable of growing without the presence of oxygen.

Ambient

Surrounding. For example, the ambient operating temperature of a vessel is temperature that is essentially the Same as that surrounding the vessel.

Amine

A class of organic compounds that are basic in nature and combine with acids to form salts. Amines are used to sweeten hydrocarbons.

ANSI

American National Standards Institute.

ASME

The American Society of Mechanical Engineers.

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GLOSSARY

ASTM

American Society for Testing and Materials.

Asymmetric Membrane

A membrane in which the pore size and structure are not the same from one side of the membrane to the other. These membranes are usually considered directional because of difference in flow characteristics depending on which side of the membrane faces the feed stream.

Assay

Analytical procedure to determine purity or concentration of a specific substance in a mixture.

Atmospheric Pressure

The force exerted on a unit area by the weight of the atmosphere.

Autoclave

A chamber for sterilizing with saturated steam filters or equipment by using constant high temperature and pressure.

B

Back Pressure

In filter use, resistance offered by the filter, usually measured in PSI.

Backwash

To clean a filter element by reversing the direction of flow through it.

Bacteria

Free living simple celled, microscopic organisms having a cell wall, lacking a defined nucleus, shape and round, rod-like, spiral or filamentous.

Bacteria Challenge

Testing the bacterial retention of a filter.

Baffle

A deflector plate at the inlet of a filter or coalescer vessel to deflect flow to protect filters from damage and to provide flow distribution.

Bag Life

Time a bag filter performs effectively.

BAR

Unit of pressure. 1 bar = 14.5 psi.

Basket Strainer

A vessel for the removal of coarse bulk solids from liquid, air or gas. The element is usually a steel perforated basket, or a mesh lined basket.

Beta (ß) Ratio

The Beta (ß) Ratio is a rating System introduced with the object of giving both filter manufacturer and user an accurate representative comparison amongst Filter media. Also, an indication of how a filter performs throughout the life of the filter. The Beta Ratio is an average filtration rating (single pass and multi-pass).

Biaxially Stretched Membrane

A micro porous membrane from either polypropylene or PTFE that has been stretched in both the MD and CD direction in a manner to form pores of a controlled size and possessing a narrow pore size distribution.

Bioburden

The load or level of microorganisms in a substance to be filtered.

Bleeder

A valve which diverts part of the fluid from the main flow of the system.

Brownian Motion

The continuous zigzag motion of suspended minuscule particles. The motion is caused by impact of the molecules in the fluid upon the particles.

Blowdown

The use of pressure to remove liquids and/or solids from a vessel.

Breakthrough

Used to describe the passing of solids through the cake build up of a filter medium. Also called breakpoint.

Bridging

Material or particulate blockage across an opening, often of a pore or filter medium.

Bubble Point

The differential gas pressure at which the first steady stream of gas bubbles is emitted from a wetted filter element under specified test conditions. A form of filter element fabrication integrity test.

BUNA-N

A synthetic rubber gasket material, used for vessel closures, flanges and filter elements.

Burst

An outward structural failure of the filter element caused by excessive differential pressure.

By-Pass

A condition that occurs when:

a) a bag or cartridge is not seated or sealed properly in the filter housing; or

b) the filter media is violated and permits unfiltered fluid to pass through.

C

Cake

Solids deposited on the filter medium during filtration in sufficient thickness to be removed in sheets of sizeable pieces. In many cases, cake may provide its own Filter media by adding to the surface of the media.

GLOSSARY

Calendering

A manufacturing process where woven and/or nonwoven fabrics are pressed between heavy rollers compressing the fibers. The process reduces the filter medium void volume, pore size rating, flow-rate and dirt-hold capacity of the medium.

Capacity

The volume of product which a vessel will accommodate, expressed in gallons or similar units. Also, an amount which will filter at a given efficiency and flow rate, expressed in gallons per minute or similar units.

Cartridge

A filter for the clarification of process liquids containing small amounts of solids. Made of a porous medium, it is used in a vessel, which performs the actual filtration process.

Catalyst

A substance that increases the rate of a reaction.

Cationic

Chemical that has a positive electrical charge.

Cellulose

A filter media of organic fibers such as wood, cotton, grass, and plant pulp.

Center-Rod/ Post

The component of a vessel used for mounting the cartridge in the vessel, usually made of a round bar material. A cen-ter pipe can also be used for the same purpose, but is made instead with perfo-rated effect and directs flow through the cartridge.

