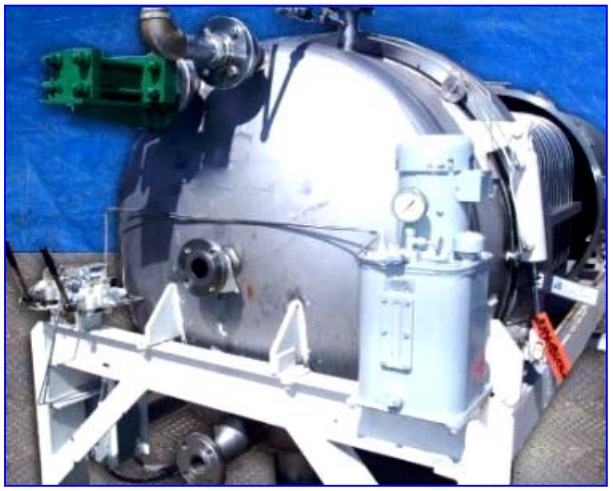
Durco Horizontal Pressure Leaf Filtration System	
Mfg: Durco	**Model: 48 DHC 330**
Stock No. HDBA101.40	**Serial No. E27894**

Durco Horizontal Pressure Leaf Filtration System. Model: 48 DHC 330. S/N: E27894. Nat'l Bd: 3094. 304 Stainless steel. (20) Leaf filters. Filtration area: 330 sq. ft. Cake capacity: 27 cu. ft. Original design flow: 100 gpm. Shell design pressure: 100 psig. Shell test pressure: 150 psig. Max design temp.: 80°F. Marathon electric hydraulic pump and motor. Vibco vibrator uses air pressure of 80 psig @ 23-30 scfm. Vibrator is regulated, filtered, and lubricated by Bikini FRL. Unit discharges dry cake media. Closure achieved through hydraulic hand pump. Overall dimensions: 17 ft. L x 60 in. W x 90 in. H. The horizontal pressure leaf filter can be advageous when the operation is intermittent. This pressure leaf filter may be designed so that the leaves and septa are assembled as a unit outside the filter, or with rotating leaves in the filter for discharge by a secondary sluice. In this horizontal pressure leaf filter, a filter cover fits over a frame (leaf) in a pressure vessel. The chamber is filled with slurry and pressure forces liquid through the cloth, into the leaf, and out of the drain port. For cleaning, sluicing is introduced with the vibrator shaking the cake off the leaves. No filter papers or filter cloths needed. The leaves have a middle perforated plate with a very finely meshed wire cloth riveted together. This type filter is usually part of a polishing operation used to filter what was missed upstream in a previous filtering process. Typical applications include food (sugar, salt), alumina (green liquor), chemicals, and pharmaceuticals.




NAT'L BD 3094
FILTRATION SYSTEMS DIV.
100 P.S.I. AT 80
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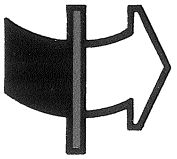
P.S.I. AT °F.
3094-1700 S.O.

Filtration



The basic objective in solids/liquid separation is efficient particulate removal. There are a number of methods of achieving this, one method being the pressure leaf filter. This type of equipment is commonly termed cake filtration due to the fact that the solids being removed form a cake. The cake, in fact, acts as a filter medium. The filter leaves are mainly there to retain the cake, as well as to give sufficient cross sectional drainage area to enable the filtered liquid to be evacuated as quickly as possible.

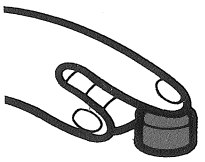
The ability of a specific liquid containing suspended solids to filter through a septum for the removal of solids is called filterability. Factors which affect filterability include: pressure, cake compressibility, specific cake resistance and viscosity.

Regardless of shape, a pressure leaf filter is a closed pressure vessel containing a filter septum. With vertical leaf designs the solids are deposited on both sides of the filter leaves. The two faces of each leaf, therefore, comprise the effective filtration area. The horizontal leaf design only uses the upper face for filtration.

Depending on the application, a precoat and/or body feed may be used to increase the filterability of the cake. This material is termed a filter aid and is available in many grades for specific applications.

Due to the variety of applications, lab and/or "on-site" pilot testing are advisable. FSD has a variety of pilot filters and a complete lab to thoroughly analyze process fluids and test for filterability.

