Binghamton Plastics

DOVER ELECTRONICS COMPANY

DEM-East Facility

ON-SITE GROUNDWATER TREATMENT SYSTEM ENGINEERING REPORT

Preliminary Submittal

Project No. 6691

April 1993

STETSON-HARZA
Architects/Engineers
181 Genesee Street
Utica, NY 13501

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1.0 INTRODUCTION

1.1 General

The Dover Electronics Facility located on Conklin Avenue in Binghamton, New York known as DEM - East is the site for a proposed on-site groundwater pump and treat system (see Figure 1.1).

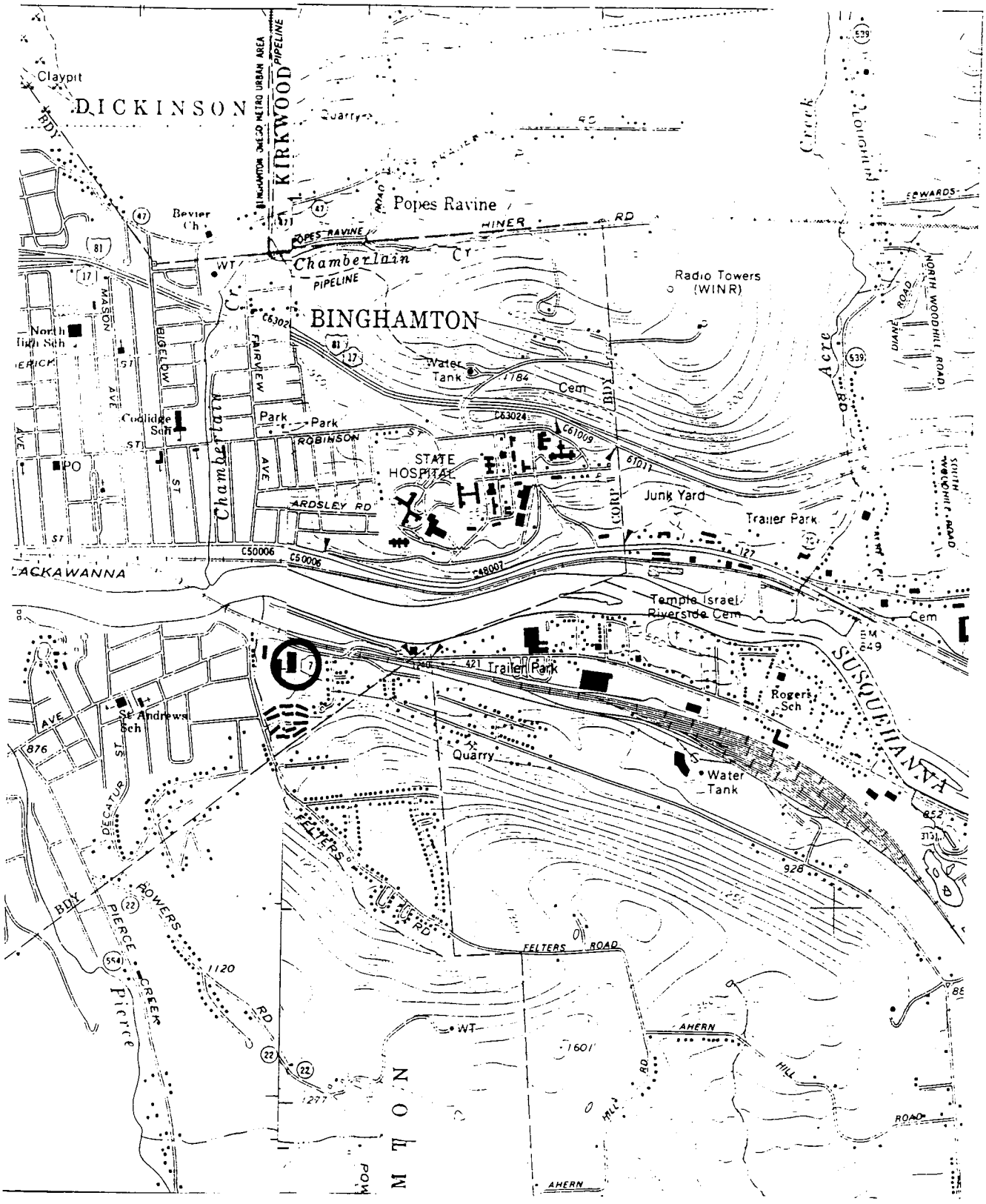
Groundwater contamination at this site has been attributed to leakage from a 1,000 gallon underground storage tank which was left in place by Binghamton Plastics, the previous owner of the facility. Removed in 1986, the tank was used as a hydraulic oil reservoir and contained 650 gallons of oil contaminated with 1,1,1 trichloroethane and trichloroethylene.

In the area of the tank excavation, monitoring well DMW1 reveals a perched water table with a yield of about 0.3 gal/min. Contaminated soil and past leakage directly into this water bearing zone has resulted in concentrations exceeding 90 ppm of total volatile organic compounds, the most toxic compound being trichloroethylene.

The proposed remedial action for this site includes utilizing an existing well DMW1 for groundwater extraction. Groundwater will be pumped from the well with a pneumatic pump to the northeast corner of the building where it will be treated and discharged to the Binghamton-Johnson City Sanitary Sewer System using an existing drain.

1.2 Purpose

This report assembles basic data and assumptions and presents calculations regarding the design of proposed pump and treat system.



Stetson-Harza A HARZA COMPANY 181 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8080	DATE DRAWN NO. 6519	DOVER ELECTRONICS COMPANY **DEM - East** **Location Map**	**FIG. 1.1**

2.0 PUMP SYSTEM

2.1 General

The pump system will consist of stainless steel, positive displacement, gas drive pump. A compressed air charge will force the water contained in the interior of the pump to northeast corner of the building where the treatment system will be located. A fully pneumatic controller will be used to set discharge and refill times. A bubbler probe will be placed in the well to shut off the system when liquid levels fall to 6 inches above the pneumatic pump inlet.

2.2 Pneumatic Cycle Controller

The controller is attached between the compressed air source and the well closure. Its function is to regulate the flow of compressed air to the pump.

The controller essentially has two systems. One system controls the necessary cycling of the drive air from pressure (discharge) to vent (refill). The other regulates the pressure of the drive air.

2.3 Flow Rate

Flow rate is dependent on discharge and vent time adjustments. When properly adjusted, the pump will switch to discharge mode when it is completely full. Since the well yield is expected to be approximately 0.3 gpm, the pump will be adjusted to run at .5 gpm to 1 gpm for 10 to 15 seconds with a 30 to 40 second fill time in between.

Adjustments can be made after installation by noting the actual time the water flows between cycles. The pump discharge time should be set at this duration. If this duration varies and begins to decrease, then the refill time should be increased.

The pump will be capable of handling flow rates from 10 ml/min. to 18 gpm.

2.4 Line Pressures

The output air pressure from the compressor will need to be set at 20 to 30 psi. Approximately 1 psi of air pressure is needed for each 2 feet of lift. Headloss along the pipe route (approximately 150 feet) due to friction would be about 15 feet as shown below by the Darcy Formula:

$$s = fv^2/(2\ Dg) = .10\ ft/ft$$

v = pipe velocity = .75 gpm = .1 ft^3/min. = 2.2 ft/second*
f = friction factor = .041**

d = pipe diameter = .0313 ft.
g = gravitational acceleration = 32.2 ft/sec^2

*3/8 inch I.D.
**Reynolds Number = 4900, e/d = .00016

Total Head Loss = L(s) = 150 feet (.10) = 15 ft.

The line pressure at the inlet of the bag filter given the setting ranges outlined previously will be from 3 to 7 psi.

3.0 TREATMENT SYSTEM

3.1 General

The treatment system will consist of two 165 pound to 175 pound carbon adsorber units placed in series. Groundwater will be filtered prior to entering the carbon units by a bag filter. It was noted during development and sampling of DMW1 that fine gray silt was continuously entering the well screen.

The treatment system will be placed in the existing compressor room in the northeast corner of the building. Water will exit the second carbon unit into a sump where an electric sump pump will force the water into an existing discharge line about 5 feet above the sump.

Sampling ports will be provided after the bag filter and in between the two carbon units. Groundwater in the sump can be tested for compliance with proposed pretreatment limits.

3.2 Pollutant Concentrations

Pollutant concentrations in the groundwater have been based on two sampling rounds, which are summarized in Table 3.1.

TABLE 3.1

POLLUTANT DETECTED IN GROUNDWATER AT MONITORING WELL DMW1

Pollutant	Groundwater Conc. (ug/l)* 8/29/91	Groundwater Conc. (ug/l)** 8/13/92
Cloroethane	194	ND
Chloroform	7	ND
Chloromethane	22	ND
1,1-dichloroethane	2,450	2,720
1,1-dichloroethylene	3,100	1,650
Trans-1, 2-dichloroethylene	505	1,650
Tetrachloroethylene	149	ND
1,1,1-trichloroethane	17,500	32,700
1,1,2-trichloroethane	12	ND
Trichloroethylene	31,000	35,200

Pollutant	Groundwater Conc. (ug/l)* 8/29/91	Groundwater Conc. (ug/l)** 8/13/92
Vinyl chloride	400	ND
Cis-1,2-dichloroethylene	30,300	17,500
Ethylbenzene	7	ND
Toluene	64	ND
Xylenes (m, o, & p)	21	ND
Bis (2-ethylhexyl) phthalate	14	DNT
Di-n-butyl phthalate	55	DNT

ND - Nondetect

DNT - Did not test for this pollutant

*EPA Methods 8240 and 8270, volatiles and semi-volatiles

**EPA Method 8240, volatiles

3.3 Bag Filter

Grain sizes for silt range from 5 to 75 microns. Initially a 5 micron bag filter will be used. Silts of small particle size do have a tendency to clog filter bags by forming a low permeable sheen along the surface of the bag.

Bags will need to be checked frequently and a supply of at least 10 bags should be kept in storage.

3.4 Carbon Weight

Activated carbon has variable effectiveness adsorbing organic compounds. High molecular weight compounds are readily adsorbed. Table 3.2 summarizes the carbon adsorptive capacity of the compounds detected at high concentrations.

TABLE 3.2

ADSORPTION CAPACITY FOR SPECIFIC ORGANIC COMPOUNDS

	Adsorption Capacity (mg compound/g carbon) at 500 ppb	Grams of Carbon needed per liter
1,1-dichloroethane	1.2	2.2
1,1-dichloroethylene	3.4	0.5
trans-1,2-dichloroethylene	2.2	0.8
1,1,1-trichloroethane	2	16.4
trichloroethylene	18.2	1.9
cis-1,2-dichloroethylene	9	1.9

Approximately 24 grams of carbon will be needed to adsorb pollutants in 1 liter of groundwater. Since it is expected that the system will treat 432 gallons or 114 liters of groundwater per day, approximately 2700 grams or 6 pounds will be spent a day. Therefore, the first drum may be spent within a month. Two extra drums will be kept in storage.