Centipoises

One one-hundredth of a poise. A poise is the unit of viscosity ex-pressed as one dyne per second per square centimeter.

Centistokes

One one-hundredth of a stoke. A stoke is equal to the viscosity in poises times the density of the fluid in grams per cubic centimeter.

Centrifugation

Separating two substances of differing densities by high speed spinning to create centrifugal force. Generally used to separate suspended particles from liquid.

Chromatography

Separation of substances in a mixture based on their affinity for certain solvents and solid surfaces.

Clarification

Clearing a liquid by filtration, by the addition of agents to precipitate solids, or by other means.

Clarifier

A processing unit using flocculation processes to separate solids from liquid often in a non-turbulent zone where heavy solids settle out of solution. Often used for wastewater.

Classification

Condition in which larger particle settle out below the finer ones. Also referred to as stratification. May also be referred to as the action to sort out particles by various groups or to other established criteria.

Cleanable

A filter element which, when loaded with contaminant, can be cleaned by a suitable process and returned to service with an ac-ceptable percentage of its original dirt holding capacity.

Clear Water Pressure Drop

Differential pressure across die filter as measured using clean water at a particular flow rate.

Coagulant

That which produces agglomeration of suspended solids.

Coalescing

The action of uniting of small droplets of one liquid preparatory to its being separated from another liquid.

Collapse Pressure

The maximum pressure that an element can withstand without permanent deformation.

Colloid

Very small, insoluble non-diffusible solid or liquid gelatinous parti-cles that remain suspension in a surrounding liquid. Solids usually on the order of 0.2 µm or less.

Compatibility

Relation to the non-reactivity of filter materials with a substance to be filtered.

Compressibility

Degree of physical change in filter cake particles when subjected to normal pressures.

Compression band

Stainless steel band sewn into the end of a bag to provide a surface to clamp against in the bag house.

Contaminant

Any undesirable particle or impurity in a stream.

Core

An inner material used for die center of an element as support, which may also be called a center tube when used with string-wound filters.

Corrosion

The conversion of metals into oxides, hydrated oxides, carbonates, or other compounds due to the action of air, water or both. Salts and sulphur are also important sources of corrosion. Removal of solids and water reduces the effect or speed of corrosion in many cases, and in other cases, corrosion inhibitors are used to reduce the effect of corrosion.

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GLOSSARY

D

Degradation

The loss of desirable physical properties by a textile material as a result of some process or physical/chemical process. Also, the wearing down or reduction in the efficiency of a media.

Delta P (P)

A symbol (P) designating pressure drop. The difference in pressure between two points, generally measured at the inlet and outlet point of a filter, separator/filter, etc. Normally measured in pounds per square inch (psi), inches of mercury (in. Hg.), or inches of water (in. H20). Also known as pressure drop.

Density

The weight per unit volume of a substance (specific weight).

Depth

A filter medium which primarily retains contaminants with the tortuous passages within the thickness of the element wall.

Depth-Type Filtration

Filtration that is accomplished by flowing a fluid through a mass filter media, with a much longer and random path through the filter. The density of the structure can be density graded, which is of particular advantage where the particular sizes of the contaminant are widely distributed. Certain types of solids, or combinations of solids, do not work well with surface filtration, and depth filtration is found to be more suitable.

Desalination

Production of fresh (potable) water from sea water, salt or brackish water by one of several processes, e.g. distillation, flash distillation, electro dialysis or reverse osmosis if salt content is not too huge.

Dewatering

A physical process that removes sufficient water from sludge so that its physical form is changed from essentially that of a fluid to that of a slurry or damp solid.

Differential Pressure

The difference in pressure across any two points of a system or component.

Dilatants

A flow condition where certain liquids will show an increase in viscosity as die rate of shear or flow is increased.

Dirt (Holding/loading) Capacity

Amount of dirt or debris retained by a filter in grams per unit area of the filter medium.

Discharge

The flow rate through a filter.

Dispersion

Operation which results in solid or liquid particles entering into suspension in a fluid. Also applies to a two phase system in which one phase, known as the disperse phase, is distributed throughout the other, known as the continuous phase

Disposable Filters

A filter which is intended to be discarded and replaced at the end of its service life.

Distillation

Process of vaporizing a liquid and collecting the vapor, which is then usually condensed into a liquid.

D.O.E.

Double Open Ended.

Downstream

The filtrate or product stream side of the filter. Fluid and/or solids that have passed through the filter.