Automation



With the increasing trend toward automation of process equipment, FSD initialed a development program to design automated systems for filtration equipment supplied to our customers. The range of industries to which FSD has supplied systems include the brewing, chemical, food, metallurgical, petrochemical industries and also waste treatment plants.

FSD automated systems are designed for each specific requirement and may be semi-automatic or fully automatic.

The semi-automated systems are designed for each specific requirement and may be semi-automatic or fully automatic.

The semi-automatic system has a central control panel where the sequence steps are activated by the operator. The various pump drives, agitator drives, valves, etc., are automatically operated to the required mode for the process step.

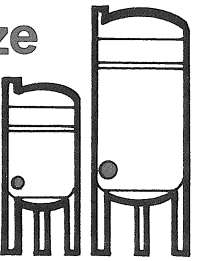
Fully automated systems are designed to the degree of sophistication required by the customer. Either step drum programmers or programmable controllers are used to insure that the required process steps are carried out automatically. Level controls, pressure differential switches, limit switches, etc., provide signals to initiate the sequencing device. Flow rate and turbidity may, if required, be monitored.

Various options are available such as main panel graphics, manual overrides, alarms, remote terminal boxes, station wiring, etc. While FSD has standardized on certain manufacturers equipment, we will supply equipment specified by customers to enable them to standardize within their plant.

Completely piped and wired, skid mounted systems are available to insure minimum installation time.

In the continental United States and Canada we provide start-up services and also instruct plant operators in the functioning and maintenance of the system.

Select the "right" size



Filter sizing

Filters are rated for the most part in square feet of active filtration area. Exactly how much area is needed depends on a number of things:

A. Flow

Each square foot of area will filter a slurry at a certain rate—GPH (m^3/h). This rate will vary for each slurry and will depend on the type of solids in suspension, the viscosity of the liquid, the filter media, the pressure available and many other variables.

If the slurry is already being filtered, data from the present operation is a good guide for the filtration rate to be expected. Our case history file provides this information for many customers who are not now filtering. In the case of new or untried applications, laboratory or pilot scale filtration studies are in order. Rates range from 6 to 120 gph/ft.^{2} (.244 to 4.889 $m^3/h/m^2$). A good average for slurries with non-sliming solids and low viscosity would be 20-30 gph/ft.^{2} (.815 to 1.222 $m^3/h/m^2$). Once filtration rate is determined, calculate the required area as follows:

$$\frac{\text{Flow required through filter —GPH } (m^3/h)}{\text{Filtration rate —GPH/sq. ft. } (m^3/h/m^2)} = \text{Area, ft.}^2\ (m^2)$$

However, this may not be the correct filter size! For the right selection, also consider:

B. Cake load

A filter large enough to handle the flow might fill up with cake too quickly; therefore, sizing must be checked based on the desired cycle length.

If the volume of cake to be filtered out during a single cycle, and the maximum cake thickness that can be built up within normal filtration pressures is known, the required area can be calculated by:

$$\frac{\text{Total ft.}^3\ (m^3)\text{ cake per cycle}}{\text{Cake thickness—ft. } (m)} = \text{ft.}^2\ (m^2)\text{ of area}$$

(continued on next page)

Past experience or test filtration are the best guides. At times, it will be more convenient to make this calculation based on gallons throughput per sq. ft. of area as follows:

$$\frac{\text{Gallons } (m^3) \text{ to be filtered per cycle}}{\text{Throughput} - \text{gal}/ft.^2\ (m^3/m^2)^*} = ft.^2\ (m)\ \text{of area}$$

*Within normal filtration pressures.