Pollutant concentrations are expected to decrease over time which would extend carbon life. If this trend does not develop it may be cost effective to add an air stripper in series with the carbon units.

3.5 Contact Time

Generally, for groundwater applications the minimum contact time should be from 8 to 15 minutes. At 5 gpm, these drums will have contact time of 8 to 10 minutes, therefore, at an average flow of .3 gpm the contact time will well exceed minimum requirements.

APPENDIX A

COLOR PHOTOGRAPHS

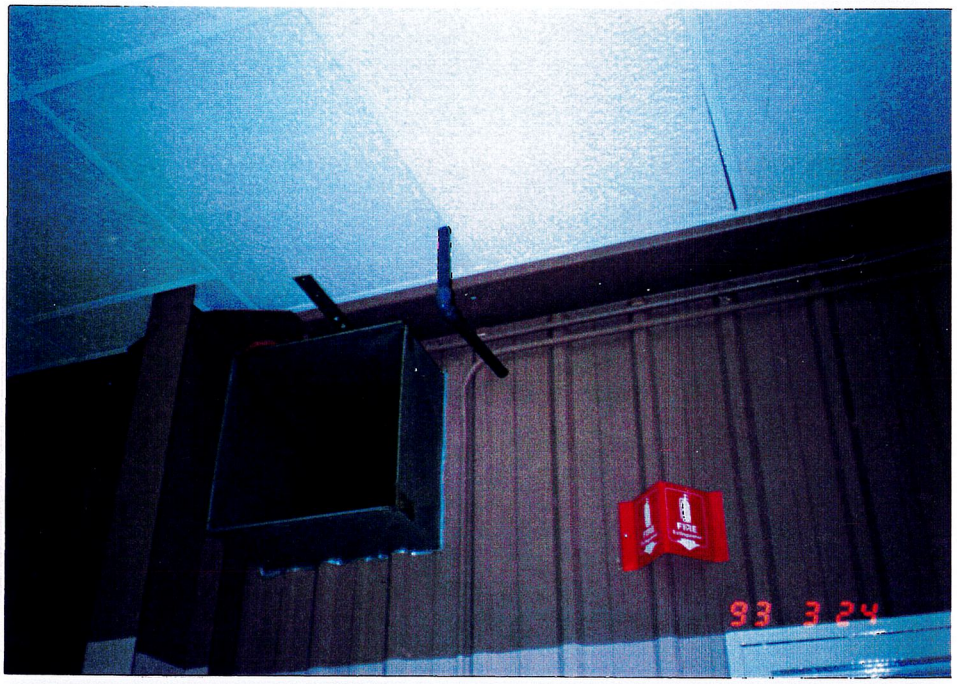
DEM-East Facility from Chambers Street. Well head is near drum.

Well head in foreground. Individual is standing at pipe entrance location.

DEM-East Facility looking toward Conklin Avenue and showing parking area.

Compressor Room Facing West. Carbon drums will be located at right by red bins.

Discharge line from compressor room where treated groundwater will exit.



Standing at discharge point at compressor room and looking west along proposed pipe route.

APPENDIX B

VENDOR INFORMATION

GEOGUARD
Dedicated To Ground Water Technology

536 ORIENT STREET ● P.O. BOX 149
MEDINA, NEW YORK 14103-0149

April 7, 1993

Stetson-Harza
181 Genesee Street
Utica, NY 13501

Attn: Paul Romano

Dear Mr. Romano:

Attached for your review is Quotation #G1231F, Revision 1, which has been modified to reflect the changes you discussed recently with Joe Deverell of R.W. Deverell Company.

Samples of 1/2" O.D. tubing, commonly used for discharge and/or air in Relia-Flo systems, are provided for your evaluation, as well as specifications for items not shown in the original quotation of March 3, 1993..

If you have any questions or comments, please feel free to contact Joe Deverell at his office, or GEOGUARD at 1-800-645-7654.

Thank you for your interest in GEOGUARD.

Sincerely,

GEOGUARD, Inc.
Dedicated to Ground Water Technology

Deborah L Beach

Deborah L. Beach
Sales Manager

Enc: Quotation, Specifications, Tubing Samples
cc: R.W. Deverell Company
P.O. Box 447
Weedsport, NY 13166
315-834-9466

GEOGUARD
Dedicated To Ground Water Technology

536 ORIENT STREET ● P.O. BOX 149
MEDINA, NEW YORK 14103-0149

Stetson-Harza
181 Genesee Street
Utica, NY 13501

April 7, 1993
Quotation G1231F Rev. 1

Attn: Paul Romano

Quan.	Description	Price
	Pricing for D.E.M. - East	
1	Model 0001 3/4 HP Electric, tank mounted air compressor, pre-wired for 120 volt service, complete with electric auto drain and all hoses	$ 850.00
1	Relia-Flo Model 50002, Pneumatic Cycle Controller with level control option (includes bubbler probe)	1,695.00
1	Relia-Flo Model 53015 In Well Quick Exhaust Valve	65.00
1	Relia-Flo Model 5422R Well Closure; 4" Non-Lockable Flat Cap	35.00
1	Relia-Flo Model 51019 Gas-Drive Pump; 2,88" O.D. x 40" L, S.S./Teflon	395.00
/ft.	Relia-Flo Model 52022 Bubbler Tubing, 3/8" O.D. x 1/4" I.D., Black PE	.30

GEOGUARD
Dedicated To Ground Water Technology

536 ORIENT STREET ● P.O. BOX 149
MEDINA,NEW YORK 14103-0149

Specification

Model 53015 In Well Quick Exhaust Valve

The assembly shall include a Teflon coated quick exhaust valve.

The assembly shall include push in tube fittings for 1/2" O.D. tubing.

The assembly is designed to be spliced in the air tube to the pump, below the well cap.

800-645-7654 ● 716-798-5597 ● FAX 716-798-0147

R.W. DEVERELL CO.
INDUSTRIAL & CHEMICAL EQUIPMENT
P.O. BOX 447, WEEDSPORT, NEW YORK 13166
TELEPHONE: (315)834-9466 or 834-6789
FAX # (315)834-9466

March 17, 1993

Stetson - Harza
181 Genesee Street
Utica, N.Y. 13501

Att: Mr. Paul Romano,
Environmental Engineer

Dear Mr. Romano:

The following is a summary of our search for an activated carbon filter system for your D.E.M. East project. The first is an offering of just carbon drums and disposal from Calgon Carbon Corp., Pittsburgh, PA. The second is an offering of a complete system by an outfit in Syracuse, N.Y.

* Calgon Carbon Corporation (800) 422-7266
Box 717
Pittsburgh, PA 15230

1 - 3 Units of 55 Gallon Steel Drum, 165# Prime Carbon- $485.00 each
or Reactivated C.- $438.00 each

Prices are F.O.B. Pittsburgh, PA

Reactivation Fees: Add $100.00 per drum plus a one time $400.00 fee if nonhazardous waste, else it is a one time $2500.00 fee.

Returns are made to Catlettsburgh, KT.

Calgon expects a usage rate of 2 # per day of carbon based on the expected flow of .4 GPM and the contaminants present. This would give approximately an 80 day life expectancy.

* Complete System - Drawing Attached

Quantity	Description	Amount
2	Carbon Absorber Units,165# @ $425.00 each	$850.00
1	American Filtration Bag Filter Housing	$800.00
1	Equipment Skid and Piping	$600.00
6	5 Micron replacement filter bags.	$ 60.00
	Total Treatment System --	$2310.00 each

The above quoted items may be purchased as individual items at the cost indicated. The above does not include applicable taxes, trucking, shipping, set-up or installation at site. The quotation is F.O.B. Syracuse, N.Y. Terms: Net 30 days. Shipment: 3 weeks.

Carbon life is given as approximately 50 days. Vendor would be willing to coordinate reactivation/disposal through Calgon Carbon Corporation. Carbon quoted is Prime.

We hope that you find this information useful. Please call my office if you have any questions.

Very truly yours,

Joseph T. Deverell

Joseph T. Deverell

Specialized Process Equipment

March 31, 1993

Mr. Paul Romano
STETSON-HARZA
181 Genesee Street
Utica, NY 13501

Re: Equipment and Qualifications

Subj: Treatment Equipment

File: Prospective

Dear Mr. Romano:

As requested, please find enclosed a copy of the quotation and equipment schematic for a carbon treatment system prepared for the R. W. Deverell Company.

Also, in order to help you better understand the areas which we may be of service to you, I have enclosed some informational literature on the specific equipment we fabricate and lease. In addition to the enclosed brochures, please note that we also custom design, fabricate, and provide a wide variety of specialized treatment systems and services, some of which are noted below:

- Non-pressure rated carbon contactors, sand filters and multi-media filters
- Carbon disposal coordination services
- "Pump and treat" skid mounted systems, complete with bag filters, backwash pumps, instrumentation and control
- On site "start up" and support services
- Oil water separators (less than 50 GPM)
- Custom equipment trailers, including totally enclosed systems
- Containment dikes
- Walkways, catwalks, stairways, etc.
- One of a kind pilot systems for purchase or lease
- Stainless steel air strippers on a joint venture basis (brochure enclosed)
- In-situ air stripping systems

Specialized Process Equipment, Inc., an O'Brien & Gere Company
5000 Brittonfield Parkway/Box 3283/Syracuse, NY 13220 / (315) 437-2400 / FAX (315) 437-9800

- All pneumatic ejection pump systems with capacities to 15 GPM
- Product recovery systems complete with groundwater depression pump
- Our own patented VEVPAR (Vacuum Enhanced Vapor Phase Adsorption with Recycle) system for VOC contaminated groundwater
- Rotary Drum Vacuum Filtration units for dewatering of sludges

We are also willing to work on turn-key projects, treatability studies and other special projects which Stetson-Harza may be involved in. Please feel free to contact us to discuss options of various treatment equipment and unique methods by which they may be applied.

I hope that you will find the enclosed information useful. Please feel free to call should you have questions or comments.

Very truly yours,

SPECIALIZED PROCESS EQUIPMENT, INC.

John C. Pezzi
Systems Engineer

JCP/blb
Enclosures
cc: Terry L. Brown
David J. Tagg
Joseph A. Brown

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Specialized Process Equipment

March 17, 1993

Mr. Joseph Deverell
R. W. DEVERELL COMPANY
P. O. Box 447
Weedsport, NY 13166

Re: Quotation

Subj: Carbon Treatment System

File: Prospective

Dear Mr. Deverell:

The purpose of this letter is to provide you with a quotation for the purchase of a groundwater carbon treatment system as shown on the attached schematic. Based on the influent flow rate and contaminants you have indicated to us, carbon life will be approximately 50 days. Per our conversation, we propose the following:

Quantity	Description	Amount
2	Carbon Absorber Units	$ 850.00
1	American Filtration bag filter housing	$ 800.00
1	Equipment skid and Piping	$ 600.00
6	5 micron replacement filter bags	$ 60.00

The above quoted items may be purchased as individual items at the cost indicated or a complete skid mounted system at a cost of $2,310.