E

Effective Area

The area of a medium that is exposed to the flow, and is usable for its intended purpose: coalescing, filtering or separating. This is die opposite of blind spots or dead area.

Effective Open Area

Area of die filtering medium through which die fluid may flow.

Efficiency

The degree to which an element will perform in removing solids and or Liquids, usually expressed as output divided by input.

Element

The medium used in a vessel to perform the function of filtration or separation. Also called the cartridge or filter. The porous device which performs die actual process of filtration.

Emulsion

A finely divided suspension of an oil in water or vice versa. Also, a dispersion of finely held particles in a stream which do not necessarily dissolve in each other, but are held in suspension.

Entrainment

Mist, fog or droplets of a liquid which are usually considered to be a contaminate when encountered in die filtration industry.

Extractable

Chemicals leached from a filter during a filtration process; usually tested for by soaking in water under controlled conditions; may be removed by pre-flushing with suitable liquid.

GLOSSARY

F

Feed

Liquid to be processed containing one or more liquid phases, such as an emulsion, and/or suspended solids, and/or insoluble solids.

Felt

A nonwoven sheet of fibers, made by a combination of mechanical and chemical actions, including pressure, moisture and heat.

Fiber

A flexible material with two relatively small dimensions and one long dimension.

Fiber Metal Felt

A nonwoven media consisting of extremely fine metal fibers (2-20 micron in diameter) which are compressed and sintered. Used to filter molten polymers in the manufacture of fibers and films and hydraulic fluids for use in aerospace filters.

Fiber Migration

Undesirable movement of filter material from the media into the feed stream.

Filter

A term generally applied to a device used to remove solid contaminants from a liquid or gas, or to separate one liquid from another liquid or gas. A filter, as referred to in the filtration industry, is a device which removes contaminants.

Filter Cake

The accumulation of particulate or solids on a surface. Can also mean a pre-coat for filtering.

Filter Life

Measure of a filter's useful service life based on the amount of standard contaminate required to cause differential pressure to increase to an unacceptable level, typically 2-4 times it initial differential pressure or 50-80% drop in initial flow or the downstream measure of unacceptable particulate.

Filtration Efficiency

Expressed as a percent of contaminant introduced to the System. It is die ability of a filter to remove specified con-taminants at a given contaminant concentration under specified test conditions.

Filter Element Life

The span of Operation from clean unit to a predeter-mined pressure drop build up, usually measured in elapsed time.

Filter Medium

The porous material mounted on a plate or frame which separates the solids from the liquids in filtering. Also referred to as filter cloth, filter plate or septum. The material that performs the actual process of filtration.

Filtrate

Filtered fluid which flows out of a Filter.

Filtration

Removal of particles from a fluid by passing the fluid through a permeable material.

Filtration Rating

The diameter of die largest hard spherical particle that will pass through a filter under specified test conditions. This is an indication of the largest opening in the filter medium.

Flocculation

Growing together of minute size particles to form larger ones, called floc's.

Flow Characteristics

The nature of fluid movement as being either turbulent, laminar, constant or of a variable rate, to various degrees.

Flow Decay

Decrease in flow rate caused by filter plugging or clogging.

Flow Rate

The rate at which a product is passed through a vessel or System, generally expressed as gallons per minute, cubic feet per minute, per hour, per day, etc.

Fluid

A liquid or gas which can be filtered by passing through a filter.

G

Gage Pressure

All pressure greater than atmospheric pressure, as read on a pressure gage.

Gel

A semi-solid that is susceptible to pressure deformation. Gels have die habit of sticking to other surfaces.

Glazed Finish

A finishing process that produces a smooth, highly polished surface using extreme temperature. Eliminates filter fiber migration.

Gradient Density

A media of different densities, with one media packed around the center tube and a media of less density around the outside. Both medias are tapered at opposite ends, which allows high flow through the less dense media, and tighter filtration through die dense media.

Gravity Filter

Filter in which the driving force for filtration is provided solely by the head of liquor above the filter medium.

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GLOSSARY

H

Housing

A container for a filter element(s). Also known as a vessel.

Hydraulics

The study of fluids at rest or in motion.

Hydrophilic

Having a strong affinity for or die ability to absorb water.

Hydrophobic

Lacking affinity for or die ability to absorb water.

Hydrometer

An instrument used to measure the density of a liquid.

Hydrostatic test

A test conducted with either air, water or other fluids at a given value over design pressure, to prove the structural integrity of a pressure vessel.