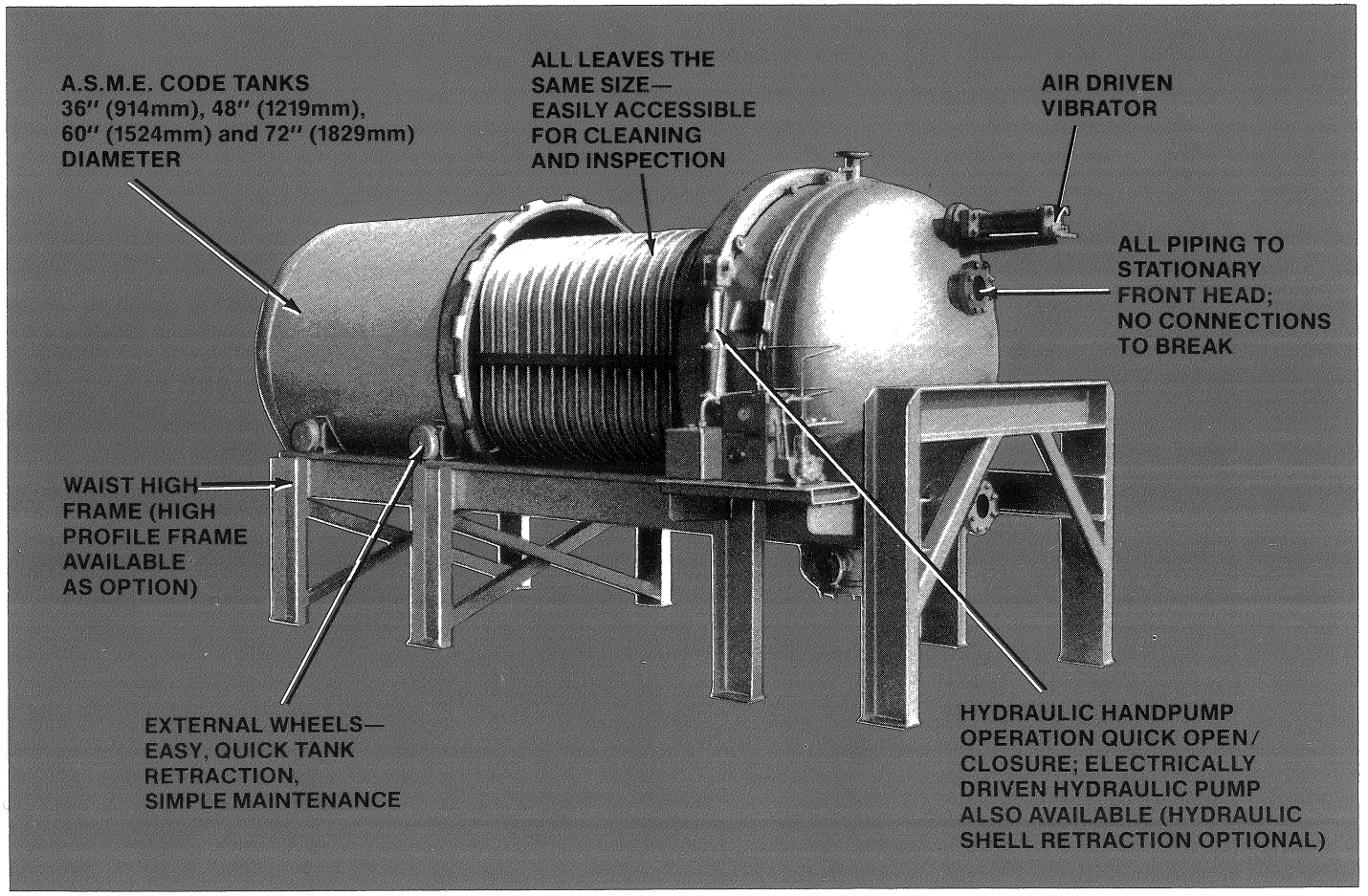
The calculation (A or B) which gives the largest area requirement is the one to be used.

FSD pressure leaf filters

TYPES AND AVAILABLE PRINCIPAL FEATURES		VERTICAL TANK				HORIZONTAL TANK	
		TYPE V	TYPE DV	TYPE VH	TYPE N	TYPE HC	TYPE DHC
Maximum size filtration area ft²		950	429	206	72 DIA	1600	1600
Maximum cake volume ft³		*39	36	17	2.3	133	133
Tank closure	Bolted	•	•	•	•	•	•
	Quick open/close	•	•		•	•	•
	Top or bottom opening		•		•		
Filter medium	Metal screen	•	•	•	•	•	•
	Fabric	•		•	•	•	
	Paper			•	•		
Feed arrangement	Baffled inlet	•	•		•	•	•
	Internal distribution	•	•	•	•	•	•
Filtrate arrangement	Common manifold	•	•	•		•	•
	External manifold	•	•				
	Sectionalized manifold					•	•
	Other				•		
Top or front head	Dished	•	•	•	•	•	•
	Flat				•		
Bottom or rear head	Dished	•	•	•	•	•	•
	Cone	•	•	•	•		
	Flat				•		
Top or bottom head lifting device	Counterweight	•	•		•		
	Toggle & lever	•	•		•		
	Lift lug			•			
	Hydraulic ram	•	•		•		
Cake discharge Dry	Vibrator (air)		•				•
	Manual		•	•	•		•
Cake discharge Wet	Oscillating sluice	•			•	•	
	Rotating sluice			•			
	Hydro jet sluice	•			•	•	
ASME coded		•	•	•	•	•	•
Jacket-Steam/Water/Cooling		•	•	•	•	•	•