The above quotation does not include applicable taxes, trucking, shipping, set up or installation at site. This quotation is FOB our shop in Syracuse, New York.

We at Specialized Process Equipment look forward to providing you with the above quoted eqipment and services. We hope that this may be the beginning of a mutually beneficial relationship.

If you have any questions or comments regarding this equipment or quotation, please do not hesitate to contact us.

Very truly yours,

SPECIALIZED PROCESS EQUIPMENT, INC.

John C. Pezzi
Systems Engineer

JCP/blb

Specialized Process Equipment, Inc.
5000 Brittonfield Parkway/Box 3283/Syracuse, NY 13220 / (315) 437-2400 / FAX (315) 437-9800

CALGON
CALGON CARBON CORPORATION

CALGON CARBON CORPORATION
P. O. BOX 6768 1120 ROUTE 22 EAST
BRIDGEWATER. NEW JERSEY 08807-2985

(908) 526-4646
FAX NO. (908) 526-2467

FAX MEMO
TO: Stetson-Harza DATE: 3-31-93

ATTN: Paul Romano TOTAL NUMBER OF SHEETS INCLUDING THIS SHEET: 7

FROM: Kim Friedman

IN THE EVENT OF TRANSMISSION ERROR CONTACT US AT THE ABOVE NUMBER.

SUBJECT: _____

MESSAGE:

RECEIVED
MAR [illegible]
STETSON-HARZA

CALGON

CALGON CARBON CORPORATION

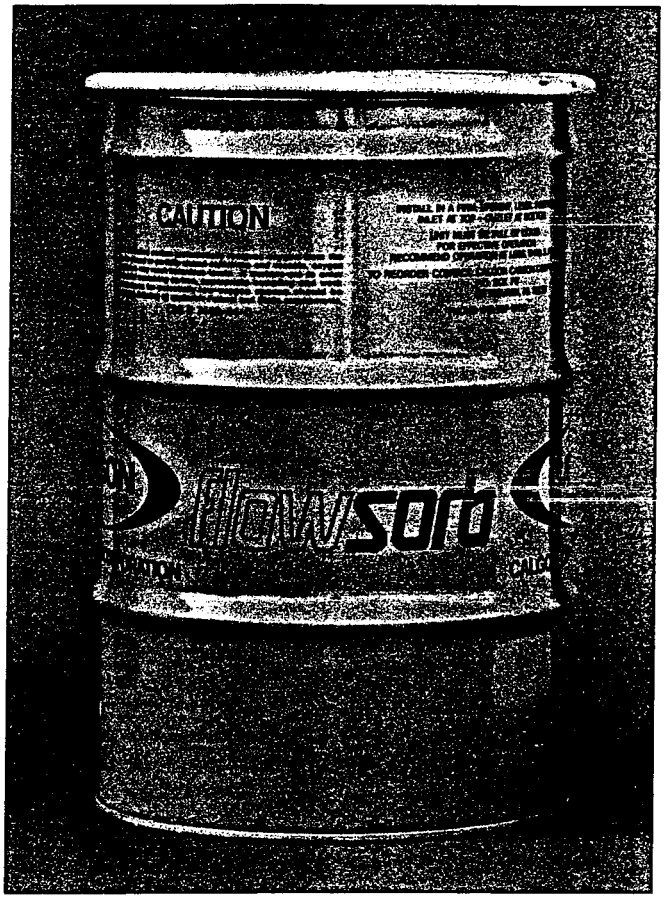
EQUIPMENT BULLETIN

FLOWSORB™

GENERAL DESCRIPTION

Designed for low-flow water treatment applications, prefabricated 55-gallon FlowSorb™ canisters contain all the operating elements found in a full-scale adsorption system. These small, economical treatment systems hold 165 pounds of granular activated carbon for applications including:

- Small wastewater streams
- Groundwater remediation
- Underground storage tank leaks
- Well pump tests
- Product purification or decolorization
- Tank cleaning water treatment
- Batch water or product treatment
- Carbon adsorption pilot testing
- Emergency spill treatment
- Monitoring well water treatment



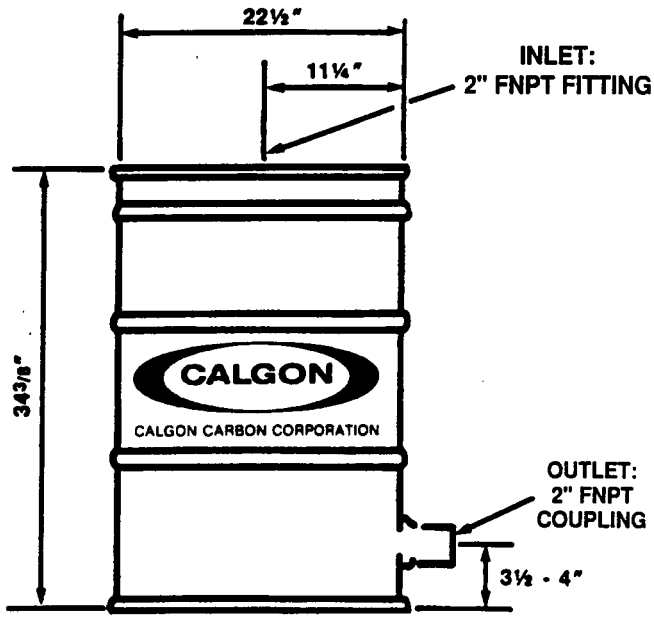
FEATURES

FlowSorb offers several features and benefits to industrial, commercial and municipal users including:

- Sturdy 16 gauge steel construction per DOT specifications
- Continuous treatment at varying flow rates and concentrations
- Simple installation and operation
- Space above carbon bed facilitates flow distribution or backflushing
- Flexibility to be used in series or parallel operation
- Supplied with virgin or reactivated carbon
- May also be supplied with Klensorb, an oil absorbent media
- Practical disposal option, as pre-approved spent carbon canisters may be returned to Calgon Carbon for safe carbon reactivation
- Low cost per unit makes carbon treatment economical

FLOWSORB SPECIFICATIONS

Vessel:	Open head 16 gauge steel canister
Pressure:	15 psig per DOT 17C
Cover:	Removable steel cover, 12 gauge bolt ring with butyl rubber sponge gasket
Internal Coating:	Heat cured epoxy phenolic
External Coating:	Baked enamel (gray)
Temperature Limit:	150° F (65.6° C) continuous 350° F (176.7° C) intermittent
Inlet:	2" FNPT
Outlet:	2" FNPT; 304 stainless steel collector
Carbon:	165 pounds granular activated carbon: Specify Filtrasorb 300 or reactivated grade
Ship Weight:	232 pounds (105 kg)
Identification:	Sequentially numbered for reference



FLOWSORB DIMENSIONS

TYPICAL FLOWSORB OPERATING PARAMETERS

Flow Rate: ..... 10 gpm (37.8 l/m)
Contact Time: ..... 4.5 minutes
Pressure Drop: ..... < 1 psi (clean water and carbon)
Operating Pressures: ..... Recommend operation at less than 5 psig, but higher pressures, up to 12 psig, possible with tight cover closure

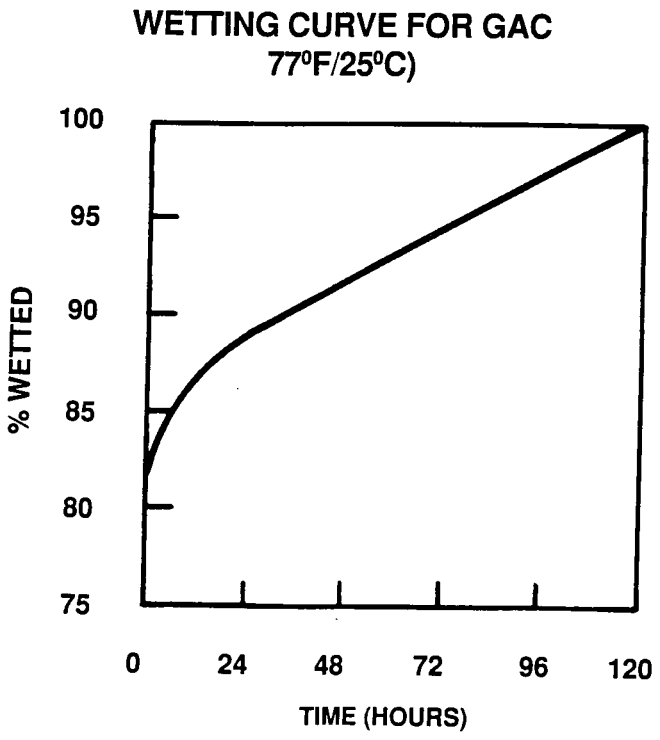
FLOWSORB INSTALLATION

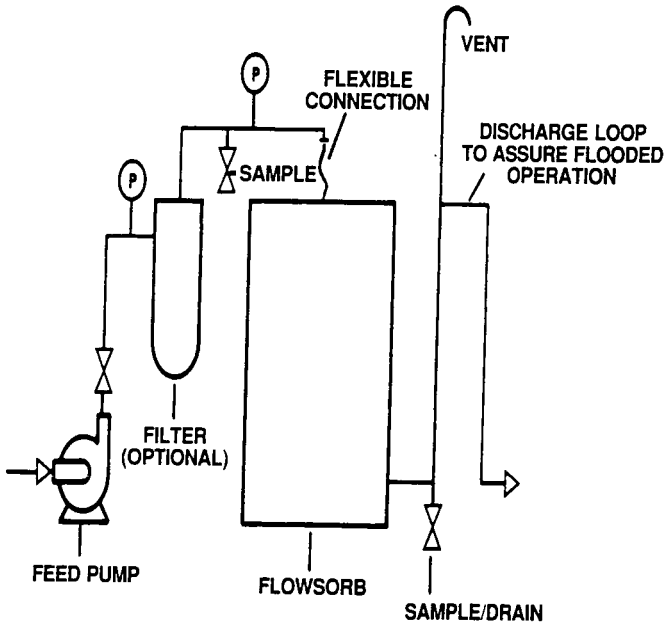
FlowSorb canisters are shipped with dry activated carbon; the carbon must be wetted and deaerated prior to use. This procedure displaces air from the internal structure of the carbon granule, thus assuring that the liquid to be treated is in contact with the carbon surface.

Prior to operation, each canister must be filled with clean water; the water should be introduced into the bottom outlet connection. The unit should set for approximately 48 hours — this allows most of the carbon's internal surface to become wetted, as shown on the wetting curve below.

After wetting, the carbon bed can be deaerated by draining the canister and again filling the canister upflow with clean water. This procedure will eliminate any air pockets which may have formed between the carbon granules. The FlowSorb is now ready for operation.