I

Immiscible

Incapable of being mixed; insoluble; the opposite of miscible.

Impregnation

The process of treating a coarse filter medium with resins.

Impurity

Any undesirable material in the fluid**. See contaminant**

Indicator, Differential Pressure

A device that signals the difference in pressure between two points, typically between the upstream and downstream sides of the filter element.

Initial Pressure Drop

A loss in pressure between the inlet and the outlet con-nections upon the start of flow through a vessel using new elements.

In-line Filter

When inlet and outlet connections are positioned at the same height on the opposite sides of a vessel so that an imaginary straight line can be drawn connecting one to die other.

Inlet Pressure

Pressure entering the inlet side of the filter. Also called upstream pressure or line pressure.

Isotropic (symmetric) Membrane

Membrane in which the pore openings are the same diameter throughout the thickness and on both sides of the membrane. Non-directional, their flow characteristics are independent of which side faces the feed stream.

Insoluble

Incapable of being dissolved in a fluid; die opposite of soluble.

L

Laminar Flow

Term synonymous with streamline flow and viscous flow. A flow regime which the flow characteristics are governed mainly by the viscosity of the fluid.

Line Pressure

Inlet pressure, upstream pressure. The pressure in the supply line.

M

Manometer

A U-shaped tube filled with a specific liquid. The difference in height between the liquid in each leg of the tube gives directly the differ-ence in pressure on each leg of the tube. Used to monitor differen-tial pressure.

Matrix

The structural support yarn or twine in wound elements, usually wound in a diamond pattern.

Maximum Operating Pressure

The highest pressure allowed in a system.

Mean Filtration Rating

A measurement of the average size of the pores of the filter media.

Media/ Medium

A porous or slotted mass in a filter element that separates solids from a fluid by a difference in die size of openings, and also through direct containment. A material of con-trolled pore size or mass through which a product is passed in order to remove foreign parti-cles held in suspension, or to repel droplets of coalesced water; or a material with our controlled pore size, such as glass fiber mats, which contribute to filtration, coalescence, or separation of two immiscible liquids.

Media Migration/ Migration

The carry-over of fibers from the filter, separator elements or other filter, into the effluent. The contaminant or media released to pass downstream from the filter element.

Meltblown

A nonwoven manufacturing process for filtration media, where a molten polymer is extruded out of an orifice with high-velocity air to create fine fibers. The fibers can create roll stock or be spray-spun onto porous tubes to create a finished filter.

Membrane

In the filtration industry, the term is used to describe the media through which the liquid stream is to be passed or exchanged. Membranes are usually associated with ion exchanged media such as dialysis, osmosis, diffusion, etc., although Filter paper itself could be classified as a membrane.

GLOSSARY

Mesh

A term referring to a woven filtration medium, typically wire cloth or monofilament woven fabric.

Mesh Count

Number of openings or fractions of openings in a lineal inch of wire cloth or monofilament woven fabric

Micrometer (mm)

A unit of length. A micrometer is a millionth of a meter or 0.000039" (29 millionths of an inch). 25 micrometers are approximately equal to a thousandth of an inch (.001").

Micron

A short unit of length in die metric system, equal to one -millionth of a meter, 10-4 centimeter, 10-3 millimeter, or 0.000039 of an inch. A micron is used as a criterion to evaluate die performance or efficiency of a filter media, or to describe die condition of either die influent or effluent. Usually stated in terms of being either absolute or nominal.

Microfiltration

Used for clarification, sterilization, to detect or analyze bacteria and other organisms and particulate matter. Separation of particles ranging from 0.1µm to 10µm.

Modular

A filter element which has no separate housing of its own, but whose housing is incorporated into the equipment it services. It may also incorporate a suitable enclosure for the filter cavity.

Molarity

The term used to indicate the concentration of dissolved substance in a given solution. The measurement is in moles of dissolved substance per liter of solution.

Monofilament Mesh

A woven fabric with evenly-spaced holes. Each thread is a single filament. The mesh combines excellent strength with little or no fiber migration.

Multifilament Mesh

A type or woven fabric, where each thread consists of many smaller diameter threads twisted together.

Multi-Pass Test

The test used to determine the beta ratio of an element.

N

Newtonian

A liquid which does not change in viscosity when faced with a change in rate of shear, agitation or flow rate.

Nominal Rating

An arbitrary value determined by die filter manufacturer and expressed in terms of percentage retention by weight of a specified contaminant (usually glass beads) of a given size.