*Based on one half inch—All others based on one inch cake thickness

Dry cake discharge horizontal (TYPE DHC) tank filters



- Non-metallic linings available
- Automatic operation
- Large filtration area and solids holding capacity
- Hydraulic quick opening closure and shell retraction minimizes down time for solids removal.
- Dry solids removal can eliminate solids disposal problems.

MODEL NUMBER	AREA ALLOY SCREEN	TANK DIA.	NO. OF LEAVES	LEAF* SPACING	GROSS TANK VOLUME	SHIPPING WEIGHT APPROX.
	ft^2 (m^2)	in (mm)		in (mm)	gal (m^3)	lbs (kg)
36DHC47	46.8 (4.35)	36 (914)	6	4 (102)	210 (.79)	2250 (1021)
36DHC62	62.4 (5.79)	36 (914)	8	3 (76)	210 (.79)	2350 (1066)
36DHC78	78.0 (7.24)	36 (914)	10	4 (102)	278 (1.05)	2500 (1134)
36DHC101	101.4 (9.42)	36 (914)	13	3 (76)	278 (1.05)	2650 (1202)
48DHC120	120 (11.14)	48 (1219)	8	4 (102)	461 (1.74)	4100 (1860)
48DHC165	165 (15.33)	48 (1219)	11	3 (76)	461 (1.74)	4280 (1942)
48DHC195	195 (18.11)	48 (1219)	13	4 (102)	584 (2.21)	4380 (1987)
48DHC225	225 (20.90)	48 (1219)	15	3 (76)	584 (2.21)	4550 (2064)
60DHC304	303.6 (28.20)	60 (1524)	12	4 (102)	909 (3.44)	4645 (2130)
60DHC354	354.2 (32.90)	60 (1524)	14	3 (76)	909 (3.44)	4750 (2155)
60DHC405	404.8 (37.60)	60 (1524)	16	4 (102)	1100 (4.16)	4895 (2220)
60DHC506	506 (47.00)	60 (1524)	20	3 (76)	1100 (4.16)	5050 (2291)
72DHC613	612.8 (56.93)	72 (1829)	16	4 (102)	1500 (5.68)	5300 (2405)
72DHC843	842.6 (78.27)	72 (1829)	22	3 (76)	1550 (5.87)	5825 (2643)
72DHC996	995.8 (92.50)	72 (1829)	26	3 (76)	1700 (6.43)	6200 (2813)
72DHC1302	1302.2 (120.97)	72 (1829)	34	3 (76)	2100 (7.95)	7000 (3176)

* Based on a maximum cake thickness of 1 inch (25 mm) for 3 inch spacing and 1½ inch (38 mm) for 4 inch spacing.

Note: Models given above are typical, intermediate sizes are available.

Leaf Designs

Over its history, FSD has been in the forefront of development in the design and manufacture of filter leaves to suit each application. There are three basic criteria in the construction of filter leaves. First, sufficient drainage area to insure the quickest filtration rate for the given application. Secondly, rugged construction to insure years of satisfactory service. And lastly, compatibility of materials of construction with process liquid and / or solids at the operating temperature.

Additional consideration should be given to the"O" ring seal to insure compatibility with the temperature of the process liquid

Available leaf constructions

3-ply, 5-ply and 7-ply design.

Materials of construction

Carbon steel, stainless steel 304, 316, 304 ELC, 316 ELC, Titanium, Hastelloy, Incolloy, Polypropylene and Rubber Coated Carbon Steel

Type of constructions

Spotwelded, Riveted, Bolted, and Laser Welded

Frame

Keyhold, Bar, Capped, U-Channel.