Canisters should be set on a flat, level surface and piped as recommended in the installation illustration. The influent pipe connection should be attached to the unit by using a flexible connection, as some minor deflection of the lid may occur if pressure builds due to filtration or other flow blockage downstream.





TYPICAL FLOWSORB INSTALLATION

FlowSorb discharge piping should include an elevated piping loop to assure that the canister remains flooded with water at all times. In addition to the piping loop, a drain connection is recommended on the discharge piping; this allows drainage of the unit prior to disconnection or temporary shutdown.

A filter should be installed if the liquid to be treated contains substantial amounts of suspended solids. A simple cartridge or screen filter helps prevent pressure buildup in the carbon bed.

FLOWSORB OPERATION

FlowSorb canisters should be full of clean water before treatment begins. Flow rate to the canister should be determined based on required contact time between the liquid and the carbon media. In groundwater treatment applications, the recommended contact time is typically 8-10 minutes with a resultant flow of approximately 5 gpm. Consult your Calgon Carbon Technical Sales Representative for advice about proper contact time for your application.

FlowSorbs can be manifolded in parallel operation for higher flow rates. For series operation, two FlowSorbs can be piped together sequentially, as normal pressure drop will not exceed the recommended operating pressure.

These canisters have space for bed expansion and can be backflushed by introducing clean water or liquid at approximately 20-25 gpm to the outlet and taking backflush water from the inlet.

THEORETICAL FLOWSORB TREATMENT CAPACITY FOR TYPICAL CASES

	Case 1		Case 2		Case 3	
	Conc.	Gallons	Conc.	Gallons	Conc.	Gallons
Benzene	20 ppb	1,600,000	200 ppb	400,000	2 ppm	85,000
Toluene	40 ppb		400 ppb		4 ppm	
Xylene	40 ppb		400 ppb		4 ppm	

	Case 4		Case 5		Case 6	
	Conc.	Gallons	Conc.	Gallons	Conc.	Gallons
TCE	50 ppb	1,900,000	500 ppb	550,000	5 ppm	125,000
PCE	50 ppb		500 ppb		4 ppm	

	Case 7		Case 8		Case 9	
	Conc.	Gallons	Conc.	Gallons	Conc.	Gallons
Phenol	1 ppm	230,000	10 ppm	50,000	100 ppm	10,000
Total SOC	10 ppm		100 ppm		1,000 ppm	

Each case represents a groundwater or wastewater stream that contains the combination of contaminants listed. The treatment capacity indicates the total gallons of that particular water that may be treated before any of the specific contaminants are present in the treated water as noted. Theoretical capacity based on 5 gpm, water at 70°F or less and 165 pounds of Filtrasorb 300. Background TOC is less than 1 ppm except phenol cases as noted. Contaminants reduced to < 5 ppb, except phenol case which is for 95% phenol reduction.

HOW TO ESTIMATE FLOWSORB LIFE

The treatment table on this page lists the volume of water that can be purified by the FlowSorb for typical contamination situations. However, most applications involve a unique mixture of organic chemical contaminants including some chemicals that adsorb at different capacities or strengths. Please consult with your Calgon Carbon Technical Sales Representative for more information about carbon usage rates.

RETURN OF FLOWSORBS

Arrangements should be made at the time of purchase regarding the future return of canisters containing spent carbon. Calgon Carbon will provide instructions on how to sample the spent carbon and arrange for carbon acceptance testing. The spent carbon is reactivated by Calgon Carbon and all of the contaminants are thermally destroyed. The company will not accept FlowSorbs for landfill, incineration or other means of disposal.

No FlowSorbs can be returned to Calgon Carbon unless the carbon acceptance procedure has been completed, an acceptance number provided, and the return labels (included with the units at the time of purchase) are attached.

FlowSorbs must be drained — and inlet/outlet connections must be plugged — prior to return to Calgon Carbon.

SAFETY CONSIDERATIONS

It is unlikely that a worker would be able to physically enter a FlowSorb canister. However, the following information and precautions apply to a partially closed canister or situations where carbon is to be removed from the canister and stored elsewhere.

Wet or dry activated carbon preferentially removes oxygen from air. In closed or partially closed containers, oxygen depletion may reach hazardous levels. If workers must enter a vessel containing carbon, appropriate sampling and work procedures should be followed for potentially low-oxygen spaces — including all applicable federal and state requirements.

CALGON CARBON LIQUID PURIFICATION SYSTEMS

FlowSorb is a unit specifically designed for a variety of small flow applications. Calgon Carbon Corporation offers a wide range of carbon adsorption systems and services for a greater range of flow rates and carbon usages to meet specific applications.

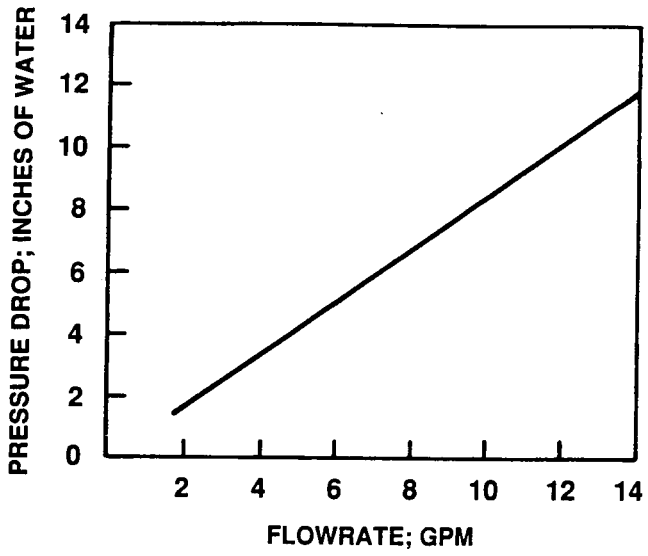
WARRANTY

There are no expressed or implied warranties, or any warranty of merchantability or fitness, for a particular purpose associated with the sale of this product.

LIMITATION OF LIABILITY

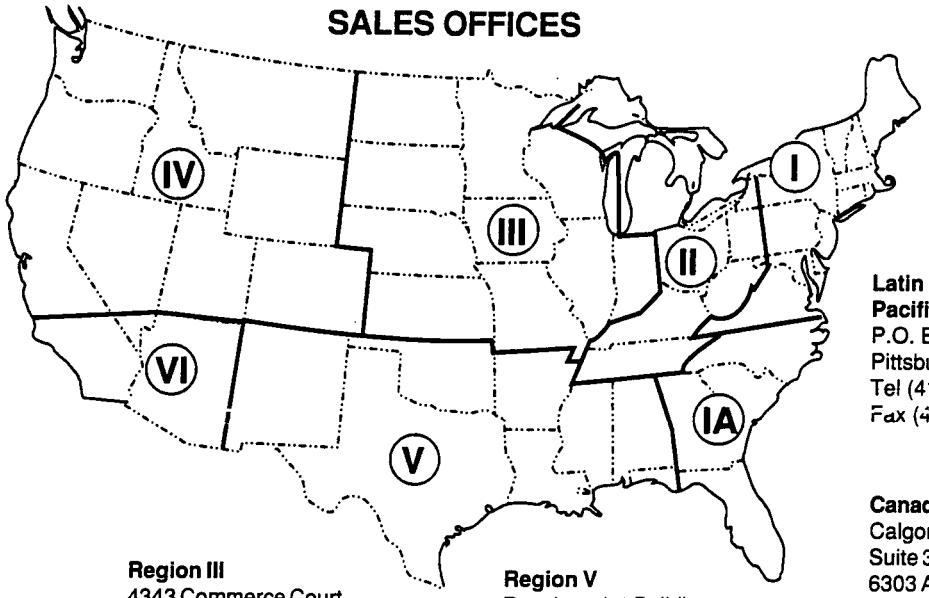
The Purchaser's exclusive remedy for any cause of action arising out of purchase and use of the FlowSorb, including but not limited to breach of warranty, negligence and/or indemnifications, is expressly limited to a maximum of the purchase price of the FlowSorb unit as sold. All claims of whatsoever nature shall be deemed waived unless made in writing within forty-five (45) days of the occurrence giving rise to the claim. In no event shall Calgon Carbon Corporation for any reason be liable for incidental or consequential damages, damages in excess of the purchase price of the FlowSorb unit, loss of profits or fines imposed by governmental agencies.

FLOWSORB PRESSURE DROP



For more information on the product described in this bulletin, or information on other adsorption equipment, please contact one of our Regional Sales Offices located nearest to you:

SALES OFFICES



Region I
PO Box 6768
1120 Route 22 East
Bridgewater, NJ 08807
Tel (908) 526-4646
Fax (908) 526-2467

Region IA
5600 77 Center Drive
Suite 200
Charlotte, NC 28217
Tel (704) 527-7580
Fax (704) 523-3550

Region II
P.O. Box 717
Pittsburgh, PA 15230-0717
Tel (412) 787-6700
800/4-CARBON
Fax (412) 787-6676

Region III
4343 Commerce Court
Suite 400
Lisle, IL 60532
Tel (708) 505-1919
Fax (708) 505-1936

Region IV
2121 South El Camino Real
San Mateo, CA 94403
Tel (415) 572-9111
Fax (415) 574-4466

Region V
Benchmark 1 Building
13430 Northwest Freeway
Suite 804
Houston, TX 77040-6071
Tel (713) 690-2000
Fax (713) 690-7909

Region VI
1901 Camino Vida Roble
Suite 112
Carlsbad, CA 92009
Tel (619) 431-5550
Fax (619) 431-8169

Latin America/Asia Pacific
P.O. Box 717
Pittsburgh, PA 15230-0717
Tel (412) 787-4519
Fax (412) 787-4523

Canada
Calgon Carbon Canada, Inc.
Suite 304
6303 Airport Road
Mississauga, Ontario
Canada L4V 1R8
Tel (416) 673-7137
Fax (416) 673-8883

Europe
Chemviron Carbon
Boulevard de la Woluwe 60
Boite 7
B-1200 Brussels, Belgium
Tel 32 2 773 02 11
Fax 32 2 770 93 94

CALGON
CALGON CARBON CORPORATION

CALGON CARBON CORPORATION
P.O. BOX 717 • PITTSBURGH, PA 15230-0717

FLOWSORB CANISTER
NON-RETURNABLE and RETURNABLE

TYPE - NON-RETURNABLE	QUANTITY 1 TO 3	4 TO 9	10 TO 29	30 OR MORE
*FLOWSORB W/F300	$485	$457	$432	$420
*FLOWSORB w/REACT	438	415	398	388
*FLOWSORB w/KLENSORB 100	974	926	888	-
TYPE - RETURNABLE				
*RETURNABLE FLOWSORB w/F300	$585	$557	$532	$520
*RETURNABLE FLOWSORB w/REACT	538	515	498	488

Note: A Carbon Acceptance Kit must be ordered for first-time purchase and each unique application. All kit(s) will be shipped from Duling Warehouse, UPS Ground Service, at no charge.