NPT

National Pipe Thread standard.

O

Open Area Ratio

The ratio of pore area of a filter medium, expressed as a percent of total area.

Operating Pressure

The normal pressure at which a system operates.

Osmosis

Diffusion of a liquid through a semi-permeable membrane from a dilute solution into a more concentrated solution, thus tending to equalize the concentration of each side of the membrane.

Outlet Pressure

Downstream pressure. Pressure exiting the outlet side of the filter.

P

Packed Bed

Discrete particles such as sand, gravel, anthracite, fabricated rings or saddles, assembled in a confined space as a filtration medium for liquids and gases.

Paper

Filter medium used on filter elements. A general term applied to resin bonded cellulose.

Particle Count

The practice of counting particles of solid matter in groups based on relative size. Frequently used in engineering, a fil-ter to a specific task, or to evaluate the performance of a filter under specific operating conditions.

Particle Size Distribution

A tabulation resulting from a particle count of solids grouped by specified micron sizes to determine the condition of either the influent or effluent stream.

Particulate

Any solid or liquid material in the atmosphere.

Permeability

The relationship of flow per unit area to differential pressure across the filter medium.

Permeate

The fluid which passes through a membrane, a term usually used with ultrafiltration or R/O.

pH

The value indicating the die acidity or alkalinity of a material. It is die negative logarithm of the effective hydrogen ion concentration. A pH of 7.0 is neutral, less than 7.0 is acidic, and greater than 7.0 is considered a base.

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GLOSSARY

Pleated

A filter element whose medium consists of a series of uniform folds and has the geometric shape of a cylinder, cone, disc, plate, etc.

Plugged

The condition of a Filter when it has collected its full capacity of contaminants and will not pass any more fluid.

Polypropylene

A thermoplastic polymeric material, resistant to a broad range of chemicals. When used as a membrane, polypropylene is hydrophobic.

Pore

A small channel or opening in a filter medium which allows fluid to pass.

Pore Size Distribution

The ratio of the number of holes of a given size to the total number of holes per unit area expressed as a percent and as a function of hole size

Porosity

The property of a solid which contains many minute channels or open spaces. The fraction is a percentage of the total volume occupied by these channels or spaces. Also describes a filter media which may have larger pores than other media.

Pre-Filter

A filter for removing gross contaminate before the prod-uct stream enters die separator.

Pressure

The force exerted per unit area by a fluid, typically measured in pounds per square inch (psi).

Pressure, absolute

Gage pressure plus 14.7 psi.

Pressure, atmospheric

The force exerted by die atmosphere at sea level, which is equivalent to 14.7 psi.

Pressure Drop

The difference in pressure between two points, generally at die inlet and outlet of a filter or a separator/filter. Measured in pounds per square inch gage, or inches of mercury See delta P.

Pretreatment

Changing the properties of a liquid-solid mixture by physical or chemical means to improve its filterability.

PSI

Pounds per square inch

PSIA

Pounds per square inch absolute.

PSID

Pound per square inch differential.

PSIG

Pounds per square inch gage.

Pulsing Backflow

Intermittent, on-off blowing with or without cake discharge.

Q

Quiscent

State of rest of a body. In entrainment separation, the body would be a liquid. Also used to describe a sump containing evacuated liquids or solids.

R

Rated Flow

The optimum flow rate for which a filter is designed.

Residue

Solids deposited upon the filter medium during filtration in sufficient thickness to be removed in sizeable pieces. Sometimes referred to as a cake or discharge solids.

Residual Dirt Capacity

The dirt capacity remaining in a service loaded filter element after use, but before cleaning, measured under the same conditions as the dirt capacity of a new filter element.

Retention

Ability of a filter to retain particles suspended in a gas or liquid. A percentage of particles originally present.

Reusable Filters

Filters that are washed or cleaned of contaminate, either in-situ or off-line, for additional uses.

Reverse Osmosis (RO)

A water treatment method whereby water is forced through a semi-permeable membrane which filters out impurities, such as salt (NaCl) from seawater.

S

S.S.

Abbreviation for stainless steel.

SAE

The Society of Automotive Engineers.

SAE Number

A classification of lubricating oils for either crankcases or transmissions, in terms of viscosity, as standardized by the Society of Automotive Engineers.

Sand Filter

Filter composed of layers of sand, graded in particle size, so that the courser particles face the unfiltered flow.

