Jim O'Brien

(7)

DOVATRON INTERNATIONAL

Conklin Avenue Facility

ON-SITE GROUNDWATER TREATMENT SYSTEM ENGINEERING REPORT

Final Submittal

August 1993

Stetson-Harza
A HARZA COMPANY
Architects/Engineers
181 Genesee Street
Utica, NY 13501

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1.0 INTRODUCTION

1.1 Background

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).

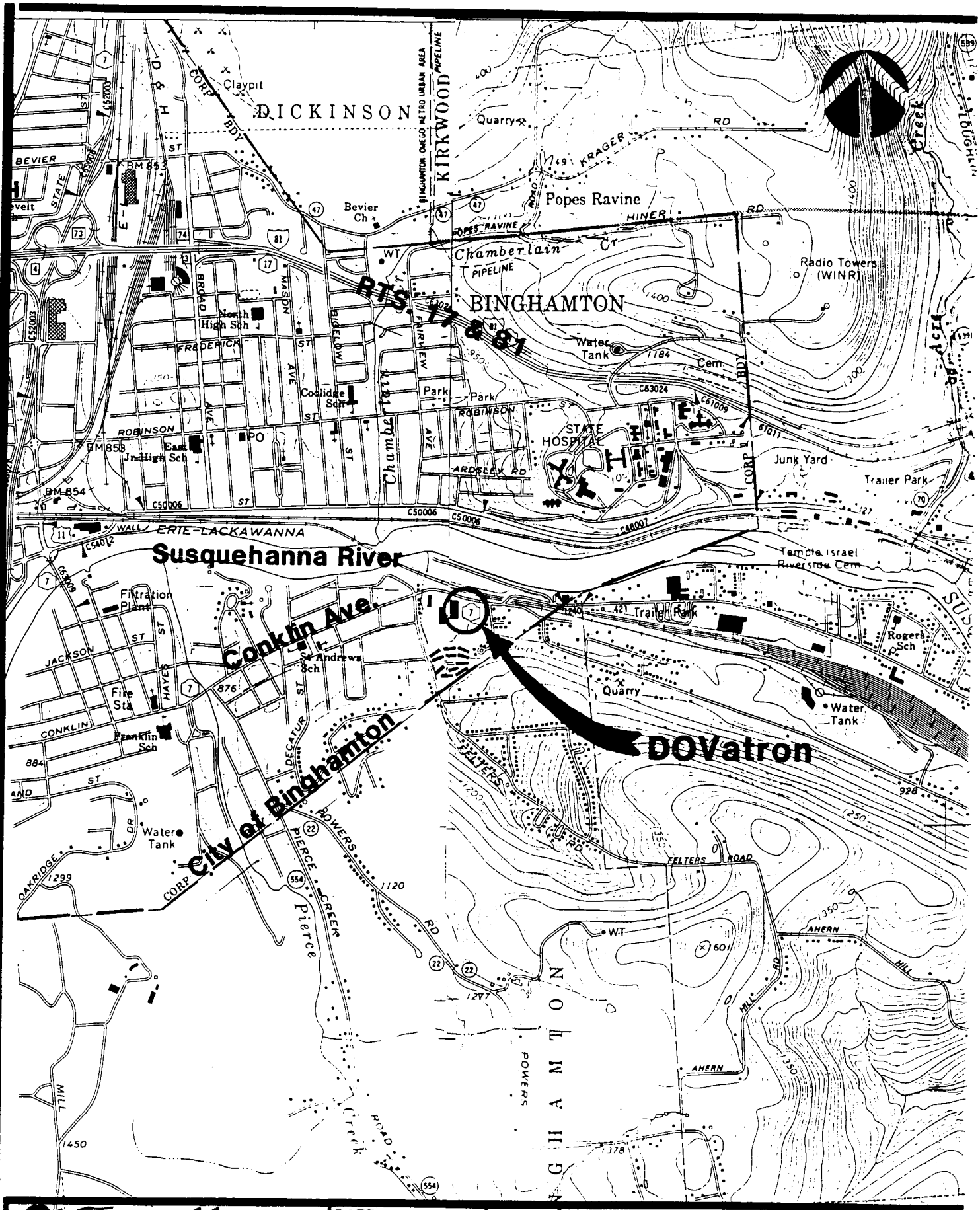
Groundwater contamination at this site has been attributed to leakage from a 1,000 gallon underground storage tank which was left in place by Binghamton Plastics, the previous owner of the facility. Removed in 1986, the tank was used as a hydraulic oil reservoir and contained 650 gallons of oil contaminated 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 8/11/93 DRAWN PDR NO. 6691	**DOVatron International** Location Map	Fig. 1.1

2.0 SUMMARY

2.1 Previous Hydrogeologic Investigations

Since acquisition of the facility by the Dover Electronics Company in the mid-1980's three hydrogeologic investigations have been performed. The first investigation completed in July 1990, consisted of subsurface soil sampling. The Phase II Investigation completed in August 1991 consisted of soil gas analysis, monitoring well construction, and subsurface soil and groundwater sampling. The Phase III Investigation included resampling the existing monitoring wells, installed under Phase II, and additional subsurface soil sampling.

2.1.1 Phase I Investigation

A Phase I Investigation was performed by Hagopian Engineering Associates in July 1990 and documented in a report entitled *Environmental Site Investigation for Dover Electronics Company, DEM - East and Kirkwood North Locations*, dated October 8, 1990. Several subsurface soil samples were taken at various locations and depths on the property. Only samples within 20 feet of the tank excavation area labeled B3C and B4C which were composited at depths of 5 feet to 7 feet and 10 feet to 12 feet showed contamination. Sample B3C was tested using EPA Method 8010 and showed 230 µg/kg of 1,1,1-trichloroethane, 33 µg/kg of carbon tetrachloride, and 31 µg/kg of trichloroethylene. Sample B4C was tested using EPA Method 8240 which detected 59 µg/kg of 1,1,1-trichloroethane, and 88 µg/kg of trichloroethylene. No groundwater study was done at this time.

2.1.2 Phase II Investigation

The Phase II Investigation was also performed by Hagopian Engineering Associates in June 1991 and documented in a report entitled, *Phase II Environmental Site Investigation for Dover Electronics.*

A soil gas study was used to confirm that the contamination was relatively isolated relative to the former tank location. Four monitoring wells were installed at the site and named MW1, MW2, MW3, and MW4. These wells were later renamed by Stetson-Harza as DMW1, DMW2, DMW3, and DMW4 to distinguish these wells from wells installed at the Kirkwood Facility. Monitoring well DMW1 is located in the backfilled area where the former tank was located as was constructed with 4 inch PVC riser instead of 2 inch riser in anticipation that it may need to be used as a recovery well. DMW4 is an upgradient well.

Subsurface soil sampling was done in conjunction with monitoring well installation. The soil sample taken from 8 to 10 feet during the installation of DMW1 was tested using EPA method 8010 and revealed 1,470 µg/kg of 1,1,1-trichloroethane, 2,070 µg/kg of trichloroethylene, 98.2 µg/kg of tetrachloroethylene, 35 µg/kg of 1,1-dichloroethane, and 9.9 µg/kg of 1,1-dichloroethylene.

APPROXIMATELY 600 FT TO SUSQUEHANNA RIVER FROM NORTH SIDE OF CONKLIN AVE

ERIE - LAKAWANNA RAILROAD

CONKLIN AVENUE

CHAMBERS STREET

SCALE: 1"=40'

CONKLIN AVENUE MANUFACTURING FACILITY

DMW3

DMW2

B1C

D-4

D-3

B3C

DMW1

D-2

B4C

D-1

B5C

DMW4

LEGEND

- BORING LOCATION
- STORM SEWER
- EXISTING MONITORING WELL

Stetson-Harza A HARZA COMPANY 181 Genesee Street, Utica, NY 13501 (315) 797-5600 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8080	DATE 8/11/93 DRAWN PDR NO. 6691	DOVatron International Hydrogeological Investigation Sample Locations	FIGURE 2.1

Groundwater analysis using EPA 8240 methodology showed the same contaminants plus a few others in the groundwater at DMW1. Results of the groundwater from DMW1 is shown on Table 2.1. Wells DMW3 and DMW4 were clean and groundwater from DMW2 had 440 µg/l of trichloroethylene.

2.1.3 Phase III Investigation

Stetson-Harza was contracted by Dover to resample wells DMW1, DMW2, and DMW3 and to take a composite sample of the soil in the former tank area at a depth of 4 to 6 feet to determine its waste classification. The results of this investigation was documented in a report entitled, *Dover Electronics Company DEM - East Phase III Investigation*, dated December 1992.

The composite soil sample was tested using Toxicity Characteristic Leaching Procedure (TCLP). No pollutant levels in the sample's extract were above regulatory levels.

The results of the groundwater analysis compared closely to the results of the June 1991 (Phase II) analysis. Results of the groundwater from DMW1 is shown on Table 2.1. DMW3 was clean and DMW2 had 506 µg/l of trichloroethylene, 231 µg/l of 1,1,1-trichloroethane, and 98.4 µg/l of cis-1,2-dichloroethylene.

TABLE 2.1

POLLUTANT DETECTED IN GROUNDWATER AT MONITORING WELL DMW1

Pollutant	Groundwater Conc. (ug/l)* 6/4/91	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
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

3.0 CONCLUSION

Based on the previous investigations, it was concluded that the need to address the contaminated groundwater was primary. The composite soil sample taken under the Phase III investigation met all regulatory levels under TCLP testing and was also under USEPA Health Effects Assessment Summary Table (HEAST) values. Also, the partition coefficients for the compounds detected in the soil are fairly low, which means they do not have a strong tendency to adhere to the soil and will leach into the groundwater.

Groundwater elevation data seemed to indicate that loose or more permeable material than the natural silty soils backfilled into the former tank pit had created a "bathtub effect." The water elevation at DMW1 is about 4 feet below the surface while the water elevation in well DMW2 is about 13 feet below the surface and the water elevation in DMW3 is about 23 feet below the surface. Boring logs indicate that groundwater in DMW3 was originally discovered at 49.5 feet and rose under pressure to 23 feet. These distinct differences in water levels in wells only 120 feet apart indicate that DMW3 is screened in a separate saturated zone and DMW2 and DMW1 are set in a perched water zone with the area around DMW1 acting as a holding tank.

4.0 RECOMMENDATION

The following recommendation was offered to Dover in the December 1992, *Phase III Investigation* Report, Section 4.2:

> Since data indicates that soil in the area of the former tank meets guidance values under the TC rule and for human health figures, it is recommended that at the present time that the soil be left in place and a pump and treat system be installed.
>
> Given the low yield in this aquifer and the fact that this is a confined, possibly manmade saturated zone, it is likely that the largest volume of groundwater would be taken out within the initial weeks of operation. After this initial period, the volume of water that could be drawn from the system will likely reduce significantly and be directly related to rain infiltration. Therefore, because of the anticipated low-volume condition, a system which included a carbon filtration unit that discharges into the local sewer system, may be more economical than an air stripping system. An air stripper could be added later if carbon filtration units become saturated frequently enough to make the air stripper more economical.
>
> It is anticipated that two carbon units would be saturated during the first two to four weeks after installation. After this period, it is assumed that the number of saturated units will reduce to about two a year. Actual number of replacements cannot be predicted due to variables of volume and contaminant concentrations in the groundwater influent. If carbon unit replacements exceed two annually after the first month of operation, an air stripper should be considered. The cost of an air stripper addition would range from $12,000 to $15,000. Even with the air stripper, the carbon filtration units may need to remain in place to remove the semi-volatile contaminants Bis (2-ethylhexyl) phthalate and Di-n-butyl phthalate detected in the EPA 8270 analysis done under the Phase II investigation.

Life of the carbon units has since been re-evaluated and a discussion is presented in Section 5.14 of this report.

5.0 PROPOSED SYSTEM

5.1 Treatment System

5.1.1 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 a discharge line.

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.

5.1.2 Pollutant Concentrations

Pollutant concentrations in the groundwater have been based on two sampling rounds, which are summarized in Table 2.1.

5.1.3 Bag Filter

Grain sizes for silt range from 5 to 75 microns. A 20 micron bag inside a 5 micron bag 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. The 20 micron bag will screen larger particles to help prolong the life of the 5 micron bag.

Bags will need to be checked frequently and a supply of at least 6 bags should be kept in storage.

5.1.4 Carbon Weight

Activated carbon has variable effectiveness adsorbing organic compounds. High molecular weight compounds are readily adsorbed. Table 5.1 summarizes the carbon adsorptive capacity of the compounds detected at concentrations above 1 mg/l.