1. Prices are F.O.B. Pittsburgh, Pennsylvania, and are subject to revision without notice. Terms are net 30 days.

   *F.O.B. Houston, Texas, or Fremont, California. If shipping from Texas, add $30; from California, add $60.

2. Shipping weight is approximately 232 pounds gross.

PS-23-0200

March 1, 1992

PRICE SCHEDULE

CALGON CARBON CORPORATION
P.O. BOX 717 • PITTSBURGH, PA 15230-0717

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FLOWSORB CANISTER
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2. Shipping weight is approximately 232 pounds gross.

CAMERON

Yakima, Inc.

Since 1944

1414 South First Street • P.O. Box 1554
Yakima, Washington 98907
(509) 452-6605 • FAX (509) 453-9912

ACTIVATED CARBON SALES & SERVICE

TO:	STETSON-HARZA	DATE:	03/31/93
ATTN:	PAUL ROMANO	FROM:	CHUCK JARNECKE
FAX#:	315/797-8143	FAX#:	509/453-9912
TOTAL NUMBER OF PAGES:	2	TIME:	10:45am

DEAR PAUL,

PERSUANT TO OUR TELECON EARLIER, PLEASE FIND A SPEC. SHEET FOR SOME OF OUR WATER SCRUB UNITS, SPECIFICALLY THE WSU 55. I HAVE QUOTED YOU OUR WHOLESALE PRICE OF $378.00 PER WSU 55 UNIT. FREIGHT CHARGES TO ZIP 13902 ARE $364.22 FOR FOUR UNITS WITH A TOTAL WIEGHT OF 1000 POUNDS. THE FREIGHT CHARGES QUOTED INCLUDE A 25% DISCOUNT WHICH WE PASS ON TO OUR CUSTOMERS.

IF I CAN ASSIST FURTHER DON'T HESITATE TO CALL OR FAX.

SINCERELY,

Chuck Jarnecke

CHUCK JARNECKE
SALES

CJ/km

WATER SCRUB UNITS

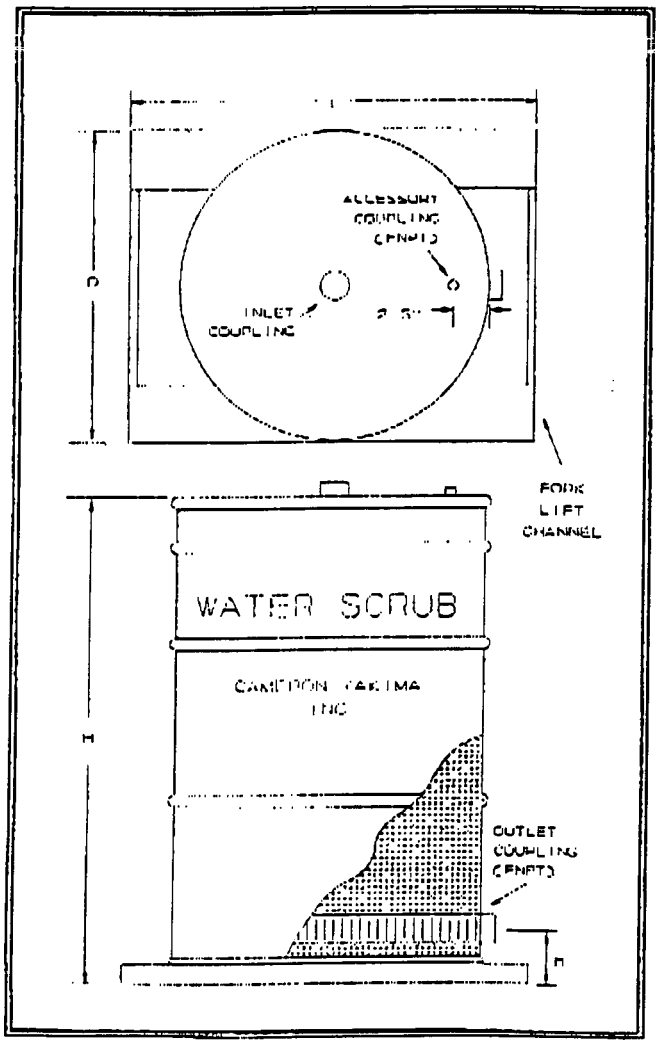
- WSU30 - WSU55 - WSU85 - WSU110 -

WATER SCRUB UNITs, filled with high quality Cameron-Yakima activated carbon, are designed for the efficient purification of your liquid waste or process stream. In service nationwide, **WATER SCRUB UNITs** have a proven ability to remove organic contaminants to non-detectable levels.

To provide long life and superior corrosion resistance, all models are constructed of heavy duty mild steel and lined with baked-on epoxy phenolic or double layered epoxy coatings. Fork lift channels are provided on the WSU110 model only.

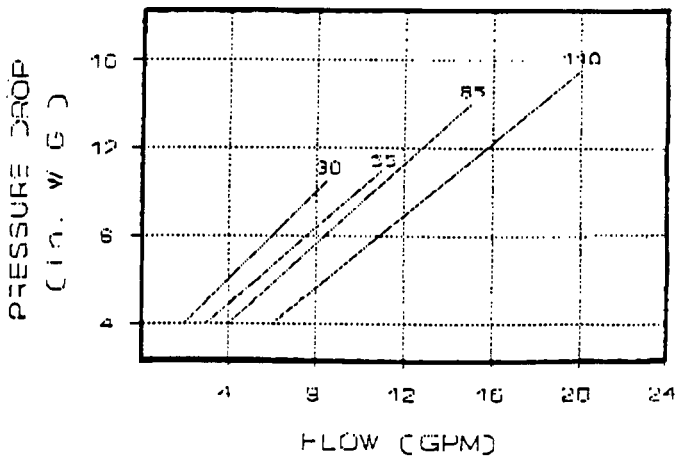
Adsorber internals consist of a proprietary PVC underdrain engineered to ensure even flow distribution and complete carbon bed use. Further, the underdrain can be removed and inspected without emptying the drum. Downflow operation is recommended.

Your **WATER SCRUB UNIT** will arrive ready for connection to process piping. When it becomes 'spent' our fully permitted reactivation facility is available to provide a number of filter service or disposal options to meet your individual needs.



SPECIFICATIONS

WSU	30	55	85	110
Inlet/Outlet Coupling (in)	2	2	2	2
Accessory Coupling (in)	3/4	3/4	na	na
H - height (in)	30	36	40	46
D - diameter (in)	19	24	26	32
L - Length (in)	na	na	na	42
h (in)	4.25	4.25	4	6.25
Max Flow (gpm)	3	5	10	15
Max Pressure (psig)	12	12	12	10
Max Temp (°F)	125	125	125	125
Carbon Capacity Weight (lb)	110	175	240	400
Volume (ft^3)	4.0	6.5	8.9	14.8
Shipping Weight (lb)	160	250	340	550



CAMERON-YAKIMA, INC. P.O. BOX 1554 YAKIMA, WA 98907
Tel: (509)452-6605 Fax: (509)453-9912

Progressive Equipment Corp.
413 East 9th Street
Erie, PA 16503 • 814/452-4363
Fax 814/459-3094

FAX COVER SHEET

DATE: 4/1/93 TIME: 9:35

TO: STETSON HARZA FAX NO.: 315/797-8143

ATTENTION: PAUL ROMANO

SUBJECT: QUOTATION

FROM: DICK MICHAEL

NUMBER OF PAGES INCULDING FAX COVER SHEET: 2

COMMENTS:

PLEASE GIVE ME A CALL SO WE CAN GO OVER THE ATTACHED QUOTATION.

Progressive Equipment Corp.
413 East 9th Street
Erie, PA 16503 • 814/452-4363
Fax 814/459-3094

QUOTATION

COMPANY: Stetson Harza
ADDRESS: 181 Genesee St.
CITY : Utica STATE: NY ZIP: 13501
ATTN : Paul Romano DATE : 4/1/93 QUOTE #: 1729

TYPE OF SYSTEM : Filtration System
MAXIMUM FLOW RATE: 1-2 GPM
SYSTEM DUTY CYCLE: ( ) 8 HRS. ( ) 16 HRS. ( ) 24 HRS. ____MONTHS/YR.
WATER ANALYSIS : __MICRO MHO'S__TSPPM__THPPM__IRON__pH
WATER SOURCE : ( ) CITY ( ) WELL ( ) POND ( ) RIVER ( )OTHER

QTY	MODEL	DESCRIPTION	UNIT PRICE	TOTAL
1	PF2.5	Progressive Epoxy-Coated Bag Filter, 1" inlet/outlet, including Sentinal Pressure Drop Alert System. 25 GPM		$725.00
		OR		
1	EPF2.5	Progressive Econoline Bag Filter, 1" inlet/outlet, including Sentinal Pressure Drop Alert System. (no epoxy) 25 GPM		$565.00
1	PENM025P3P	25 Micron Nylon Monofilament Filter Bags.		$ 12.00
1	PENM050P3P	50 Micron Nylon Monofilament Filter Bags.		$ 9.50
1	PENM075P3P	75 Micron Nylon Monofilament Filter Bags.		$ 8.00

SHIP DATE: 3-6 Weeks Usual A.R.O.
TERMS : Net 30 days
F.O.B. : Point of Shipment

PROGRESSIVE EQUIPMENT CORPORATION

SUBMITTED BY: Dick Michael
Dick Michael, Inside Sales

ATTENTION: Paul Ramano

Here is the information I promised to send you . . .

FLUID CONDITIONING EQUIPMENT

A Division of Peacock Services, Inc.