GLOSSARY

Saybolt Seconds Universal (SSU)

Units of viscosity as measured by observing the time in seconds required for 60 ml. of a fluid to drain through a tubular orifice 0.483 inches long by 0.0695 inches in diameter at stated conditions of temperature and pressure.

Scavenger

A filter or element in the bottom of a filter that recovers the liquid heel that remains in a filter tank at the end of a cycle.

Screen

Often a flat filter from wire cloth mesh or monofilament fabric filter used to classify particles of a certain size to “to screen out particles”. Can also cover an element for protection; also used as a basic material for a separator element of basket in a basket strainer.

Screw Base

Element base which is threaded to mount by screwing the cartridge onto the cartridge adaptor.

Scrim

An open weave textile or nonwoven fabric used as a strengthening member incorporated within the matrix of a filtration medium to provide increased tensile or tear properties.

Scrubber

Any device in which a contaminant, solid or gaseous, is removed from a gas stream by impacting it with liquid droplets.

SCFD

Standard cubic feet per day.

SCFH

Standard cubic feet per hour.

SCFM

Standard cubic feet per minute.

Sedimentation

Action of settling of suspended solids.

Self-Cleaning

Filtering device designed to clean itself by the use of a blowdown or backwash action.

Separation

The action of separating solids or liquids from fluids. May be accomplished by impingement, filtration or by coalescing.

Separator/Filter

A vessel which removes solids and entrained liquids from another liquid or gas, using some combination of a baffle and/or coalescer, filter or separator element. A vessel may be single stage, two stage, or single or two stage with pre--filter section for gross solids removal. The usual application is the removal of water from gas or another immisci-ble liquid. General reference to term applies die equip-ment capable of both Separation and filtration to specific degrees of efficiencies.

Service Life

The length of time an element operates before reaching the maximum allowable pressure drop.

Shell

The outer wall of a vessel, usually referred to as the body.

Sieve

A screen filter with straight-though capillary pores and identical dimension.

Singed Finish

The process of removing fibers from a cartridge or fabric by passing over a flame or another heat source. The process creates a smooth finish that inhibits fiber migration.

Sintered

Media, usually metallic, that is processed to cause diffusion bonds at all contacting points, retaining openings for the passage of filtrate.

Skid Mounted

When one or more vessels with pumps and motors are mounted on a portable platform.

Sludge

Dirt, carbon, water and chemical compounds found in oils.

S.O.E.

Single Open Ended.

Solids

A mass or matter contained in a stream which is considered undesirable and should be removed.

Solute

Liquid which has passed through a filter. Also referred to as discharge liquor, effluent, filtrate, mother liquor or strong liquor.

Solution

A single phase combination of liquid and non-liquid substances, or two or more liquids.

Specific Gravity

The ratio of a substance's weight to that of some standard substance (water for liquids and solids, air or hydrogen for gases). This is by definition a unit less value.

Stream

Term sometimes used and synonymous with the words product, liquid, air, gas, fluid etc. in speaking of any matter processed by filtration or separation equipment.

String Wound

An inexpensive filter consisting of textile roving (yarn) wrapped around a center core to form a filter medium and filter cartridge (element).

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GLOSSARY

Stoke's Law

A physical law, which approximates the viscosity of a particle falling under the action of gravity through a fluid. Friction drag controls the rate of fall at a constant velocity known as the terminal or free-setting velocity.

Substrate

Substance or basic material as a filter media or to which a deposit is added.

Sump

Collecting area of a housing located downstream typically from a coalescer element, in which coalesced droplets of the dispersed phase are deposited; also called water leg. May also be used to collect solids in applications where gross solids are present in a stream; also called mud sump.

Supernatant

Liquid above settled solids.

Surface area

The total area of an element that is exposed to an approaching flow.

Surface Filter

Filter medium that retains particles wholly on the surface and not in the depth of the cross-section of a filter medium e.g. plain weave wire cloth and monofilament woven fabrics or membrane.

Surface Filtration

A process that traps contaminants larger than the pore size on the top surface of the filter, usually a membrane, wire cloth or monofilament fabric. Contaminants smaller than the specified pore size may pass through the medium or may be captured within the medium by some other mechanism, such as surface affinity, triboelectric potential or other means, which prevents particle penetration.

Surge

Peak system pressure measured as a function of restricting or blocking fluid flow.

Suspension

Solids or liquids that are held in other liquids.

Suspended Solids

Non-settled particles in a fluid.

Swing Bolt

Type of housing head closure which reduces service time. Opposite of thru-blot flange where studs are used, such as with ASA type flanges.