TABLE 5.1

ADSORPTION CAPACITY FOR SPECIFIC ORGANIC COMPOUNDS

	Loading* (mg/g)	Pounds of Carbon needed per 1000 gallons
1,1-dichloroethane	30	.75
1,1-dichloroethylene	15	0.9
trans-1,2-dichloroethylene	15	0.9
1,1,1-trichloroethane	150	1.8
trichloroethylene	175	1.7
cis-1,2-dichloroethylene	30	4.9

*Provided by Calgon Corp.

Approximately 10 to 15 pounds of carbon will be needed to adsorb pollutants in 1000 gallons of groundwater. Since it is expected that the system will treat 432 gallons of groundwater per day, approximately 6 pounds of carbon 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.

5.1.5 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.

5.2 Well Pump System

The groundwater will be conveyed to the treatment system by an air powered submersible pump. This system has been selected because of its reliability for pumping low flows at low discharge heads. Also, it is a safe pump to use where the atmosphere has a potential to be explosive due to the presence of ignitable volatile organics.

5.2.1 General

The groundwater will be pumped from the well near Chambers Street through the interior of the plant to the northeast corner of the building where the treatment system will be located. A pneumatic controller will be used to set pumping rate. A bubbler tube will be placed in the well to shut off the pump when liquid levels fall to 9 inches above the pump inlet.

5.2.2 Air Driven Pump

The air driven pump is essentially a bailer with two check valves which allows approximately 0.5 gallons of water to be stored within the pump body (see Figure 5.1). A compressed air charge through an air line is delivered to the pump, from an air compressor, forcing groundwater into the discharge tubing. When the air charge is removed, air is vented, and the pump body refills with water.

Because the pump has only two moving parts and functions solely using compressed air, it can survive dry pumping and the silt that is expected to enter the well screen.

An air driven pump should not be confused with an airlift pump which bubbles air into water near the bottom of the water column and depends on unbalanced hydrostatic forces to lift the water. Generally air lift pumps are used in applications where only 5 to 10 feet of lift is desired.

5.2.3 Air Compressor

A dedicated air compressor will be provided to supply compressed air to power the well pump. The air compressor system includes an oil-less piston compressor unit mounted on a 10 to 20 gallon tank with an automatic arrangement for draining condensate from the tank. Minimal maintenance should be required.

The pneumatic controller requires a minimum input pressure from the compressor of 55 psi. The compressor will be sized to deliver a minimum of 2.5 SCFM at 100 psi.

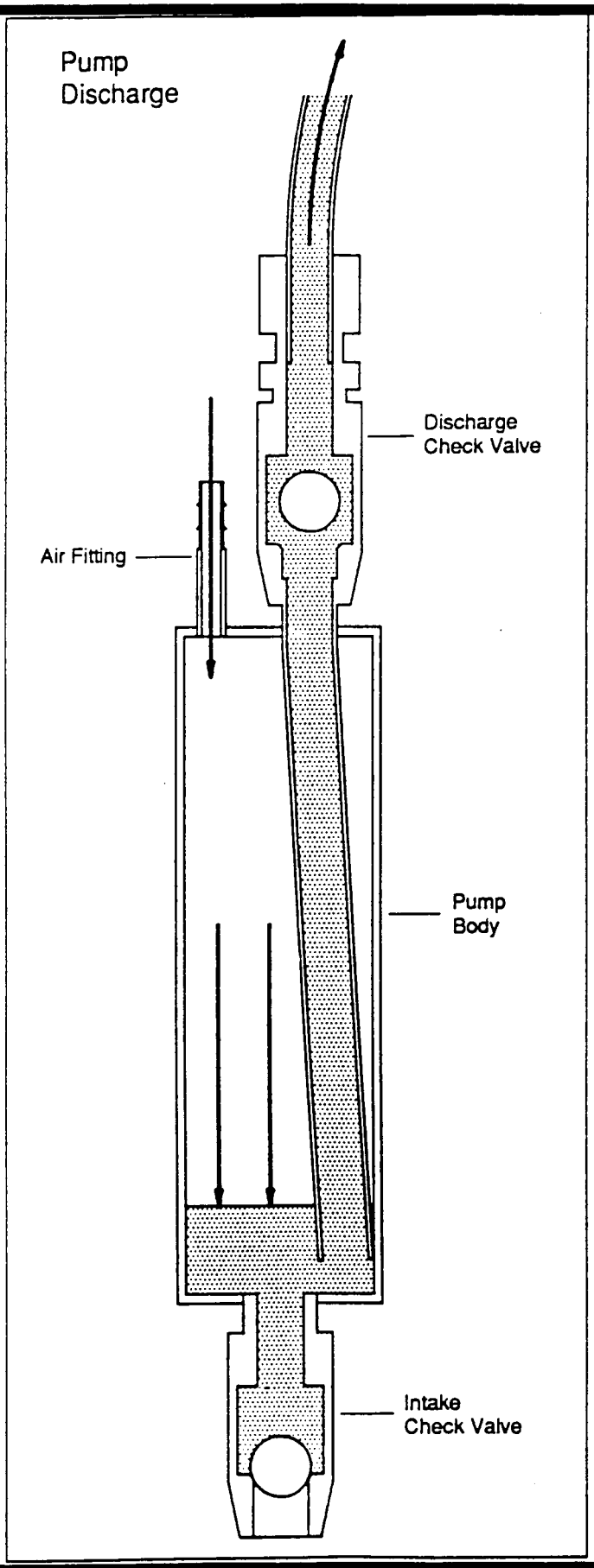


Figure courtesy of GEOGUARD

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 8/11/93 DRAWN PDR NO. 6691	DOVatron International Air-driven Pump	FIG. 5.1

5.2.4 Pneumatic Controller

a. General

A pneumatic controller regulates the air supply from air compressor to the well pump. It functions as a pressure reducer and timer to control the duration of the pressure (discharge) and vent (refill) positions of the pump. By controlling the frequency of the pump cycle time, the pump discharge rate can be adjusted to match the recharge rate of the well.

b. Controller Settings

Flow rate is dependent on the static lift, pipe friction, and the air pressure setting. Average flow rate is dependent on discharge and vent time adjustments and needs to be equivalent to the actual well yield. When properly adjusted, the pump will switch to discharge mode when it is completely full.

The controller will likely need to be set at pressures from 18 to 24 psi. The timer should be sent for a discharge time from 4 to 8 seconds.

5.2.5 Bubbler Tube

The bubbler tube runs from a probe set along side the pump body to the controller. Its function is to track the water level inside the well. If the water level is low, the controller will sense back pressure from the bubbler tube and prevent compressed air from entering the pump timing control module.

5.2.6 Piping

According to figures provided by Dover Electronics it will tank approximately 180 feet of pipe for each of the water discharge line, air line, and bubbler tubing to reach the compressor room where the system will be located.

a. Hydraulics

Refer to Appendix A, Basis of Design, for calculations of head loss and pressure in the discharge line. One-half inch (1/2") O.D. pipes will be used for the air and water lines and 3/8 inch tubing will be used for the bubbler tube.

b. Materials

Chemical resistance tables show that PVC is reactive to trichloroethylene. Polyethylene (PE) and polypropylene (PP) are considered fair to good or having a moderate effect while stainless steel, teflon, and polyvinylidene fluoride (PVDF) are considered good to excellent choices. PVC uses solvent welded connections where as PP, PE, and PVDF require thermosealing.

Given the diluted concentrations of the compounds present, polyethylene or polypropylene will be sufficient. Polypropylene is preferred for the water line because it is rigid and is supplied in sections. Polyethylene is typically supplied in rolls. Piping from the discharge to the sewer connection can be PVC because pollutants will be removed. The air line and the bubbler tubing will be polyethylene.

6.0 COST ESTIMATES AND PURCHASE OPTIONS

6.1 Pump System

The table below summarizes cost for pumping systems made by Geoguard (a division of American Sigma) of Medina, NY and by Accuwell (a division of ISCO) of Lincoln, NE.

		Geoguard	Accuwell
1.	Air Compressor	$ 850.00	$1,995.00
2.	Pneumatic Cycle Controller	1,695.00	995.00
3.	Check Valve	65.00	Included
4.	Well Cap	325.00	110.00
5.	Gas-Driven Pump	325.00	345.00
	revised quote 8/11/93 Jim	~~$2,970.00~~ # 3,140	$3,445.00

In addition to these costs, approximately 200 feet of 1/2 inch O.D. polypropylene pipe, 180 feet of 1/2 inch O.D. polyethylene, tubing, 180 feet of 3/8 inch O.D. polyethylene tubing, and 95 feet of 1-1/2 inch O.D. PVC pipe will need to be purchased for air and water flow. If a plumber were hired to install the piping, his cost would be around $3,000 for labor according to Means cost data. The electric discharge pump and basin to pump the treated water to the sewer connection location will cost $556. It will cost about $535 for a Bilco door at the well head and a concrete structure to surround the well would cost from $275 to $350 as quoted by Binghamton Concrete Structures. Labor cost for an excavator to install the concrete structure and piping into the building will be approximately $1,000 based on Means cost data.

6.2 Treatment System

The following table summarizes cost for treatment systems consisting of carbon adsorber units from Calgon, Cameron-Yakima, and Specialized Process services. Under the Calgon and Cameron-Yakima columns we have included the same bag fire and equipment skid prices as these items will have to be purchased separately.

Specialized Process Services offers a complete skid mounted system with all components bolted, assembled, and connected. The table also includes the cost for buying two additional carbon drums in advance as it is estimated that two drums would be spent during the initial months of operation.

Calgon makes two types of treatment units. The Disposorb drums are made of plastic and may be easier to landfill and acceptable to incinerate at some facilities. The Flowsorb drums are expected to be sent back to Calgon for regeneration. The price ranges for the Calgon products are due to different grades of carbon. The lowest price is based on reactivated carbon. Reactivated carbon will be adequate for this application.

The skid under the Calgon and Cameron-Yakima is based on the quote from R.M. Headlee Co. for a 3 foot by 8 foot Chemgrate fiberglass grating platform with pedestals.

	Calgon Flowsorb	Calgon Disposorb	Cameron-Yakima	Specialized Process
4 Carbon Units	$1660-1828	$2,140	$1512	$1,700
Shipping	$200	$200	$364	$200
Bag Filter	$440	$440	$440	$800
6 Additional Filter Bags	$24	$24	$24	$60
Skid	$510	$510	$510	$600
	$2,864-3,002	$3,314-3,826	$2,850	$3,360

TABLE 6.1

CONSTRUCTION COST ESTIMATE

Pump System		
Geoguard Components	$ 3,000	(see Page 12)
Precast Concrete Structure	350	
Bilco Door	540	
Piping and Accessories	1,200	
Plumber - Labor	3,000	
Excavator - Labor	1,000	
Air Release Valves	150	
Treatment System		
Bag Filter and Carbon Units	2,900	(see Page 13)
Discharge Pump and Basin	560	
Signet Flow Meter	840	
Misc. Shipping Charges	300	
TOTAL	$13,800	

APPENDIX A

BASIS OF DESIGN

DATE
STARTED 4-29-91
FINISHED 4-29-91
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

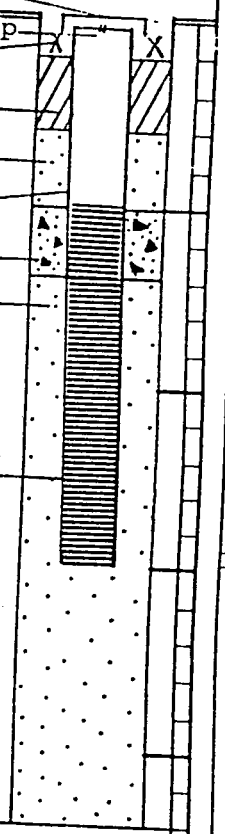
HOLE NO. B-1
SURF. ELEV.
G. W. DEPTH See Notes

PROJECT Dover Electronics (ESI# GD-91-051)

LOCATION Conklin Avenue, Binghamton, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION
0		1	4	4	1	5		FILL: Brown fine-medium GRAVEL, Some Asphalt (Dry)
			3					
		2	3	6	6	12		Brown fine-coarse GRAVEL, Some Silt (Wet-Firm)
			9					
5		3	5	6	9	15		Same
			9					
		4	7	8	8	16		Same
			14					
		5	10	11	10	21		Same
10			16					
		6	8	12	12	24		Same
			14					
								(Moist-Firm)
		7	20	40	19	59		Brown SILT, Some fine-medium Gravel
			20					(Moist-Very Compact)
15		8	12	18	18	36		Same
			25					(Moist-Compact)
		9	20	27	26	53		Same
			24					(Moist-Very Compact)
		10	13	18	14	32		Same
			18					(Moist-Compact)
		11	11	27	18	45		Same
			21					
								Boring Terminated at 22.0'

NOTES



Groundwater first encountered at 1.0' with augers at 4.0'.

Upon completion, no groundwater with augers at 19.0'.