Drainage Member

4 x 4 x 063, 4 x 4 x 080 mesh, tubular slit, DurcoTex, Solid Polypropylene.

Intermediate Member

Perforated plate, polypro 4 x 4 060, 8 x 8 mesh.

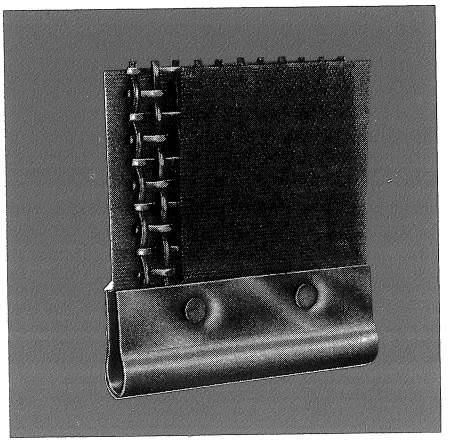
Surface members

FSD standard is 24 x 110 PDW (Plain Dutch Weave); most commercially woven metals can be supplied; bags from most natural and man made fibers.

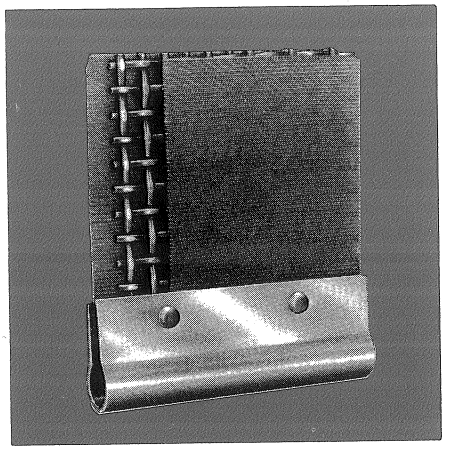
Nozzles

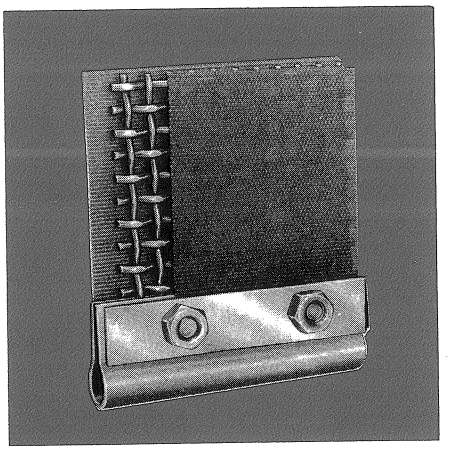
Machined 316 S.S. (standard), Polypropylene, and all commercially available metals.

FSD is able to offer most types of leaf construction for various pressure leaf filters.

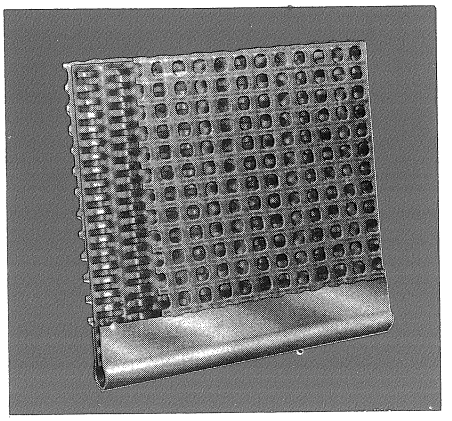


1. This construction is the most economical metalic leaf manufactured by FSD. It has a keyhole frame, 4 X 4 mesh drainage rnember with 24 X 110 P.D.W. screen. The whole system is spotwelded together.