System Silting

The agglomeration and settling of ultra-fine particles in a fluid system.

T

Teflon (PTFE)

Highly durable and resistant to range of temperatures and chemicals. PTFE is hydrophobic. Polytetrafluoroethylene is better known as Teflon.

T-Type Filter

A filter in which the inlet and outlet ports are located at one end of the filter with the major axes of its ports in a straight line and with the filter element axis perpendicular to this line.

Tensile Strength

The maximum stress a material that is subjected to a stretching bad can withstand, without tearing.

Tensiometer

Device used to read the surface tension of a liquid or to reading the interfacial tension between two immiscible liquids.

Terminal Pressure

Pressure drop across the unit at the time system is shut down or when the maximum allowable pressure drop is reached.

Terminal Velocity

Steady velocity achieved by a falling particle when gravitational forces are balanced by viscous forces.

Thermal Lockout

A device that prevents the actuation of the signal button in a differential pressure indicator below a preset temperature. Used to prevent false indicator actuations during periods of high fluid viscosity such as experienced in starting a cold system.

Thixotropic

A liquid which shows a marked reduction in viscosity as the rate of shear, agitation or flow rate is increased.

Three-Stage Filter Separators

Liquid prefilter coalescer separators containing three kinds or types of replaceable elements.

Throughput

The amount of solution which will pass through a filter prior to plugging.

Tipping Pan Filter

Process industry equipment which collects particulate from a liquid stream on a screen over a vacuum forming a dewatered cake and discharging the accumulation by tipping the collection screens.

Tortuosity

The ratio of the average effective flow path length to the minimum theoretical flow path length (thickness) of a filter medium.

True Density

Mass of a particle divided by its volume, pores etc. being excluded from the volume calculation.

Turbidimeter

An instrument for measurement of turbidity, in which a standard suspension usually is used for reference.

Turbidity

A cloudy or hazy appearance in a naturally clear liquid, caused by the suspension of colloidal liquid droplets or fine solids.

GLOSSARY

Turbulent Flow

Flow regime in which the flow characteristics are governed mainly by the inertia of the fluid. Turbulent flow in ducts is associated with high Reynolds Number (Re). It also gives rise to high drag.

Turn-Over

The number of times the contents of die system pass through a filter per unit of time.

U

Ultra Filter

A type of membrane used to remove very fine suspended submicronic particles as well as some dissolved solids.

Uniformity Coefficient

Separation factor applied to the sizing of the sand used in water filtration plants.

Uniformity Of Feed

Uniformity of the mixture of the solids in the feed liquid.

Unloading

The release downstream of trapped contaminant, due to a change in flow rate, mechanical shock and/or vibration, or as excessive pressure builds up, or due to a media failure.

Upstream Side

The feed side of the filter. Fluid that has not yet entered the filter.

Useful Life

Determined when contamination causes a filter or system to have an adverse (lower) flow rate, low efficiency or high differential pressure, providing for an inefficient operation.

V

Vacuum

A reference to a pressure that measures below atmospheric pressure.

Vent Filters

Filters that allow the passage of air while restricting the flow of fluid; typically containing low micron rated microporous membrane media. Common in medical devices and pharmaceutical tanks.

Vessel

A container in which the filtration process occurs, through a filter media such as cartridges or bags that are installed inside.

Viscosity

The degree of fluidity; also, die property of a fluid's molecular structure by virtue of which they resist flow, die internal flow resistance of a fluid; or, die resistance of flow exhibited by a liquid resulting from die combined effects of cohesion and adhesion. The units of measurement are die poise and die stoke. A liquid has die viscosity of one poise if a force of one dyne per square centimeter causes two parallel liquid surfaces one square centimeter in area and one centimeter apart to move past each other at a rate of one centimeter per second. There are a great many crude and empirical methods for measuring viscosity, which generally involve measurements for die time of flow or movement of a ball, ring or other object in a specially shaped or sized apparatus.

Void Volume

The amount of open or empty area across the full spectrum of a material or substance. A term often used to describe the amount of porosity in a filter medium.

Volumetric Flow Rate

Fluid flow expressed as a volume flowing per unit of time ($cc.^3$/sec., ft^3/min., etc.)

W

Wastewater

Effluent water carried downstream from a filtration or separation process.

Water Breakthrough Test (WBT)

An integrity test for hydrophobic filters or filter medium in which the resistance to water flow is overcome by a specific pressure such that water will flow through a specific pore size of the filter or filter medium. Also called Water Intrusion Test.