No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

CLASSIFICATION Visual by Driller (M.W.)

Stetson-Harza
A HARZA COMPANY

DESIGN BRIEF

PROJECT NAME Dover Electronics Interim Remedial Measures SHEET 1 OF 2

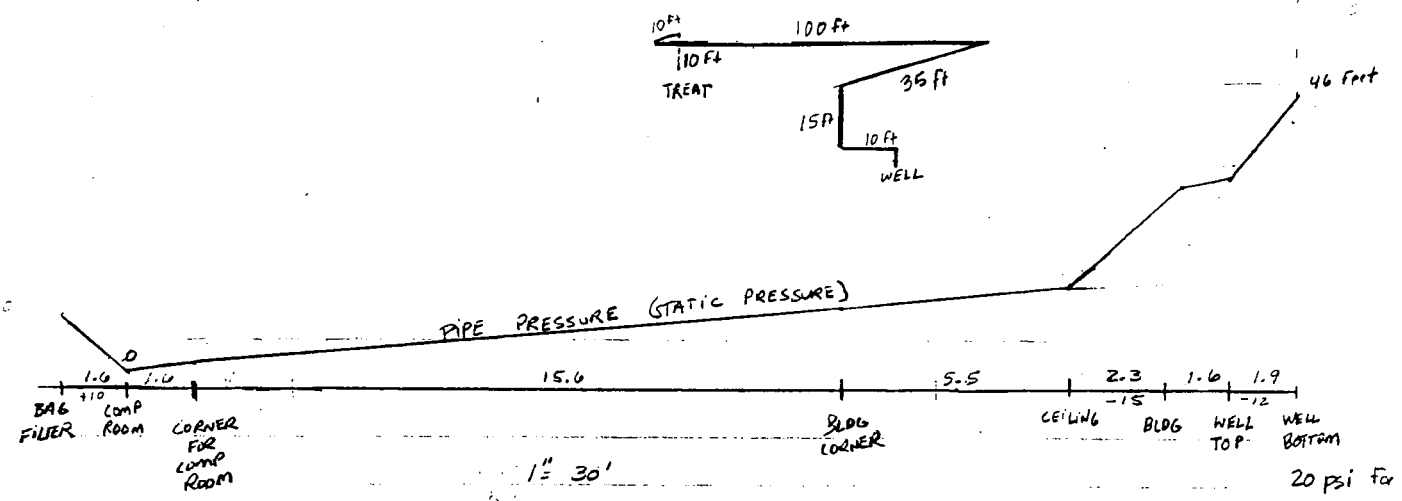
SUBJECT Pressure Setting for Air Compressor & Resulting Flow Rate PROJECT NO. 6691

BY PDR DATE 4/93

CHKD. BY DATE

-15 + 2

46 - 12 = 34



Darcy

$$s = \frac{fv^2}{2Dg}$$

V = pipe velocity = 2.42 ft/s

$$Q = \frac{(2.42\ ft/s)(.000767\ ft^2)}{.002228\ \frac{cfs}{gpm}} = 0.83\ gpm$$

175 ft. (180 - 10 + 5 = 175)

f ≈ .037

$$z_1 + h_{v_1} + h_{p_1} = z_2 + h_{v_2} + h_{p_2} + h_f$$

$$46 = 27 + \frac{v^2}{2g} + 0 + \frac{fVL}{2Dg}$$

$$46 - 27 = v^2\left(\frac{1}{2g} + \frac{fL}{2Dg}\right)$$

$$v^2 = \frac{46-27}{(.0155 + 3.2m)} = 5.877$$

$$V = \sqrt{5.877} = 2.42$$

f = friction factor = .037 ✓

Reynolds # $= \frac{Dv}{\nu} = \frac{(.03125)(2.42)}{1.41 \times 10^{-5}}$

$= 5400\ (>2000)$

roughness, $\epsilon = .000005$

$\epsilon/D = .00016$

D = inner diameter = 3/8 in = .03125 ft.

g = gravitational acceleration = 32.2 ft/s²

$$s = \text{headloss per foot} = \frac{fv^2}{2Dg} = \frac{(.037)(2.42)^2}{2(.03125)(32.2)} = 0.108\ \frac{ft.}{ft.}$$

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DESIGN BRIEF

PROJECT NAME Dover Electronics Interim Remedial Measures SHEET 2 OF 2

SUBJECT Pressure Setting for Air Compressor & Resulting Flow Rate PROJECT NO. 6691

BY PDR DATE 4/93

CHKD. BY DATE

$$h_p - 27 = V^2\left(\frac{1}{2g} + \frac{fL}{2Dg}\right)$$

$$Q = .75 \; ; \quad V = \frac{.75\,(.002228)}{.000767} = 2.18 \text{ ft/s}$$

$$h_p = V^2\left(\frac{1}{2g} + \frac{fL}{2Dg}\right) + 27$$

$$= (2.18)^2\left(.01553 + \frac{.039(175)}{2(.03125)(32.2)}\right) + 27$$

$$= (2.18)^2(.01553 + 3.3913) + 27$$

$$= (2.18)^2(3.407) + 27$$

$$= 43.19$$

Reynold # $= \frac{(.03125)(2.18)}{1.41 \times 10^{-5}}$

$= 4800$

$\varepsilon/D = .00016$

$f = .039$

at	1:1.8 ratio	24 psi
at	1:2.3 ratio	19 psi

headloss at .75 gpm

$$S = \frac{(.039)(2.18)^2}{2(.03125)(32.2)} = 0.092$$

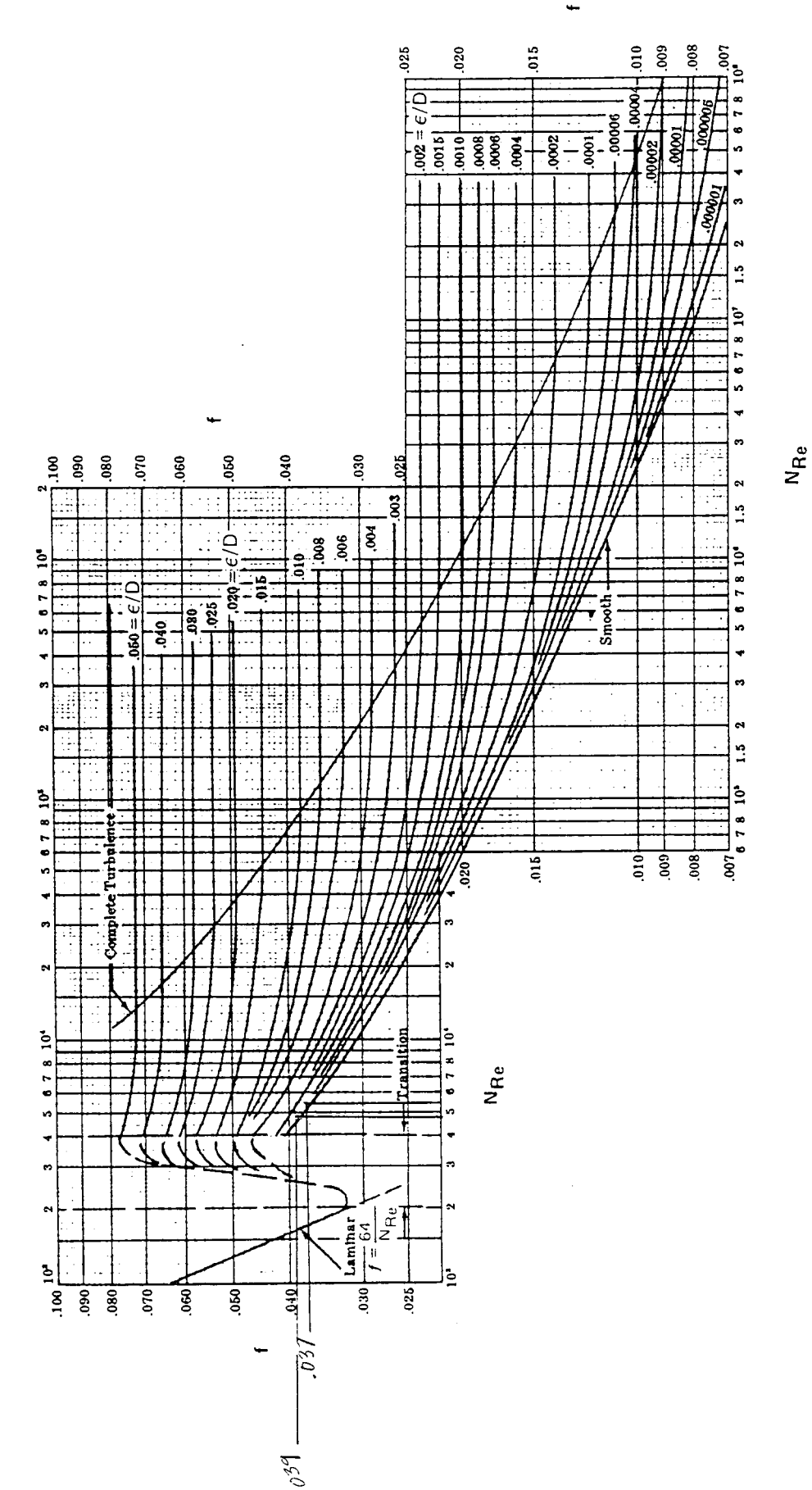


Figure 3.13 Moody Friction Factor Chart

FLUIDS

Table 3.8
Specific Roughness and Hazen-Williams Constants for Various Pipe Materials

	ϵ(ft)		C		
type of pipe or surface	range	design	range	clean/ new	design/ 10–20 years old
STEEL					
welded and seamless	0.0001–0.0003	0.0002	150–80	140	100
interior riveted, no projecting rivets				139	100
projecting girth rivets				130	100
projecting girth and horizontal rivets				115	100
vitrified, spiral-riveted, flow with lap				110	100
vitrified, spiral-riveted, flow against lap				100	90
corrugated				60	60
MINERAL					
concrete	0.001–0.01	0.004	150–85	120	100
cement-asbestos			160–140	150	140
vitrified clays					110
brick sewer					100
IRON					
cast, plain	0.0004–0.002	0.0008	150–80	130	100
cast, tar (asphalt) coated	0.0002–0.0006	0.0004	145–50	130	100
cast, cement lined	0.000008	0.000008		150	140
cast, bituminous lined	0.000008	0.000008	160–130	150	140
cast, centrifugally spun	0.00001	0.00001			
galvanized, plain	0.0002–0.0008	0.0005			
wrought, plain	0.0001–0.0003	0.0002	150–80	130	100
MISCELLANEOUS					
fiber				150	140
copper and brass	0.000005	0.000005	150–120	140	130
wood stave	0.0006–0.003	0.002	145–110	120	110
transite	0.000008	0.000008			
lead, tin, glass		0.000005	150–120	140	130
plastic (PVC and ABS)		0.000005	150–120	140	130

The relative roughness is

$$\frac{\epsilon}{D} = \frac{0.0002}{0.3355} = 0.0006$$

From the Moody friction factor chart, $f = 0.0195$.

From equation 3.71,

$$h_f = \frac{(0.0195)(1000)(7.56)^2}{(2)(0.3355)(32.2)} = 51.6 \text{ ft}$$

Example 3.20

Repeat example 3.19 using the Hazen-Williams formula. Assume $C = 100$.

Using equation 3.73,

$$h_f = \frac{(3.022)(7.56)^{1.85}(1000)}{(100)^{1.85}(0.3355)^{1.165}} = 90.8 \text{ ft}$$

Using equation 3.74,

$$h_f = (10.44)(1000)\frac{(300)^{1.85}}{(100)^{1.85}(4.026)^{4.8655}} = 90.9 \text{ ft}$$

3 MINOR LOSSES

In addition to the head loss caused by friction between the fluid and the pipe wall, losses also are caused by obstructions in the line, changes in direction, and changes in flow area. These losses are named *minor losses* because they are much smaller in magnitude than the h_f term. Two methods are used to determine these losses: the method of equivalent lengths and the method of loss coefficients.