BOX 338 EAST AURORA, N.Y. 14052
PHONE (716) 655-0330
FAX (518) 372-5960
(716) 655-0649

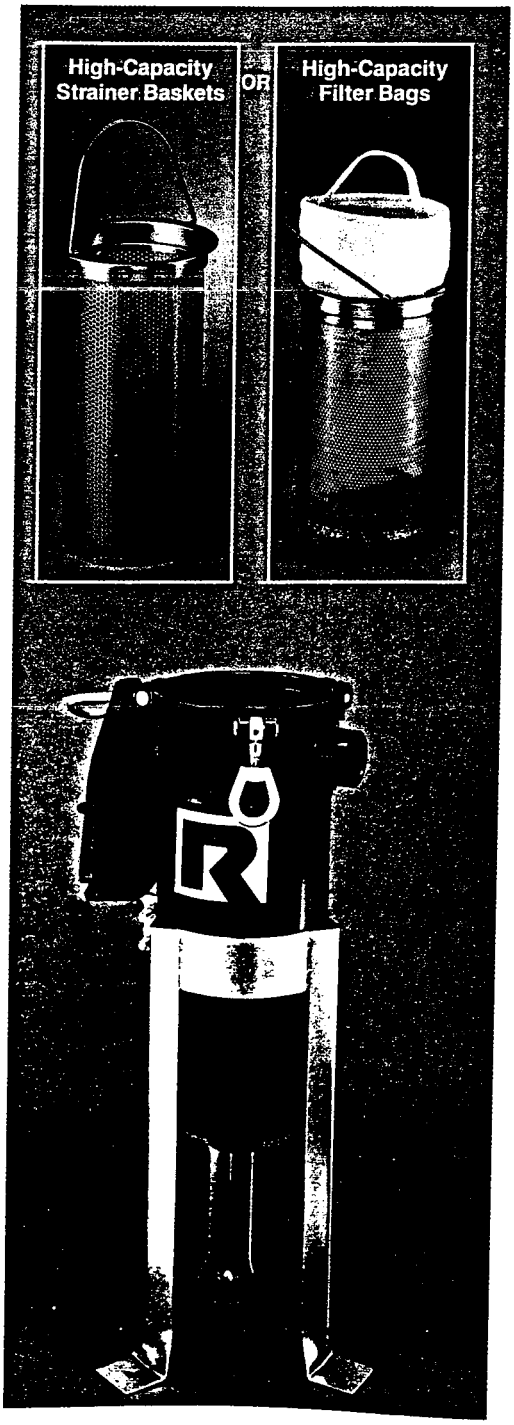
SCOTT E. SPRINGLI

SALES ENGINEER

Thank you

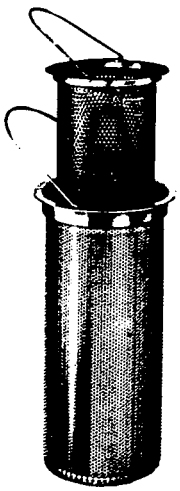
Strainers or Bag Filters: Your Choice!

Rosedale strainer/filter housings are made in many sizes, and all can serve as basket strainers (for particle retention down to 74 micron size) or as bag filters (for particle retention down to 1 micron size). In all cases, covers are easily removed, without tools, and the basket or bag is easily cleaned or replaced.



FEATURES

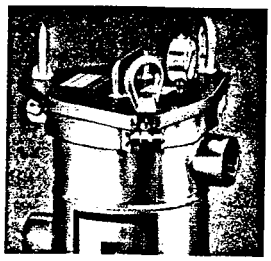
- Large-area, heavy-duty baskets
- Low pressure drops
- Housings are permanently piped
- Covers are O-ring sealed
- Carbon steel, or stainless steel (304 or 316) housings
- All housings are electropolished to resist adhesion of dirt and scale
- Adjustable-height legs, standard on Models 6 and 8; optional extra on Model 4
- Easy to clean
- ASME code stamp available
- Liquid displacers for easier servicing
- Special options include filter bag hold-down devices, sanitary construction, different outlet connections, higher pressure ratings, extra-length legs, heat jacketing, and adapters for holding filter cartridges.
- Multiple-basket and duplex units are available



Dual Stage Straining/ Filtering

All Rosedale Model 8 housings can be supplied with a second, inner basket which is supported on the top flange of the regular basket. Both baskets can be strainers (with or without wire mesh linings) or both can be baskets for filter bags. They can also be mixed; one a strainer basket, the other a filter bag basket. Dual-stage action will increase strainer or filter life and reduce servicing needs.

Covers are secured by three eyenut assemblies. One of them acts as a hinge when cover is opened. Model 4 units can also be ordered with a lighter cover, held in place with a single quick-opening clamp (photo on cover).



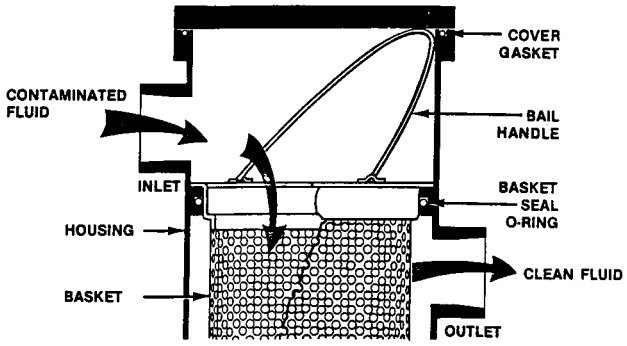
MULTI-BASKET MODELS

Larger units with multiple baskets (from 2 to 23) are also made. They can handle flows from 400 to 4500 gpm. Ask for Catalog MB.

DUPLEX MODELS

Most of the models described here are also available as duplex systems. Two units come piped together with valves to permit continuous use of either unit while servicing the other. One lever actuates all valves simultaneously. Ask for Catalog DF.

Operation

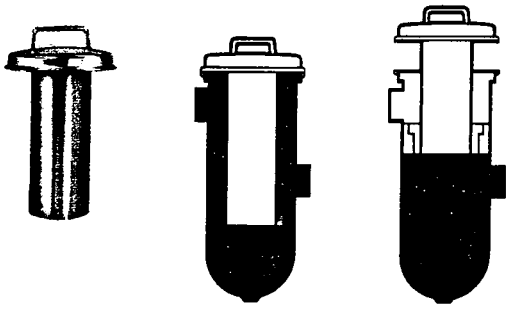


Unfiltered liquid enters the housing above the bag or basket and passes down through them. Solids are contained inside the bag or basket where they're easily and completely removed when the unit is serviced. A hinged basket bail is pushed down by the closed cover, to hold the basket against a positive stop in the housing. It helps prevent bypassing of unfiltered liquid.

Fluid bypass around the basket is prevented by an optional O-ring seal between the basket rim and the housing ID. This seal is required on Model 8 bag filters. Model 4 and 6 bag filters don't need this O-ring because the OD of the filter bag seals against the housing itself, rather than against the ID of the basket rim.

A single cover gasket is used to seal the opening, and covers can be installed and removed without tools.

Liquid Displacer Option



All strainers or filters can be supplied with a liquid displacer. When in use the displacer (a sealed 304 stainless steel cylinder) is inside the strainer basket or filter bag, displacing liquid that would otherwise fill the inner space. When the cover and displacer are removed, the level of liquid within the strainer basket or filter bag is lowered which results in less product loss, and fast, easy changes.

If the weight of the cover-displacer assembly is a concern (the heaviest, on a Model 8-30, is 20 pounds) you can easily detach the displacer.

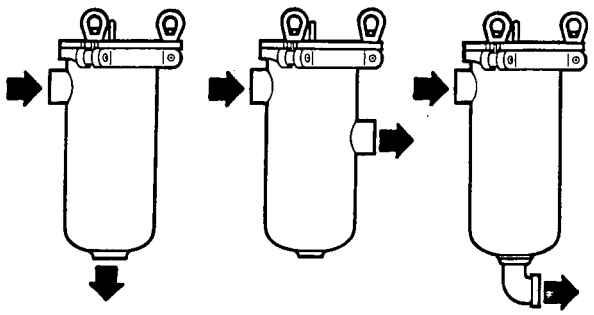
Construction Materials

All housings and other wetted parts not otherwise specified can be ordered in carbon steel. 304 stainless steel, or 316 stainless steel.

Four different materials can be ordered for all seals involved.

All baskets and mesh linings are made of stainless steel. 304 stainless will be supplied with carbon and 304 housings, 316 stainless with 316 housings.

Convenient Piping Arrangements



Style 1
Bottom outlet

Style 2
Side outlet

Style 3
Bottom outlet
with elbow

Many basket options

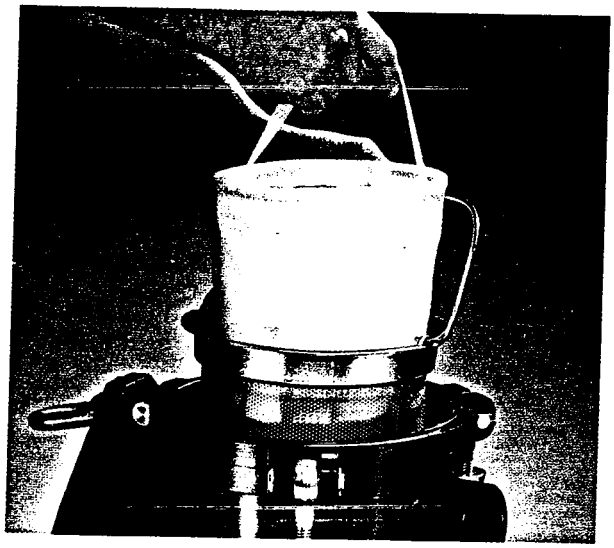
The baskets offered will permit the straining and filtering of a wide variety of fluids, to retain solids of almost any size.

All baskets are easily removed and cleaned. All are made in depths to suit the housing selected.

Plain perforated strainer basket.
Choose from the following perforation sizes: 1/4, 3/16, 9/64, 3/32, and 1/16 inch.

Perforated strainer basket with wire mesh linings.
High quality wire is used, in mesh sizes 20, 30, 40, 50, 60, 70, 90, 100, 150, and 200.

Filter bag basket.
They have 9/64-in.-diameter perforations, for a 51 percent open area. They accept standard size filter bags (see Rosedale Catalog FB).



Choosing a basket strainer or bag filter

Once the choice between **straining** a fluid (removing particles down to 74 micron size) and **filtering** it (removing particles down to one micron) has been made, the choice of which size Rosedale model must be made. All three models (4, 6, and 8) and the baskets and bags that go in them, are of the same basic design. They differ in dimensions, capacities, maximum pressure ratings, and pipe size. Selection is based on these variables.

PRESSURE DROP DATA
Basket strainers and bag filters are usually selected so that the pressure drop does not exceed 2 psi, when they are clean. Higher pressure drops may be tolerated when contaminant loading is low.

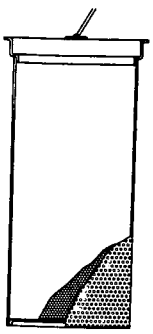
The pressure drop data is accurate for all housings with strainer or filter bag baskets. When filter bags are added, total pressure drop becomes the sum of the pressure drop as determined by the steps below plus the pressure drop through the bag as defined in Rosedale Filter Bag Catalog FB.

Follow these easy steps:

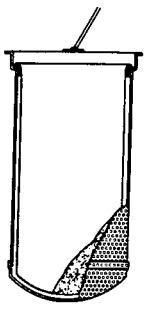
1. Using the desired pipe size and approximate flow rate, determine the basic pressure drop from the appropriate graph.
2. Multiply the pressure drop obtained in step 1 by the viscosity correction factor found in the accompanying table. This is the adjusted (clean) pressure drop for all baskets, without filter bags.