Water Flow/Flux

Measure of the amount of water that flows through a filter, a variable of time, the degree of contamination, differential pressure, total porosity and filter area.

Water head

The height of water in a column. Provides a defined amount of pressure on a surface.

Water Leg

Area of housing for collection of water.

Weight Of Solids

Measure of solid particulate matter contained in a fluid sample.

Wet Cast Membrane

A process to manufacture microporous membranes, typically from thermoplastic materials, solvents and non-solvents in the formation of a microporous membrane. 75 to 80% of all microporous membranes manufactured use this process.

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GLOSSARY

Wet Strength

Strength of a medium when saturated with water.

Wetting Agent

A surfactant added to a filter medium to insure complete intrusion (wetting) by a high surface tension fluid such as water.

Wire Cloth

Woven fabric from metal wire used as a screen, surface filter or media support. Often used in sifting, belting, hydraulic filtration etc. Most common wire used is stainless steel.

Wound

A filter medium comprised of two or more layers of helical wraps of a continuous strand or filament in a predetermined pattern.

Woven

A Filter medium made from strands of fiber, thread or wire, inter-laced into a cloth through the action of a loom.

Y

Yoke

End cap used to hold a cartridge in place.

Z

Zeta Potential

The potential across the diffuse layer of ions surrounding a charged colloidal particle.

CONTACT US

HEADQUARTERS

649 Enfield Road
Burlington, Ontario
L7T 2X9, Canada

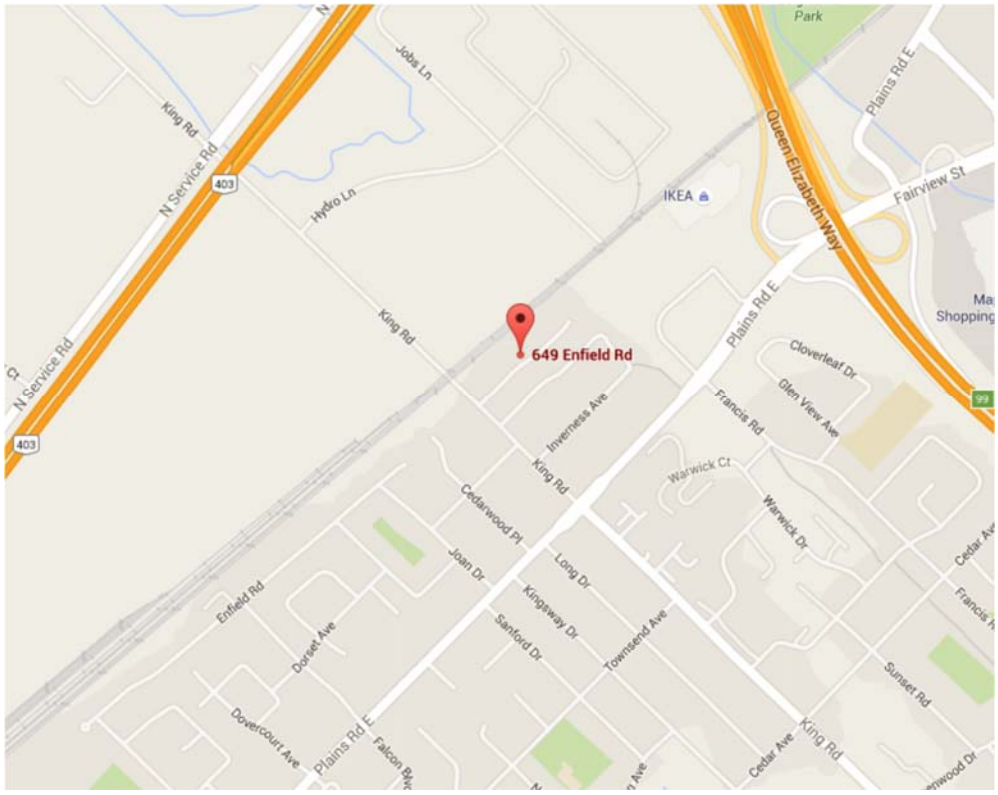
***TOLL FREE*: 1-877-352-2301**

***TEL*: 905-637-3030**

***FAX*: 905-637-3031**

***WEBSITE*: www.filtersolutions.com**

***EMAIL*: info@filtersolutions.com**



For any questions or inquiries, please contact FSI at the above contact information.

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