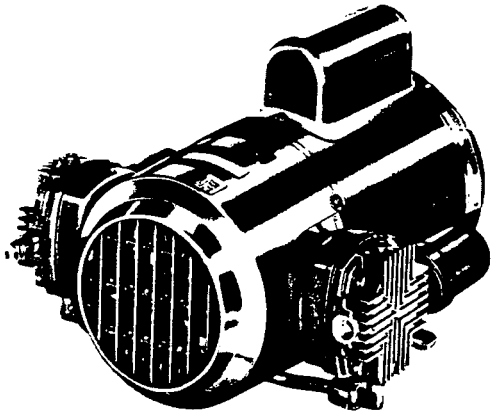
Models 5HCD
5HCE
5HCD-"Q"
5HCE-"Q"

Oilless, Motor Mounted

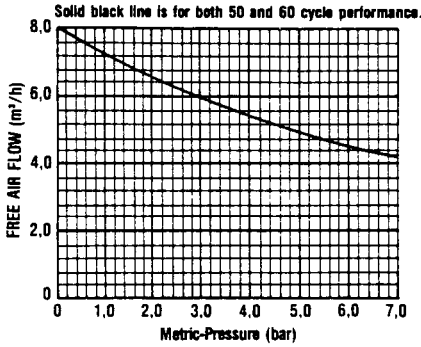
STANDARD LINE

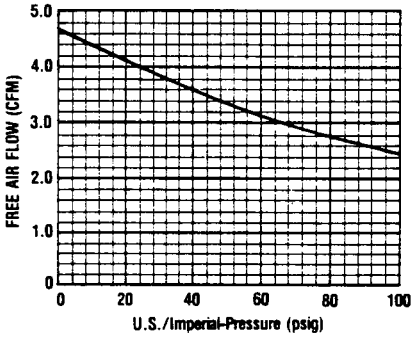
INCLUDES
- Twin Cylinder
- Thermotector (on Single-Phase Motors)
- Filter/Silencers
- Safety Valve

RECOMMENDED
- Pressure Gauge AF583
- Repair Kit K263



Solid black line is for both 50 and 60 cycle performance.

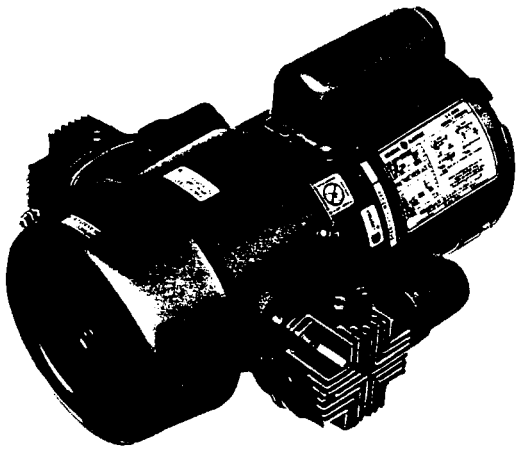




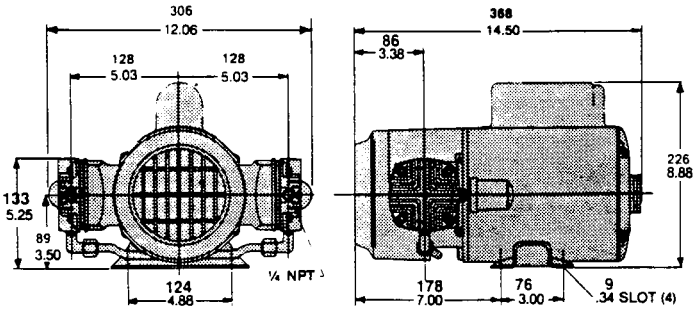
QUIET LINE®

INCLUDES
- Same as standard line plus special head design and sound supression components that reduce sound level by 7 dBa @ 100 psig (measured at 1 meter).

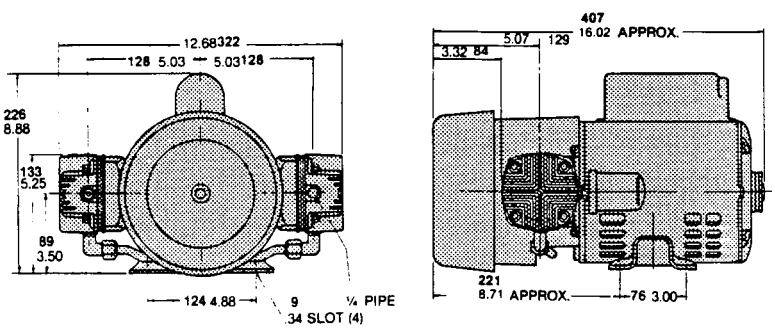
RECOMMENDED
- Repair Kit K263



Note: On all drawings
Metric
U.S./Imperial
(Dimensions for reference only)



Model 5HCD-10-M500X



Model 5HCD-Q10-M500X

Model No. Chart	Motor	RPM 60 Cycle	RPM 50 Cycle	HP	kW	Net Wt. lbs.	Net Wt. kg
5HCD-10-M500X	115/230-60-1	1725		¾	.56	39	17.7
5HCE-10-M501X	110/220-50-1		1425	¾	.56	39	17.7

Model No. Chart	Motor	RPM 60 Cycle	RPM 50 Cycle	HP	kW	Net Wt. lbs.	Net Wt. kg
5HCD-Q10-M500X	115/230-60-1	1725		¾	.56	42	19.1
5HCE-Q10-M501X	110/220-50-1		1425	¾	.56	42	19.1

Above flow data is with no accessories. Flow readings will be approximately 5% less when taken with inlet filter/silencers installed.

Stetson-Harza
A HARZA COMPANY

DESIGN BRIE

PROJECT NAME Devatron International – Conklin Ave SHEET 1 OF 1
SUBJECT Pump & Treat PROJECT NO.
air pumping time BY PDR DATE 6/93
CHKD. BY DATE

Volume of air required:

$$\text{Pump Body} = .5\ \text{gal}\left(\frac{1\ ft^3}{7.481\ \text{gal}}\right) = .0668\ ft^3$$

$$\text{Piping} = (\text{Area})(200\ ft) = (.00306\ ft^2)(200\ ft) = .614\ ft^3$$

$$\text{Total} = .668 + .614 = .68\ ft^3$$

Compressor running at 70 psi reduced at controller to 20 psi in line – cfm cons

Compressor delivers 3 cfm at 70 psi

$$\text{Compression ratio at 20 psi} = \frac{20 + 14.7}{14.7} = 2.36$$

$$\text{scfm} = 2.36\ (3) = 7.08\ \text{scfm}$$

$$\text{time} = \frac{.68\ ft^3}{7.08\ \text{scfm}} = .096\ \text{min} = 6\ \text{seconds}$$

Say 4 – 8 seconds Pump ON

2 pages

CARBON
CALGON CORPORATION

CALGON ADSORPTION SYSTEMS — ENGINEERING DEPARTMENT

CUSTOMER Paul Ramino / ~~Statson Harza~~ SHEET ____ OF ____

LOCATION ~~Binghamton, NY~~ PROJECT NO. ____

SUBJECT ____ BY ____

DATE 4/30/93

Influent	(ppm)	loading	#C/1000 gallons
1,1 Dichloroethane	2.7	30 mg/g	.75
1,1 Dichloroethylene	1.65	15 mg/g	.9
t, 1,2 Dichloroethylene	1.65	15 mg/g	.9
1,1,1 Trichloroethane	53	150 mg/g	1.8
Trichloroethylene	35	175 mg/g	1.7
C 1,2 Dichloroethylene	17.5	30 mg/g	4.9

10.35 → 15 #/1000g w/safety factor.

At 0.3gpm for 24 hrs = 432 gallons/day.

Flowsorb/Disposorb w/ 165# carbon lasts ≈ 35 days. – 40 days

Estimated freight for 4 Flowsorbs/Disposorbs to Binghamton NY is ... $150 – $200

Disposorb pricing attached. Any questions please feel free to call.

Kim Friedman
908-526-4646

Stetson-Harza
A HARZA COMPANY

DESIGN BRIEF

PROJECT NAME	Dover Electronic Interim Remediation	SHEET	1 OF 2
SUBJECT	Sump pump sizing	PROJECT NO.	6691
		BY	PDR DATE 5/28/93
		CHKD. BY	DATE

SUMP PUMP SELECTION

$$TDH = \underset{\text{approx. lift}}{15\ ft.} + \frac{2.96}{100}(95 + 16) = 18.3\ ft.$$

(16: equivalent length; 2.96/100: friction loss at 20 gpm)

= 17.2 ft @ 16 gpm

= 17.7 @ 18 gpm

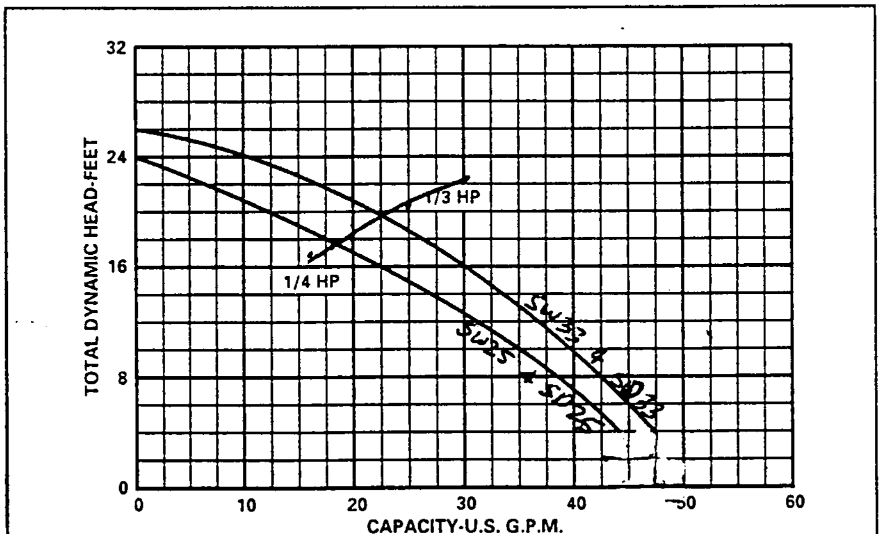
= 20.3 @ 25 gpm

= 22.0 @ 30 gpm

– Aurora Pumps – Hydromatics

MODELS SD25/33 & SW25/33

Performance Data



Total Head (feet)		4	6	8	10	12	14	16	18	20	22	24
GPM	1/4 HP	44	41	36	33	29	26	23	18	12	6	0
	1/3 HP	47	45	43	40	37	34	30	26	22	16	10

18 gpm (.002228) = 2.27 ft... [cut off]

775-2545 DEC

Stetson-Harza
A HARZA COMPANY

DESIGN BRIE

PROJECT NAME DOVER ELECTRONICS INTERIM REMEDIATION SHEET 2 OF 2

SUBJECT SUMP PUMP SIZING PROJECT NO. 6691

BY PDR DATE 5/28/93

CHKD. BY DATE

Figure F — FRICTION HEAD IN FEET PER 100' OF SCHEDULE 40 PIPE

GPM	1-1/4"		1-1/2"		2"		2-1/2"		3"	
	PLASTIC	STEEL	PLASTIC	STEEL	PLASTIC	STEEL	PLASTIC	STEEL	PLASTIC	STEEL
4	.34	.35								
6	.71	.72	.33	.34						
8	1.19	1.20	.56	.57						
10	1.78	1.74	.83	.85						
12	2.48*	2.45*	1.16	1.18	.34	.35				
14	3.29	3.24	1.54	1.51	.45	.46				
16	4.21	4.15	1.97*	1.93*	.58	.59				
18	5.25	5.17	2.41*	2.40*	.72	.73				
20	6.42	6.31	2.96	2.92	.88	.88				
25	10.39	9.61	4.80	4.80	1.38	1.39				
30	13.6	13.0	6.27	6.23	1.81	1.82	.75	.77		
35	19.2	18.2	8.82	8.82	2.4*	2.4*	1.01	.99		
40			10.7	10.80	3.12	3.10	1.28	1.3		
45			14.0	14.0	3.8	3.8	1.5	1.6	.55	.56
50			16.5	16.5	4.7	4.7	1.9*	1.9*	.66	.68
60					6.5	6.6	2.7*	2.7*	.94	.91
70					8.6	8.8	3.7	3.6	1.2	1.2
80					11.1	11.4	4.7	4.6	1.6	1.6
90					13.8	14.3	5.8	5.8	2.0*	2.0*
100					16.8	17.5	7.1	7.1	2.4	2.4
125							10.9	10.9	3.7	3.6
150							15.9	15.9	5.2	5.1
175									6.9	6.9

* Recommended loss in friction head per 100'.