	Viscosity, cps								
	1 (H_2O)	50	100	200	400	600	800	1000	2000
All unlined baskets	.65	.85	1.00	1.10	1.20	1.40	1.50	1.60	1.80
40-mesh lined	.73	.95	1.20	1.40	1.50	1.80	1.90	2.00	2.30
60-mesh lined	.77	1.00	1.30	1.60	1.70	2.10	2.20	2.30	2.80
80-mesh lined	.93	1.20	1.50	1.90	2.10	2.40	2.60	2.80	3.50
100-mesh lined	1.00	1.30	1.60	2.20	2.40	2.70	3.00	3.30	4.40
200-mesh lined	1.30	1.70	2.10	3.00	3.40	3.90	4.40	5.00	6.80

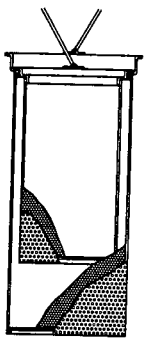
SINGLE-STAGE BASKETS
(all models)



Single-stage perforated strainer basket, with or without wire mesh liner.

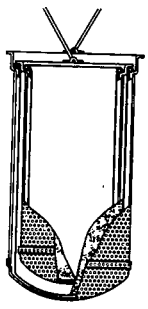


Single-stage filter bag, within perforated basket. Can also be wire mesh lined, or be made entirely of heavy wire mesh.

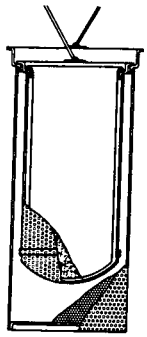


Dual-stage straining can be done with two perforated strainer baskets, with or without wire mesh linings.

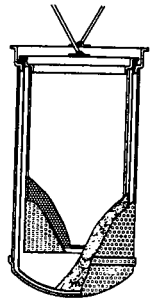
TWO-STAGE BASKETS
(Model 8 only)



Both inner and outer filter bags in this dual-stage configuration can be of the throw-away or cleanable type.



A filter bag within a wire mesh-lined outer basket. Mesh is backstop if bag ruptures or is missing.



A perforated strainer basket (with or without wire mesh lining) inside a filter bag gives effective dual-stage straining-filtering.

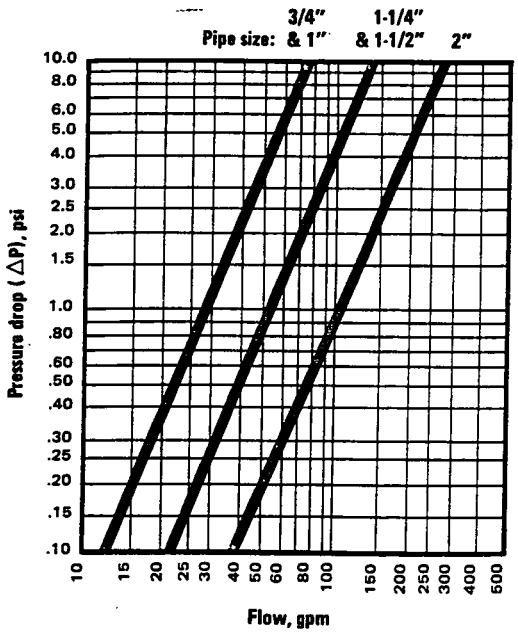
The following model descriptions and flow tables can be used to aid in selection, and make comparisons between the various styles.

Model 4 — For flow rates to 50 gpm*

- Pipe sizes 3/4 thru 2-inch, NPT or flanged
- Two basket depths: 6 or 12 inches (nominal)
- Three pressure ratings: 200 psi (with clamp cover) and 300 or 500 psi (with eyenut cover)
- ASME code stamp available

BASKET DATA

Depth Nominal (inches)	Diameter (inches)	Surface Area (sq. ft.)	Volumn (cu. in.)	Bag Size No.
6	3.9	0.5	65	3
12	3.9	1.0	130	4

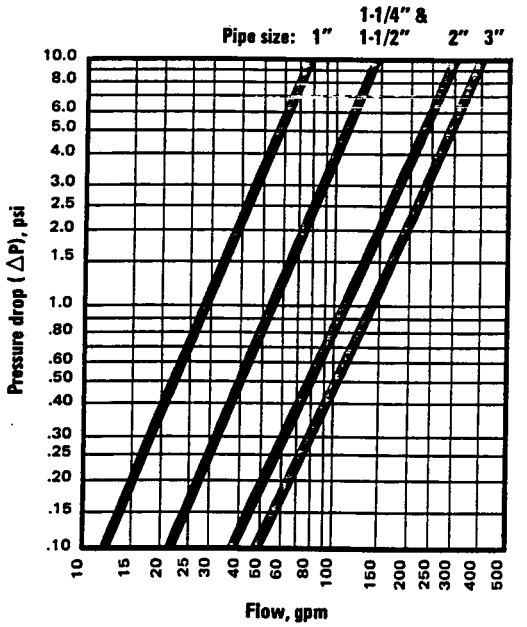


Model 6 — For flow rates to 100 gpm*

- Can provide 3.4 square feet of basket or bag surface area without need for ASME code construction
- Can be fitted with cartridge filter element adapter
- Pipe sizes 3/4 thru 4-inch, NPT or flanged
- Three basket depths: 12, 18 or 30 inches (nominal)
- Four pressure ratings: 150, 210, 300, or 500 psi
- ASME code stamp available

BASKET DATA

Depth Nominal (inches)	Diameter (inches)	Surface Area (sq. ft.)	Volumn (cu. in.)	Bag Size No.
12	5	1.3	235	7
18	5	2.0	350	8
30	5	3.4	630	9



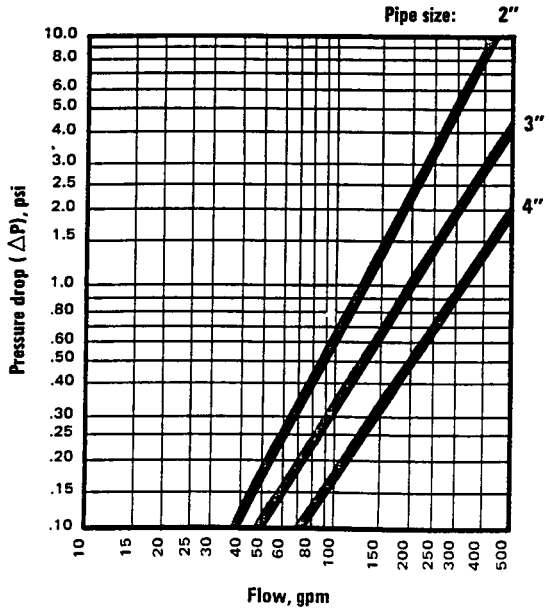
Model 8 — For flow rates to 220 gpm*

- Can be fitted with an adapter to hold cartridge filter elements
- Pipe sizes 3/4 thru 6-inch, NPT or flanged
- Two basket depths: 15 or 30 inches (nominal)
- Four pressure ratings: 150, 210, 300, or 500 psi
- ASME code stamp available

BASKET DATA

Depth Nominal (inches)	Diameter (inches)	Surface Area (sq. ft.)	Volumn (cu. in.)	Bag Size No.
15	6.7	2.3	500	1
30	6.7	4.4	1000	2

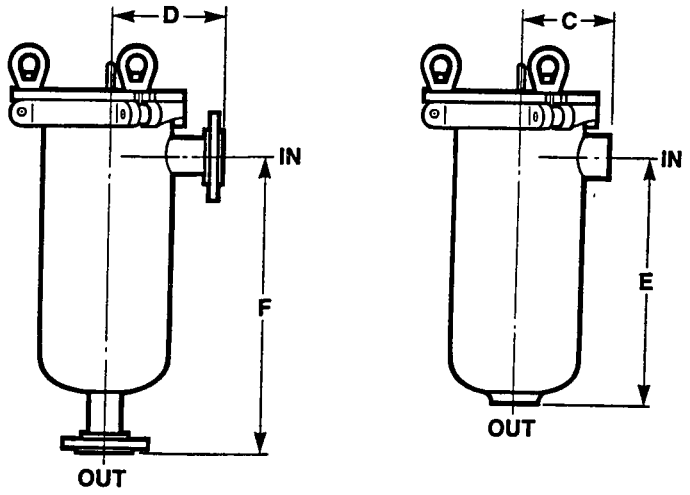
** Based on housing only. Fluid viscosity, filter bag used, and expected dirt loading should be considered when sizing a filter.*



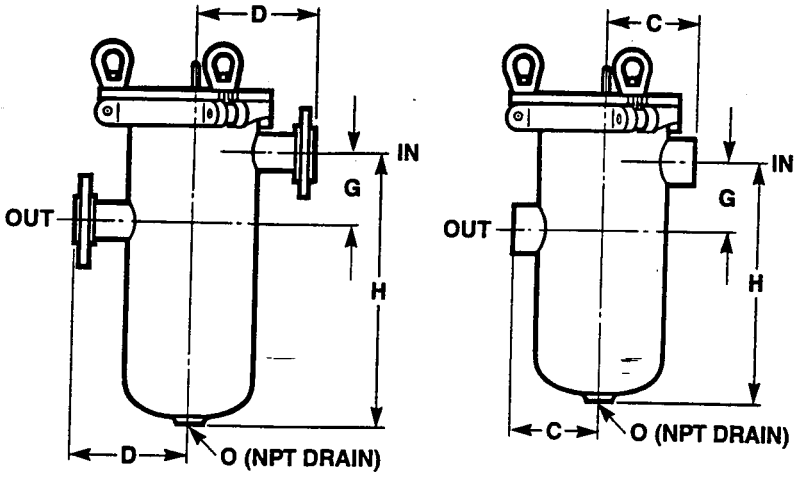
FLANGED (150 lb. ANSI)

THREADED (NPT)

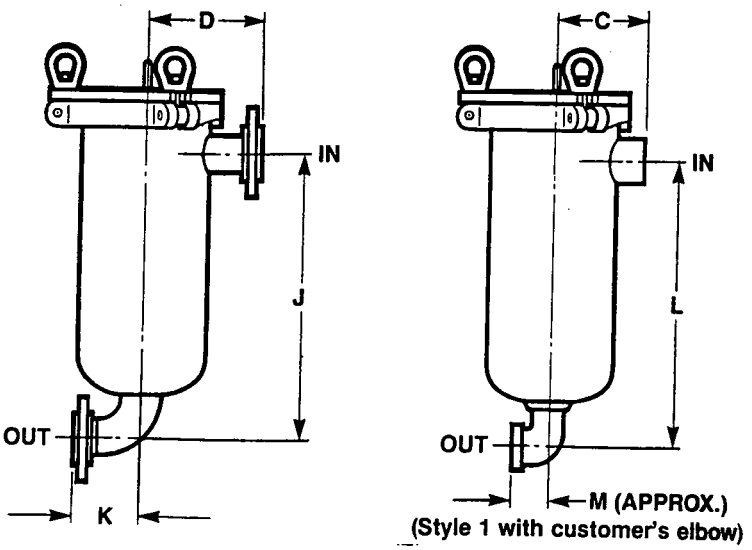
STYLE 1



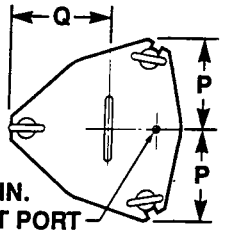
STYLE 2



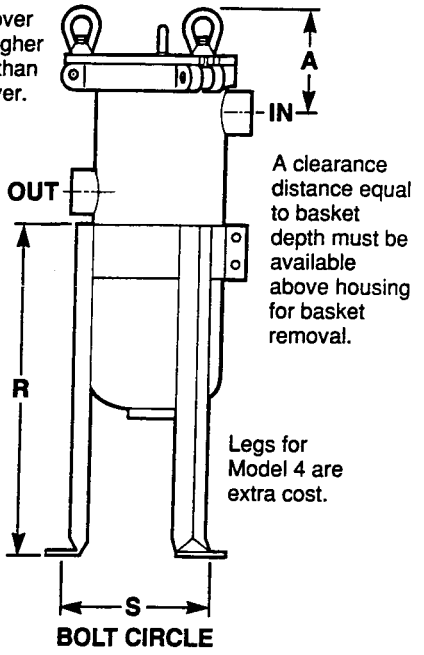
STYLE 3



EYENUT COVER



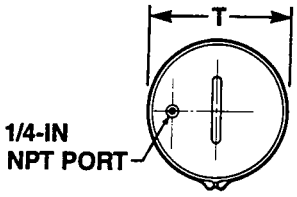
Eyenut cover permits higher pressure than clamp cover.