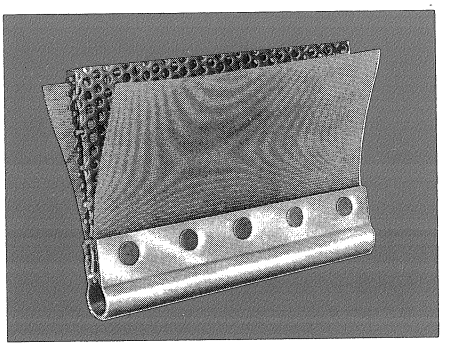




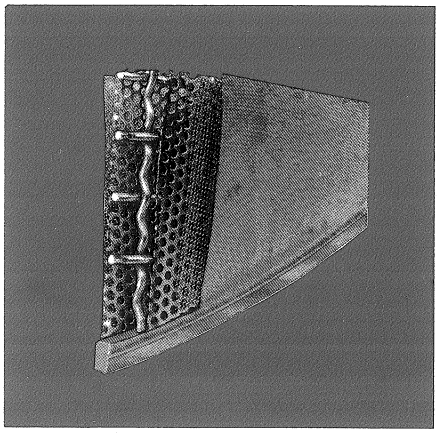
2. and 3. Same as No. 1 except that No. 2 has riveted construction and No. 3 has bolted construction to facilitate screen replacement.



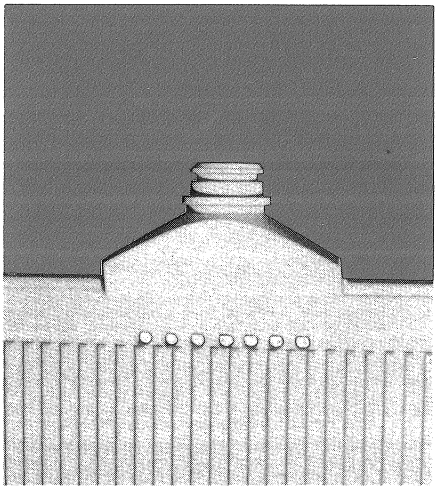
4. This leaf is our standard construction for sluicing filters. The leaf comprises a keyhole frame with a tubular slit drainage member welded to the frame. Polypropylene netting is attached to the drainage member and the whole leaf covered with a fabric bag (not shown for clarity).



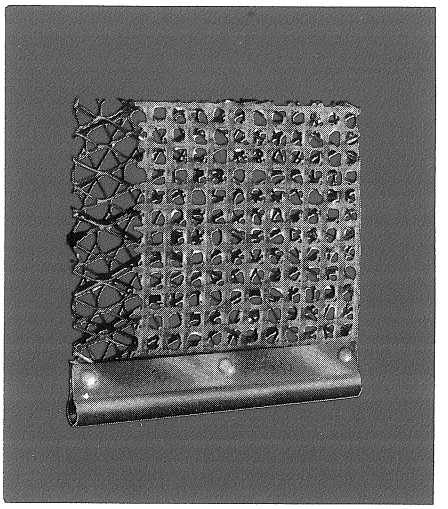
5. Heavier construction than 1 through 4. An intermediate screen of perforated plate has been added to give a 5 ply construction.



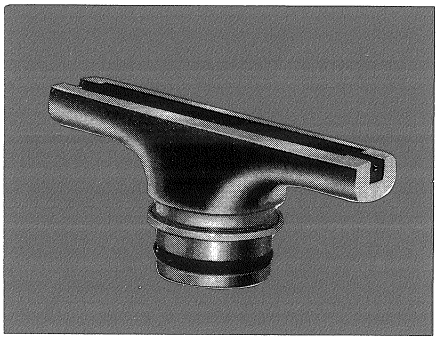
6. A circular leaf of 7 ply construction developed for the brewing industry. Using a bar frame with heavy duty 1 X 1 drainage member, perforated plate and 16 mesh interrnediate members with a 24 X 128 surface screen (60 micron nom.). The surface screen is laser welded to the bar frame by a method developed by FSD (patent applied for)



7. This shows nozzle outlet area of typical polypropylene leaf. This leaf, which is only used on a sluicing filter, requires a fabric bag while in operation. The grade of polypropylene used is the best available and is inert to most chemicals. There is, however, a temperature limitation of 194° F (90° C).



8. Titanium leaf – this construction is the choice for highly corrosive applications. It is strong, but light in weight. The design incorporates a keyhole frame with a 2 x 1 and two $1^{1}/_{4}$ x $^{1}/_{2}$ expanded metal screens for drainage. A polypropylene netting is then attached to the screen prior to a bag being fitted.



9. Typical outlet nozzle. Standard material is 316 stainless steel which is investment cast then machined to very close tolerances. A positive seal is obtained by the use of an "o" ring.

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