FIGURE F is from Arrora Pump Manual

BASIN SIZE

Pump should run a minimum of 2 minutes

At 1/4 Hp pump (SW25/5025) operating point is at 17.7 ft, 18 gpm

Volume = 18 gpm x 2 mins = 36 gallons

18" diameter basin – (minimum 24" depth necessary)

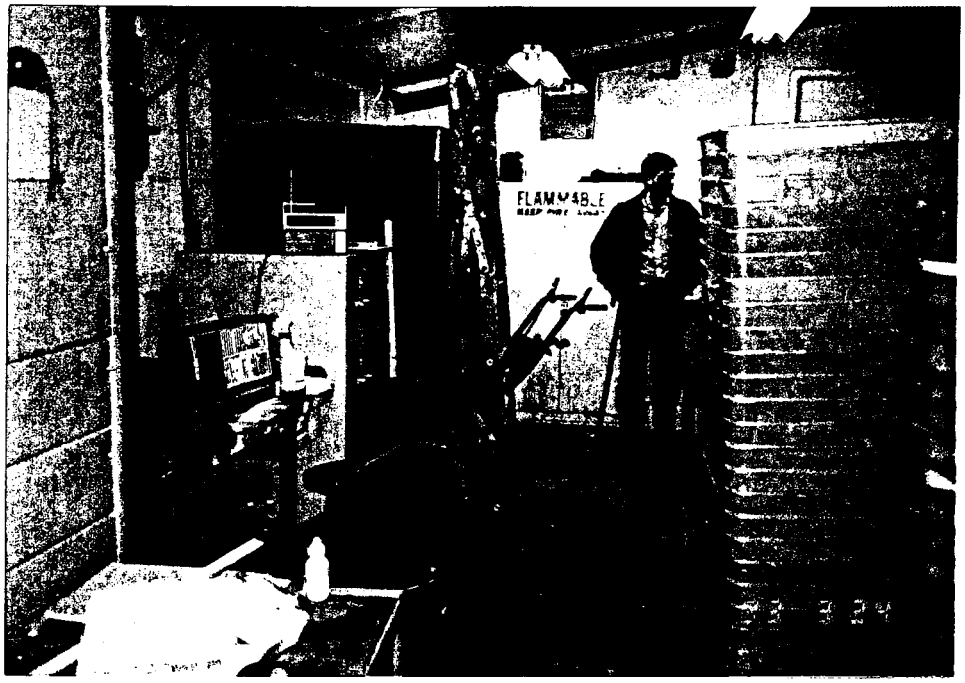
$\frac{\pi \cdot R^2 \cdot \text{Depth}}{231} = \text{Volume}$; $\text{Depth} = \frac{\text{Volume}(231)}{\pi (9)^2} = 33$ inch

18" x 36" → Possible

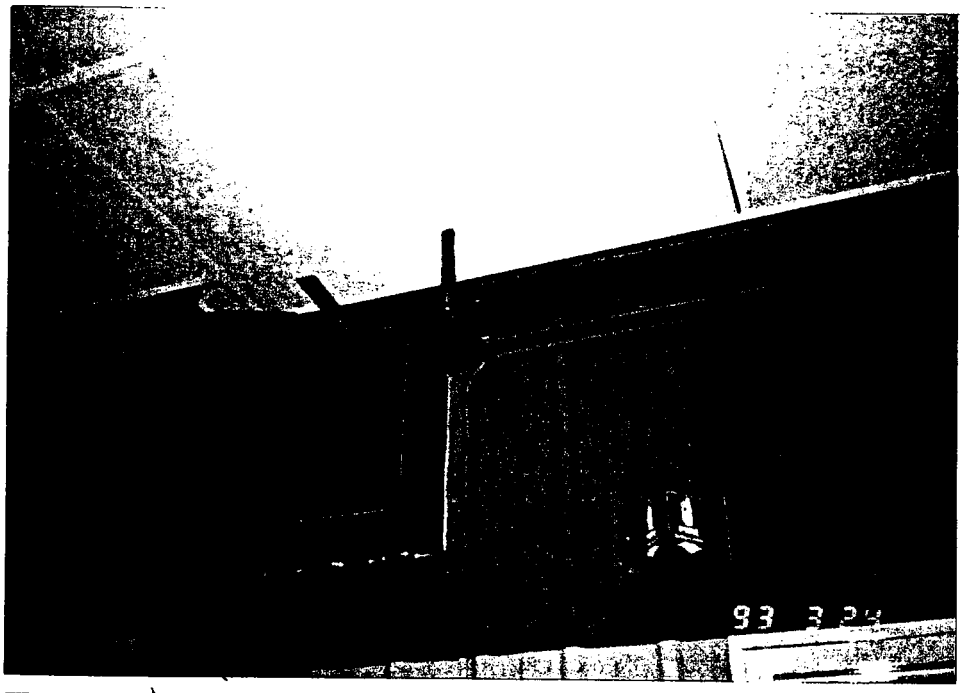
APPENDIX B

COLOR PHOTOGRAPHS

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.

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.

APPENDIX C

VENDOR INFORMATION

GA Industries Inc.
9025 MARSHALL ROAD, MARS, PA 16046 USA
☎ PHONE: (412) 776-1020 ✧ FAX: (412) 776-1254

IMPORTANT FAX!

RECEIVED
JUN 17 1993

TO: Stetson / Hanza REF: STETSON-HANZA PAGE ____ OF ____
FROM: Warren Nuonis FAX NO: ____ / COUNTRY: ____
DATE: 6/17/93 / TIME: ____ OTHER: BY ____

Attn & Paul Romano

1 - each 1/2" Fig 905 Minimatic
Golden Anderson Air Release
Valve complete
$50.00
FOB: Mars, Pa.
Want: 5 lb.
Delivery: Stock

Thanks!
Warren Nuonis

GA INDUSTRIES, INC.
PUBLICATION 1989-1

MINIMATIC
PRESSURE TYPE AIR VENT

FIG. 905

MINIMATIC

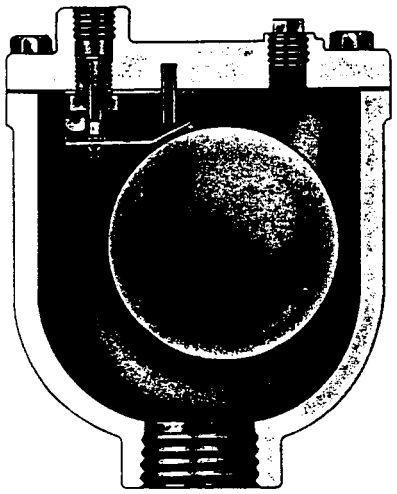
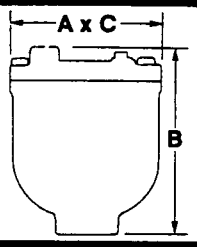


FIG. #905

GENERAL DIMENSIONS

VALVE SIZE (INLET)	OUTLET	A	B	C	Wgt. (lbs.)
1/2" NPT 3/4" NPT	1/4" NPT	4"	5"	3⅜"	5



ENGINEERING SPECIFICATIONS

The air vent (release) valve shall be float operated and shall incorporate a simple lever mechanism to enable the valve to automatically release accumulated air from a fluid system while that system is pressurized and operating.

The air vent valve shall close drop-tight, incorporating an easily renewable Viton seat, suitable for hot or cold water service. All internal metal parts shall be of stainless steel. The float shall be stainless steel, and be capable of withstanding a test pressure of 750 PSIG. The linkage/lever mechanism shall be designed to prevent jamming.

The body and cover shall be of cast iron conforming to ASTM A126 Class B. The air vent valve shall be designed to withstand a 450 PSIG test pressure.

The air vent (release) valve shall be as manufactured by GA Industries, Inc., Mars, PA, their Figure #905 "Minimatic" or approved equal.

ENGINEERING DATA

Pressure Rating: Valve body rated 200 psi W.O.G., tested to 300 psi
Float tested to 750 psi

Working Pressure:
0 -150 psi with 3/32" Orifice (STANDARD-Fig. 905)
151-200 psi with 1/16" Orifice (Optional-Fig. 905-H)
CONSULT FACTORY IF OPERATING PRESSURE IS LESS THAN 20 PSI.

Maximum Venting Rate:
FIG. 905 @ 150 psi with 3/32" Orifice = 14.7 SCFM
FIG. 905-H @ 200 psi with 1/16" Orifice = 8.5 SCFM

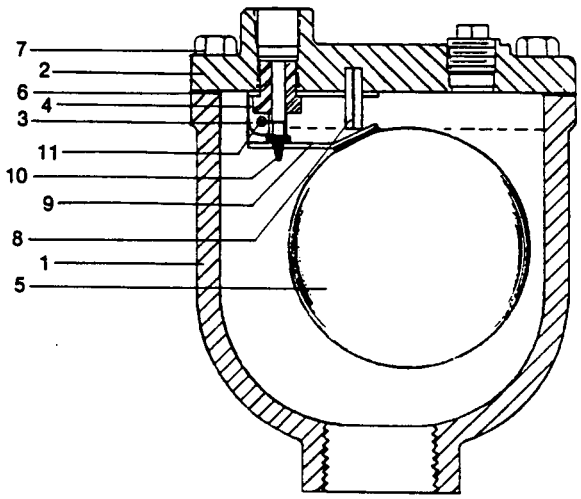
FOR SIZING AND LOCATING SEE PAGES 16-17.
OTHER ORIFICES AVAILABLE, CONSULT FACTORY

Where to Install Air Valves:
1. Peaks
2. Increase Down Slope
3. Decrease in Upward Slope
4. Long Ascents
5. Long Desents
6. Long Horizontals
7. Pumps
8. Large Valves, Cylinders, and Piping Loops

PARTS LIST & MATERIAL SPECIFICATIONS

1. BODY — A-126 Class B Cast Iron
2. COVER — A-126 Class B Cast Iron
3. LEVERAGE BRACKET — 304 Stainless Steel, ASTM A240
4. SEAT — 304 Stainless Steel, ASTM A240
5. FLOAT — 302 Stainless Steel, ASTM A240
6. GASKET — Cranite or Armstrong CS-301
7. COVER BOLTS — Steel, ASTM A307
8. SPRING PIN — 18-8 Stainless Steel, ASTM A240
9. FLOAT ARM — 304 Stainless Steel, ASTM A240
10. ORIFICE BUTTON — Viton
11. PIVOT PIN — 18-8 Stainless Steel, ASTM A240

PARTS LOCATION



R. M. HEADLEE CO., INC.

TECHNICAL SALES

RECEIVED
JUN 17 1993
STETSON-HARZA
BY

June 14, 1993

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

Attention: Paul Romano

Re: Chemgrate Fiberglass Grating Dovatron Project

Dear Paul:

Thank you for taking the time to discuss Chemgrate Fiberglass Grating. As we discussed during our meeting, Chemgrate offers a 65% resin, 35% glass Fiberglass Grating System. Since no fillers are included in our resin system, Chemgrate offers maximum corrosion protection for your tough environmnents. Secondly, the silica we use for nonslip walking surface is imbedded into the grating when the resin is still in the liquid form. This procedure provides the longest lasting nonslip walking surface available on the market.

I would like to offer the following price for the fiberglass grating platform you requested:

(1) 3' x 8' Chemgrate Fiberglass Platform, 1" x 1" x 4" Chemgrate Fiberglass Grating, Cp-84 resin system, integral grit top, cream color, included are (10) elastomeric pedestals.
Price. $510.00

Thank you for your interest in Chemgrate Fiberglass Grating. We look forward to working with you on this project.

Regards,

R. M. HEADLEE CO.,INC.

GARY LAUCHERT

GL:pac
CC: Buffalo Office

CENTRAL NEW YORK BRANCH
6493 Ridings Road
Syracuse, N.Y. 13206
Phone (315) 437-3379
FAX (315) 437-4071

MAIN OFFICE/WHSE. (Buffalo)
S-3596 California Road
Orchard Park, N.Y. 14127-1786
Phone (716) 662-9813
FAX (716) 662-1557

ALBANY BRANCH
QUAKER VILLAGE OFFICE
76 Quaker Road
Queensbury, N.Y. 12804
Phone (518) 792-2252

PRODUCT DESCRIPTION & BENEFITS

WHAT IS CHEMGRATE?

Chemgrate Floor Grating is a molded, one-piece fiberglass reinforced polyester (FRP) grating, available in standard-sized panels. It is principally used for floors, platforms, stairs, ramps, catwalks and trench covers.

Chemgrate is typically composed of 65% resin and 35% continuous fiberglass strand. It cannot rust, never needs painting and resists chemical corrosion. Chemgrate is made with an integral anti-slip surface to reduce slips and falls. It has a high strength-to-weight ratio and is virtually maintenance-free.