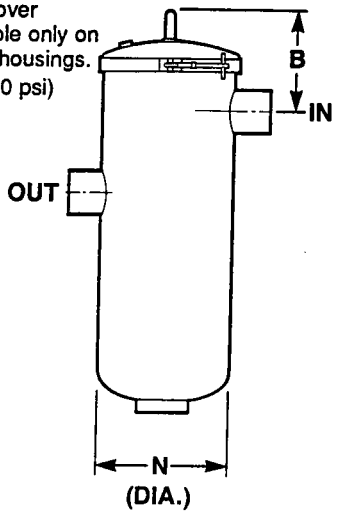
A clearance distance equal to basket depth must be available above housing for basket removal.

Legs for Model 4 are extra cost.

CLAMP COVER



Clamp cover is available only on Model 4 housings. (rated 200 psi)



Model	Pipe Size	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T
4-6	3/4	5.5	5.2	3.5	5.0	10.1	12.0	3.0	10.1	10.4	4.0	11.2	1.3	4.5	1/2	3.5	3.6	14.0	6.8	5.6
	1	5.5	5.2	3.5	5.0	10.1	12.0	3.0	10.1	10.9	4.0	11.5	1.5							
	1-1/4	6.0	5.8	3.5	5.0	9.4	12.0	4.3	9.5	10.5	4.0	11.1	1.8							
	1-1/2	6.0	5.8	3.5	5.0	9.3	12.0	4.3	9.5	10.8	4.0	11.3	2.0							
	2	6.0	5.8	3.5	5.0	9.3	12.0	4.3	9.5	11.6	4.0	11.8	2.3							
4-12	3/4	5.5	5.2	3.5	5.0	16.1	18.0	3.0	16.1	16.4	4.0	17.2	1.3	4.5	1/2	3.5	3.6	14.0	6.8	5.6
	1	5.5	5.2	3.5	5.0	16.1	18.0	3.0	16.1	16.9	4.0	17.5	1.5							
	1-1/4	6.0	5.8	3.5	5.0	15.4	18.0	4.3	15.5	16.5	4.0	17.1	1.8							
	1-1/2	6.0	5.8	3.5	5.0	15.3	18.0	4.3	15.5	16.8	4.0	17.3	2.0							
	2	6.0	5.8	3.5	5.0	15.3	18.0	4.3	15.5	17.6	4.0	17.8	2.3							
6-12	1	6.1		4.3	6.0	17.3	19.8	4.3	17.3	18.1	5.0	18.6	1.5	6.0	3/4	5.0	5.3	18.0	9.5	
	1-1/4	6.1		4.3	6.0	17.3	19.8	4.8	17.3	18.4	5.0	19.0	1.8							
	1-1/2	6.1	N/A	4.3	6.0	17.3	19.8	4.8	17.3	18.8	5.0	19.3	2.0							N/A
	2	6.1		4.3	6.0	17.2	19.7	4.8	17.3	19.6	5.0	19.7	2.3							
	3	7.0		4.3	6.0	18.2	20.7	6.6	18.2	22.0	4.8	21.9	3.1							
6-18	1	6.1		4.3	6.0	23.3	25.8	4.3	23.3	24.1	5.0	24.6	1.5	6.0	3/4	5.0	5.3	18.0	9.5	
	1-1/4	6.1		4.3	6.0	23.3	25.8	4.8	23.3	24.4	5.0	25.0	1.8							
	1-1/2	6.1	N/A	4.3	6.0	23.3	25.8	4.8	23.3	24.8	5.0	25.3	2.0							N/A
	2	6.1		4.3	6.0	23.2	25.7	4.8	23.3	25.6	5.0	25.7	2.3							
	3	7.0		4.3	6.0	24.2	26.7	6.6	24.2	28.0	4.8	27.9	3.1							
6-30	1	5.5		4.3	6.0	35.3	37.8	4.3	35.3	36.1	5.0	36.6	1.5	6.0	3/4	5.0	5.3	18.0	9.5	
	1-1/4	6.0		4.3	6.0	35.3	37.8	4.8	35.3	36.4	5.0	37.0	1.8							
	1-1/2	6.1	N/A	4.3	6.0	35.3	37.8	4.8	35.3	36.8	5.0	37.3	2.0							N/A
	2	6.1		4.3	6.0	35.2	37.7	4.8	35.3	37.6	5.0	37.7	2.3							
	3	7.0		4.3	6.0	36.2	38.7	6.6	36.2	40.0	4.8	39.9	3.1							
8-15	2	6.6		5.9	7.5	20.9	23.5	4.8	21.0	23.2	3.3	23.1	2.3	8.6	1	5.8	6.3	22.0	12.0	
	3	7.4	N/A	6.8	7.5	21.7	24.6	6.6	21.9	25.5	4.8	25.9	3.1							N/A
	4	7.4		6.8	8.6	21.5	25.1	8.4	21.9	26.8	6.3	27.6	3.8							
8-30	2	6.6		5.9	7.5	35.9	38.5	4.8	36.0	38.2	3.3	38.1	2.3	8.6	1	5.8	6.3	22.0	12.0	
	3	7.4	N/A	6.8	7.5	36.7	39.6	6.6	36.9	40.5	4.8	40.9	3.1							N/A
	4	7.4		6.8	8.6	36.5	40.1	8.4	36.9	41.8	6.3	42.6	3.8							

HOW TO ORDER

Build an ordering code as shown in the example. Each option is available only on the model sizes indicated in the colored blocks preceding its description.

Key to blocks: 4 = Model 4
6 = Model 6
8 = Model 8

EXAMPLE: 8 15 3P 1 150 N C D B S – M 200 – 2M 50

(HOUSING; BASKET; OPTIONAL INNER BASKET)

MODEL NO.
4 = 4
6 = 6
8 = 8

HOUSING SIZE
4 6 in. = 6
4 6 12 in. = 12
8 15 in. = 15
6 18 in. = 18
6 8 30 in. = 30

PIPE SIZE, NPT & FLANGED[1]
4 6 8 3/4-in. female NPT = 3/4P
4 6 8 1 in. female NPT = 1P
4 6 8 1-1/4-in. female NPT = 1-1/4P
4 6 8 1-1/2-in. female NPT = 1-1/2P
4 6 8 2-in. female NPT = 2P
6 8 3-in. female NPT = 3P
4 6 8 3/4-in. 150-lb. ANSI flange = 3/4F
4 6 8 1-in. 150-lb ANSI flange = 1F
4 6 8 1-1/4-in. 150-lb ANSI flange = 1-1/4F
4 6 8 1-1/2-in. 150-lb ANSI flange = 1-1/2F
4 6 8 2-in. 150-lb ANSI flange = 2F
6 8 3-in. 150-lb ANSI flange = 3F
6 8 4-in. 150-lb ANSI flange = 4F
8 6-in. 150-lb ANSI flange = 6F

OUTLET STYLE
4 6 8 Bottom = 1
4 6 8 Side = 2
4 6 8 Bottom elbow = 3

PRESSURE RATING[2]
4 6 8 300 psi = 300
4 6 8 500 psi = 500
4 200 psi (clamp cover) = 200
6 8 150 psi = 150
6 8 210 psi = 210

ASME CODE STAMP
None = N
4 6 8 Code = UM

HOUSING MATERIAL
4 6 8 Carbon steel = C
4 6 8 304 stainless steel = S
4 6 8 316 stainless steel = 316

FOR MODEL 8 ONLY

OPTIONAL INNER BASKET, MEDIA SIZE
No symbol if type 2B basket was selected
8 Perforation diameters (for type 2P baskets)
1/4, 3/16, 9/64, 3/32, 1/16
8 Mesh sizes (for type 2M and 2BM baskets)
20, 30, 40, 50, 60, 70, 80, 100, 150, 200

OPTIONAL INNER BASKET TYPE
8 2B = Filter bag basket, 9/64 perforations[3]
8 2P = Strainer basket, perforated metal
8 2BM = Filter bag basket, perforated, mesh lined[3]
8 2M = Strainer basket, perforated, mesh lined

BASKET, MEDIA SIZE
No symbol if type B basket was selected
4 6 8 Perforation diameters (for type P baskets)
1/4, 3/16, 9/64, 3/32, 1/16
4 6 8 Mesh sizes (for type M and BM baskets)
20, 30, 40, 50, 60, 70, 80, 100, 150, 200

BASKET TYPE
4 6 8 B = Filter bag basket, 9/64 perforations[3]
4 6 8 P = Strainer basket, perforated metal
4 6 8 BM = Filter bag basket, perforated, mesh lined[3]
4 6 8 M = Strainer basket, perforated, mesh lined
4 6 8 HWM = Filter bag basket, heavy wire mesh[3]

BASKET SEAL
N = No seal (never on Models 4 & 6 bag-type baskets)
4 6 8 S = Seal required (always on Model 8 bag-type baskets)

COVER GASKET
4 6 8 B = Buna N
4 6 8 E = Ethylene Propylene
4 6 8 V = Viton Fluoroelastomer
4 6 8 T = Teflon Fluorocarbon Resin

DISPLACER
N = No displacer
4 6 8 D = Displacer

1. ANSI 150-lb R.F. flanges provided as standard. Other styles and classes available. ANSI B16.5 Pressure-Temperature rating tables determine flange class for ASME code housings. Consult factory.

2. Higher pressure ratings available. Consult factory.

3. Filter bags are specified separately. See Rosedale Filter Bag Catalog FB.

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Catalog 468.5 129M592 Litho in USA