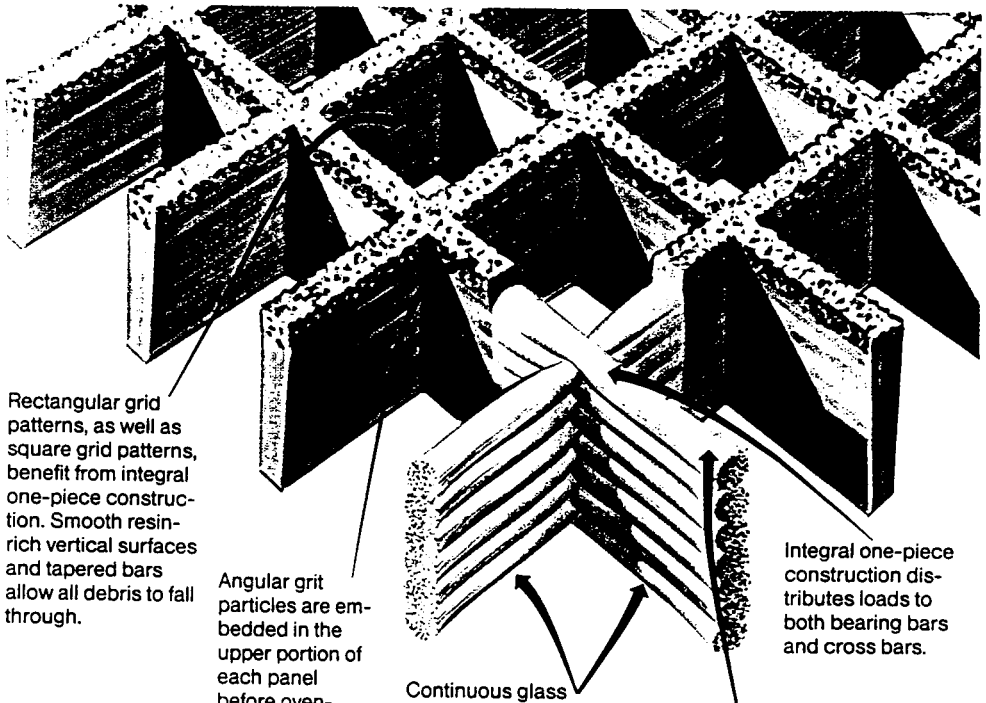
Chemgrate grating has a slight resiliency that makes it comfortable to stand on for long periods. Work platforms made with Chemgrate reduce leg and back strain, increasing worker comfort and productivity. Chemgrate is recommended by leading ergonomic consultants, due to these anti-fatigue benefits.

A unique method of integral construction (see illustration on this page) provides excellent strength. Since Chemgrate panels are light in weight, they can be easily installed without mechanical hoists or lifts. (A complete description of Chemgrate will be found on Pages 8 and 9.)

The most-used standard Chemgrate panel is 4' x 12' with bearing bars running across the panels, making the span 4 feet. The panel weight may vary, depending on the type of resin used in manufacture.

When you know the design load (example: 300 lbs. for worker traffic) and the acceptable deflection, determine the allowable span for a given grating size from the tables on Page 9. After the span has been established, check the Safety Factor you deem acceptable for that span. (We have provided a Safety Factor based on one-tenth the load required to fail the span.)

HOW CHEMGRATE IS MADE



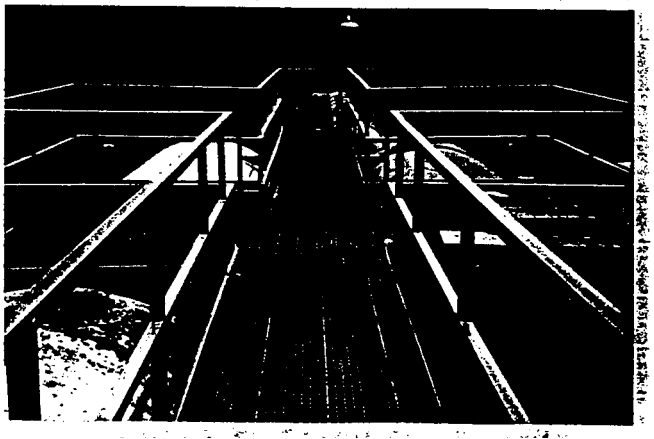
Rectangular grid patterns, as well as square grid patterns, benefit from integral one-piece construction. Smooth resin-rich vertical surfaces and tapered bars allow all debris to fall through.

Angular grit particles are embedded in the upper portion of each panel before oven-curing to provide a long-lasting anti-slip top surface.

Continuous glass fiber strand in alternating layers is thoroughly wetted with polyester resin for excellent corrosion resistance.

Load applied to a Chemgrate bar is transferred to adjoining cross bars and bearing bars, providing load distribution on the grating as well as on the support structure.

Integral one-piece construction distributes loads to both bearing bars and cross bars.



Tank-top walkway at a petrochemical plant

Corrosion-resistant flooring in a chemical processing plant

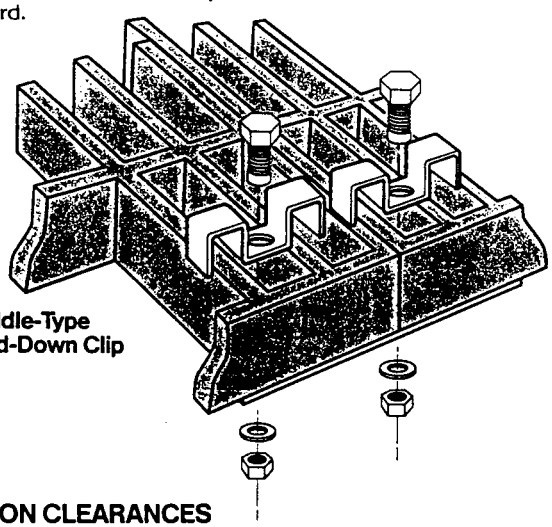
PANEL SUPPORT & HOLD-DOWN PROCEDURES

Use Chemgrate Hold-Down Saddle Clips to attach panel to support structures. Install clips a maximum of every 48," and use at least four clips per piece of Chemgrate (at least eight clips per 4' X 12' panel). Please contact your Chemgrate Stocking Representative for any questions regarding support or hold-down of Chemgrate grating.

HOLD-DOWN SADDLE CLIPS

We recommend the use of saddle-type hold-down clips and we offer 14-gauge stainless steel (Type 316) saddle clips and ¼" hex-head bolts and nuts. Clips can also be attached to support structures with pop rivets, self-tapping screws, or welded studs.

NOTE: If adjoining ends of Chemgrate panels cannot be fully supported, connect them with end-panel connectors to reduce tripping hazard.

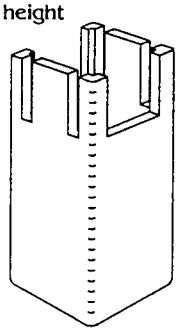


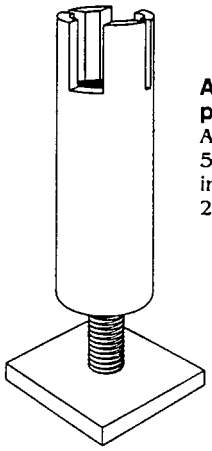
Saddle-Type Hold-Down Clip

PEDESTALS

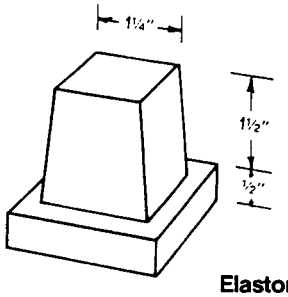
Adjustable or stationary pedestals are available from Chemgrate for use where elevated floors or work platforms are desirable.

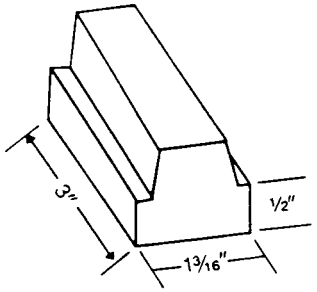
Stationary pedestal
3" - 12" height





Adjustable pedestal
Adjusts within 5" - 12" height in maximum 2" increments



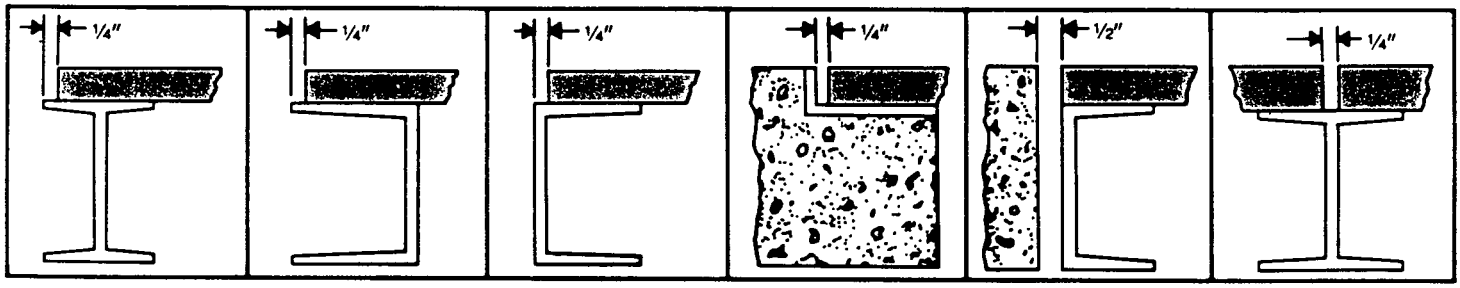


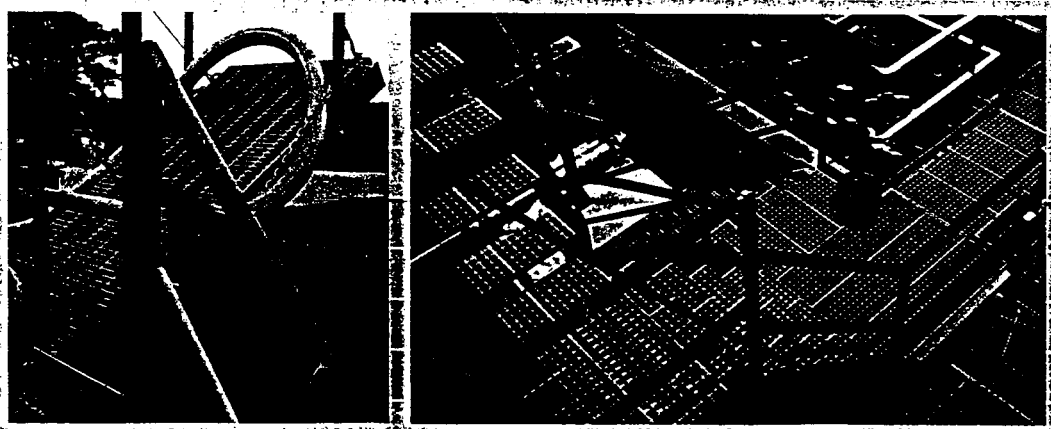
Elastomeric Pedestal
For 1½" Square & 1" (1" X 4") Standard and (1" X 4") Heavy Duty grids.

FOR MORE INFORMATION, ASK FOR BROCHURE "PEDESTAL SUPPORTED PLATFORMS."

STANDARD INSTALLATION CLEARANCES

IMPORTANT: Provide a minimum of 1½" support for all edges of a Chemgrate panel.





Anti-slip gangway at a fuel loading facility

Corrosion-resistant flooring and stairs at a copper refinery

RECEIVED

JUL 28 1993

STETSON-HARZA

BY

GARTNER EQUIPMENT COMPANY, Inc.

302 Sand Street, Syracuse, New York 13204, Phone 315—476-8321, FAX 315—476-8349

Mailing Address: P.O. Box A, Syracuse, New York 13208-0280

FAX TRANSMITTAL

TO: Stetson Harza/Utica
ATTN: Paul Roman
FROM: Bruce Ruggles

DATE: 07-28-93
PAGE 1 OF 1
FAX # 797-8143

Paul:

Per our phone discussion of today we revise and add to our 6/21 proposal as follows:

One (1) HYDROMATIC SW25M1 submersible sump pump with 1/4 HP, 115 volt motor, and 10 feet of power cord — $134

One (1) SJ ELECTRO Model SJE Wide Angle Mercury Switch Level Control — $33

One (1) TOPP 24" diameter x 30" high Fiberglass Basin with one (1) 4" inlet hub (loose)

One (1) TOPP 28" diameter Steel Cover Plate with access plate

(last two items: $389)

Price .... $ 556.00

Plus Freight Charges

Shipment: Two (2) Weeks After Receipt of Order

(1 wk in House)

Regards,

Bruce Ruggles/bc

Bruce Ruggles

freight charges $75

$631

HYDROMATIC SW25/33

Submersible Sump/Effluent Pump

- Basement Sumps
- Septic Tank Effluent
- Industrial Circulators
- Transfer Tanks

AURORA PUMP
A UNIT OF GENERAL SIGNAL

SW25/33 SUBMERSIBLE SUMP/EFFLUENT PUMP

The Hydromatic SW25/33 submersible pump is specifically designed to meet the demands of residential sump and septic tank effluent applications. The 1-1/2 inch NPT discharge pump is available with either a 1/4 or 1/3 horsepower, energy-efficient motor, in both automatic and manual configurations; and can handle capacities up to 47 gallons per minute and heads to 26 feet.

The SW25/33 features a heavy-duty cast iron construction that provides the durability for a long service life, as well as assisting in dissipating heat from the motor, for cooler operation. The pump's anti-clog, vortex-design impeller is made from a tough non-corrosive, thermoplastic material, which is capable of providing long, trouble-free service even in demanding applications.

The SW25/33's oil-filled motor provides superior cooling characteristics, allowing the motor to run cool and quiet in extended service. This oil-filled design also provides permanent lubrication of the shaft bearings, minimizing maintenance and extending the service life of the pump. In addition, to protect against overheating, the motor windings contain an automatic reset thermal overload.

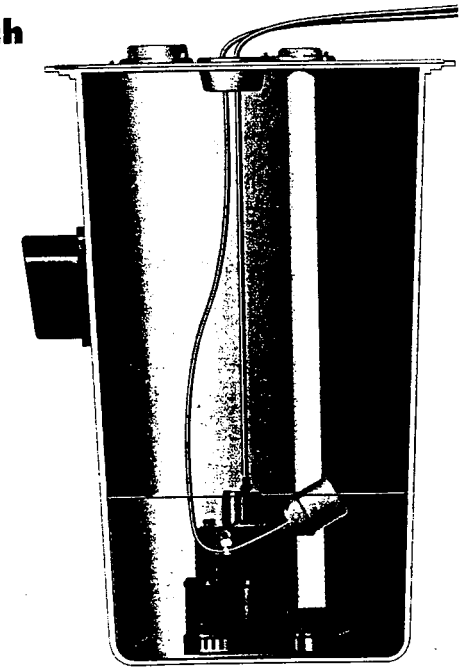
Automatic models feature an easily adjustable, wide-angle float switch incorporating a unique piggyback plug arrangement. This plug allows for simple conversion to manual operation by simply removing the switch plug and inserting the motor plug directly into the electrical outlet. This feature provides an easy way of periodically cycling the pump to ensure it is operating properly.

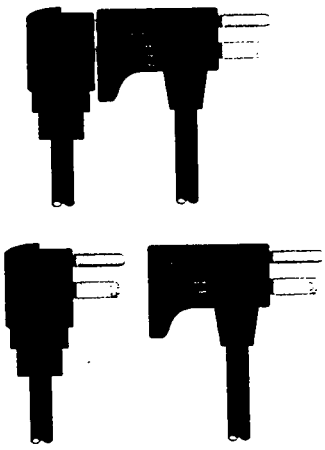
SW25/33 TYPICAL INSTALLATION

Wide-angle Piggyback Float Switch

The SW25/33 uses a tilt-sensitive wide-angle float switch, which is hermetically sealed inside a non-corrosive polypropylene float. As liquid level rises, float changes angle until the switch makes circuit. The switch is not sensitive to rotation (no "up" side), which simplifies installation. Its reliability is proven to 500,000 cycles.

The wide-angle system operates between 115 and 125 degrees. Drawdown range is 6 to 14 inches, variable with length tethered to pump (5 inch maximum); and can be adjusted in seconds. Pumping differentials up to 35 inches can be obtained when the float is tethered to the discharge pipe. For maximum pump life, adjust tether length for deepest drawdown.

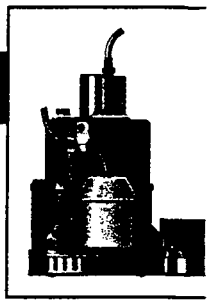




Piggyback Switch Plug

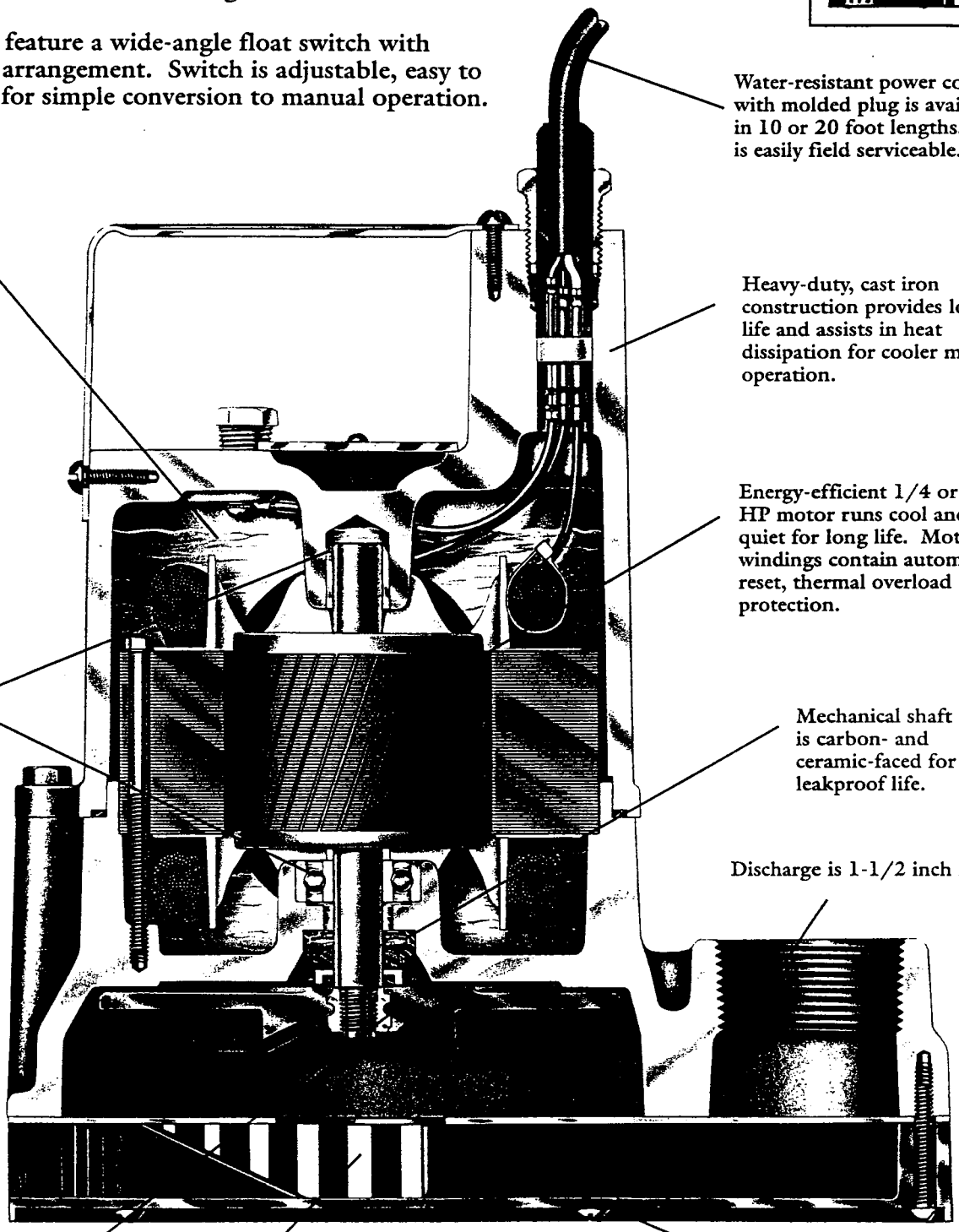
The Hydromatic wide-angle float switch features a unique piggyback, plug arrangement. The pump power cord plugs into the back of the switch plug to provide automatic operation. To operate the pump manually, simply plug the pump power cord directly into the electrical outlet, bypassing the switch plug. The piggyback plug provides ease of service and allows the pump to be cycled manually on a periodic basis to ensure proper operation.

FEATURES/BENEFITS



The SW25/33 is a completely submersible pump for use in basement sump or septic tank effluent applications; and is available in automatic or manual configurations.

Automatic models feature a wide-angle float switch with piggyback plug-in arrangement. Switch is adjustable, easy to service and allows for simple conversion to manual operation.



Water-resistant power cor with molded plug is availa in 10 or 20 foot lengths, a is easily field serviceable.

Oil-filled motor provides superior cooling and permanent lubrication of bearings minimizing maintenance and extending service life.

Heavy-duty, cast iron construction provides lon life and assists in heat dissipation for cooler mo operation.

Energy-efficient 1/4 or 1 HP motor runs cool and quiet for long life. Moto windings contain automa reset, thermal overload protection.

Lower ball and upper bronze-sleeve bearings support motor shaft, minimizing the effects of impeller thrust loads. This design results in minimum friction and perfect alignment of rotor, for longer service from pump.

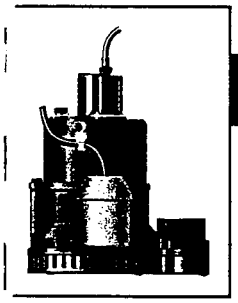
Mechanical shaft se is carbon- and ceramic-faced for lo leakproof life.

Discharge is 1-1/2 inch N

The anti-clog, vortex-design impeller creates whirlpool pumping action to effectively remove solids-laden wastewater from sump. The impeller is made from a tough, thermoplastic material to prevent corrosion, withstand abrasion and provide long, trouble-free life.

Multiple strainer inlets prevent foreign objects from clogging pump — providing optimum operation and reduced maintenance.

Bottom-suction design alleviates build-up of deb providing optimum pum performance and reduced maintenance.



ENGINEERING DETAILS - SW25/33

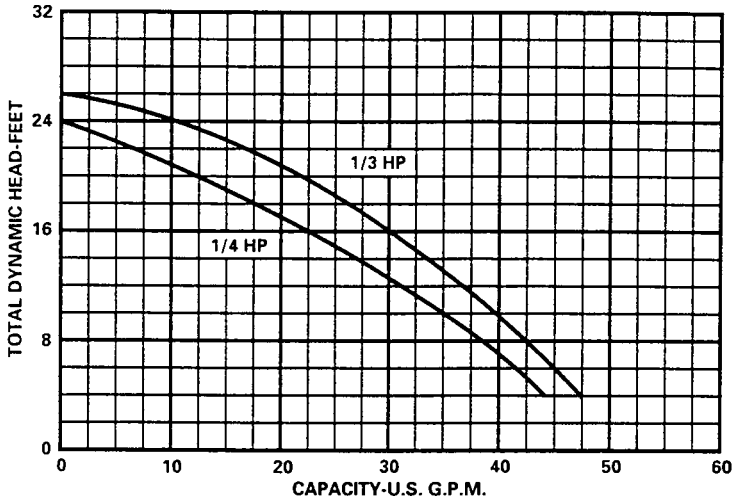
Pump Characteristics

Pump/Motor Unit	Submersible	
Manual Models	SW25M1	SW33M1
Automatic Models	SW25A1	SW33A1
Horsepower	1/4	1/3
Full Load Amps	8.0	10.0
Motor Type	Shaded Pole (4 pole)	
R.P.M.	1550	
Phase Ø	1	
Voltage	115	
Hertz	60	
Operation	Intermittent	
Temperature	120°F Ambient	
NEMA Design	A	
Insulation	Class A	
Discharge Size	1-1/2" NPT	
Solids Handling	1/2"	
Unit Weight	30 lbs.	
Power Cord	18/3, SJTW, 10' std. (20' optional)	

Materials of Construction

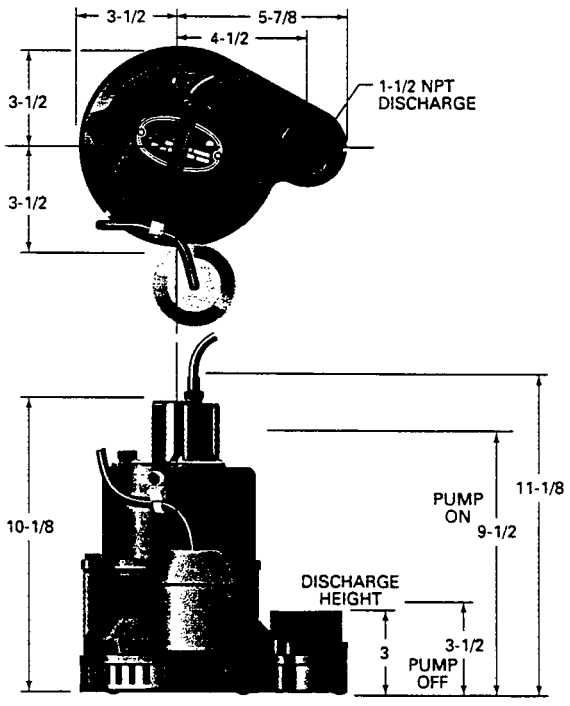
Handle	Steel
Lubricating Oil	Dielectric Oil
Motor Housing	Cast Iron
Pump Casing	Cast Iron
Shaft	Steel
Mechanical Shaft Seal	Seal Faces: Carbon/Ceramic Seal Body: Anodized Steel Spring: Stainless Steel Bellows: Buna-N
Impeller	Thermoplastic
Upper Bearing	Bronze Sleeve Bearing
Lower Bearing	Single Row Ball Bearing
Strainer/Base	Plastic
Fasteners	Stainless Steel

Performance Data



Total Head (feet)		4	6	8	10	12	14	16	18	20	22	24
GPM	1/4 HP	44	41	36	33	29	26	23	18	12	6	0
	1/3 HP	47	45	43	40	37	34	30	26	22	16	10

Dimensional Data



1. All dimensions in inches
2. Component dimensions may vary ± 1/8 inch
3. Not for construction purpose unless certified
4. Dimensions and weights are approximate
5. On/Off level adjustable
6. We reserve the right to make revisions to our products and their specifications without notice

AURORA/HYDROMATIC Pumps, Inc.
1840 Baney Road, Ashland, Ohio 44805
(419) 289-3042

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

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

RECEIVED

WATER SCRUB UNITS

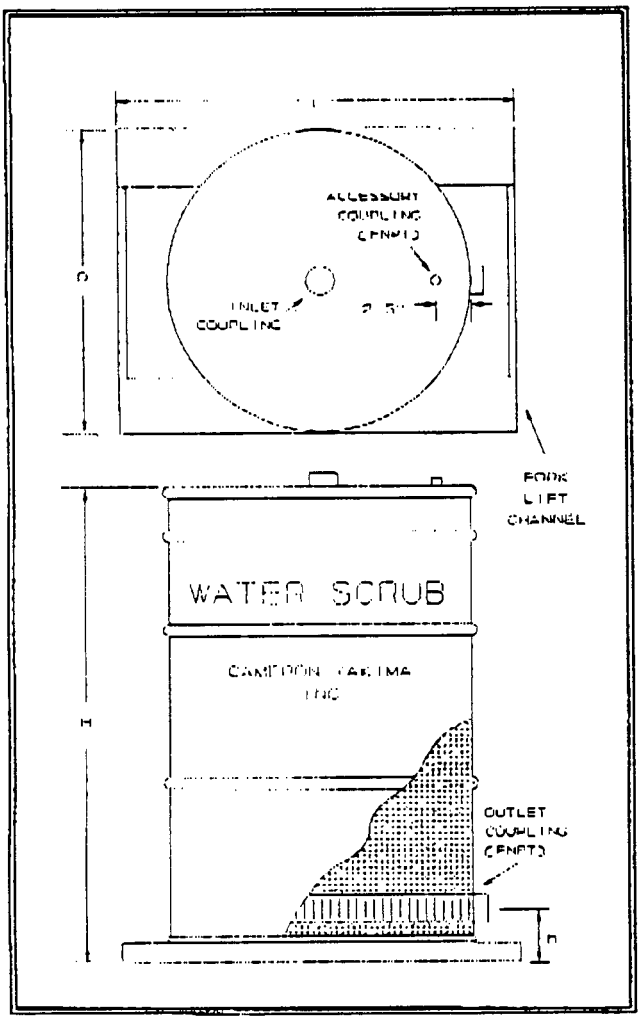
- WSU30 - WSU55 - WSU85 - WSU110 -

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.

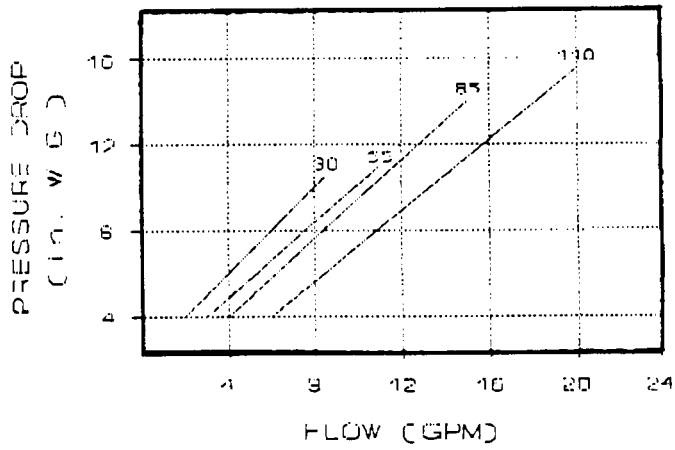
Adsorber internals consist of a proprietary PVC underdrain engineered to ensure even flow distribution and complete carbon bed use. Further, the underdrain can be removed and inspected without emptying the drum. Downflow operation is recommended.

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

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 1993
STETSON-HARZA

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

PRICE SCHEDULE

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.

Prices remain confirmed on 3/10/93 with Kim Friedman

PS-23-0200

March 1, 1992

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

SMALL DISPOSORB™ ADSORBER UNITS
(55 GALLON)

TYPE	QUANTITY 1 TO 4	5 TO 9	10 OR MORE
SM DISPOSORB w/FILTRASORB 300	$663	$631	$599
SM DISPOSORB w/FILTRASORB 400	701	674	642
SM DISPOSORB w/KLENSORB 100	974	926	888
SM DISPOSORB w/REACT	535	514	481

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

2. Shipping weight is approximately 350 lbs. gross. Shipping weight for Small Disposorb with React is approximately 400 lbs. gross.

PRICE SCHEDULE

CALGON

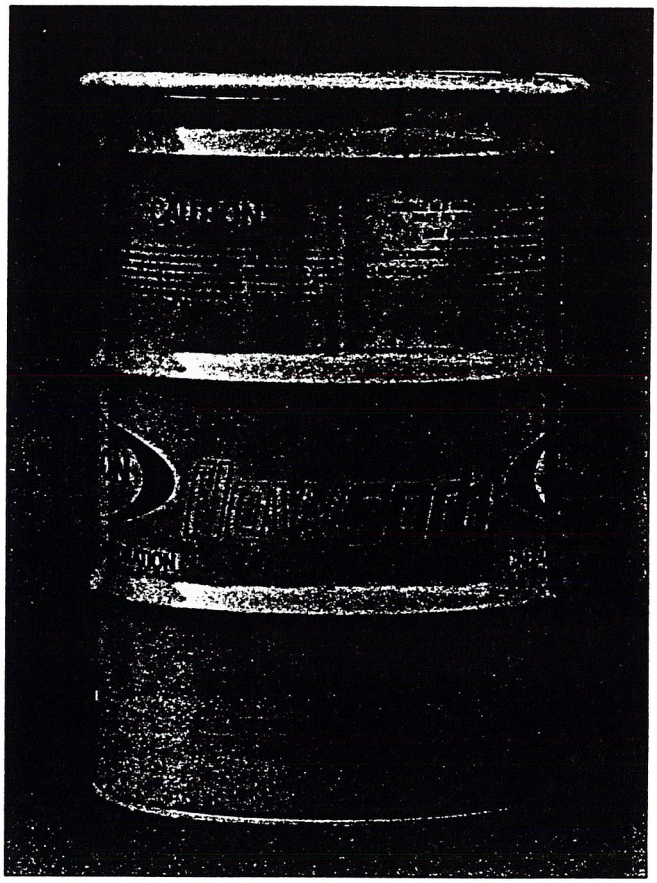
EQUIPMENT BULLETIN

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



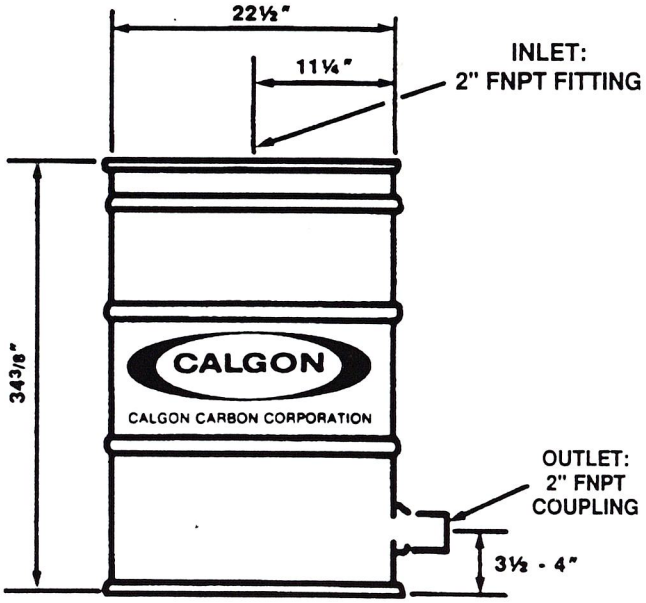
FEATURES

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

CALGON CARBON CORPORATION • P.O. BOX 717 • PITTSBURGH, PA 15230-0717 • PHONE 1-800-4CARBON

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

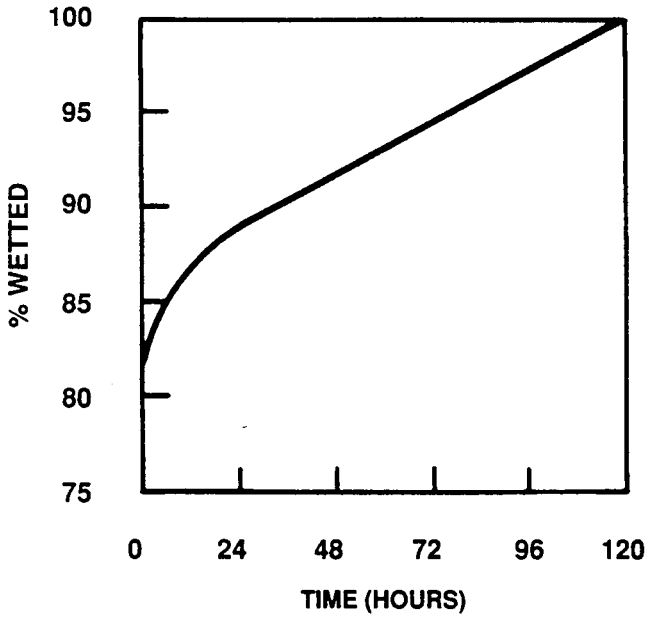
FlowSorb canisters are shipped with dry activated carbon; the carbon must be wetted and deaerated prior to use. This procedure displaces air from the internal structure of the carbon granule, thus assuring that the liquid to be treated is in contact with the carbon surface.

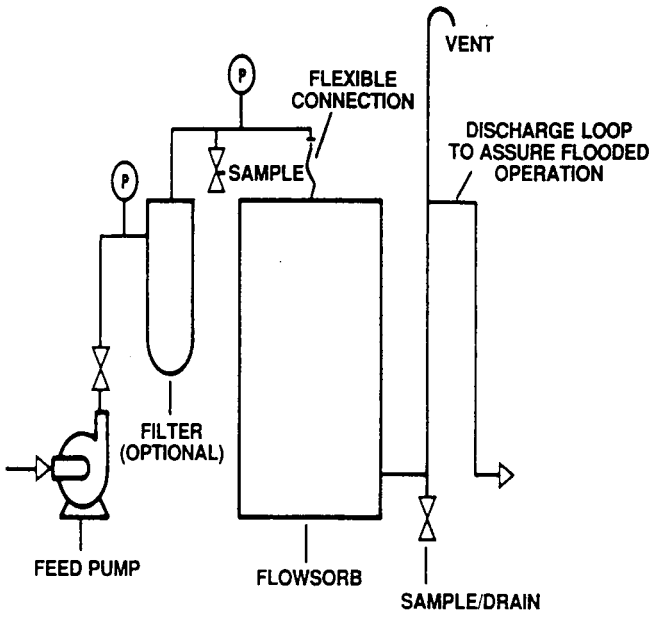
Prior to operation, each canister must be filled with clean water; the water should be introduced into the bottom outlet connection. The unit should set for approximately 48 hours — this allows most of the carbon's internal surface to become wetted, as shown on the wetting curve below.

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.

WETTING CURVE FOR GAC 77°F/25°C)





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.

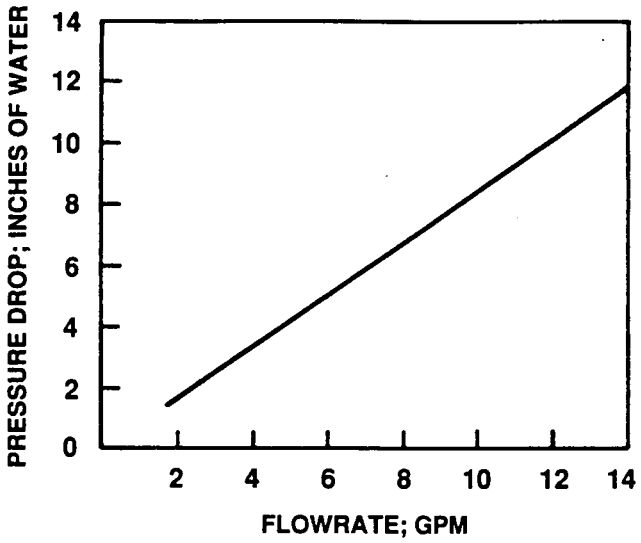
WARRANTY

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

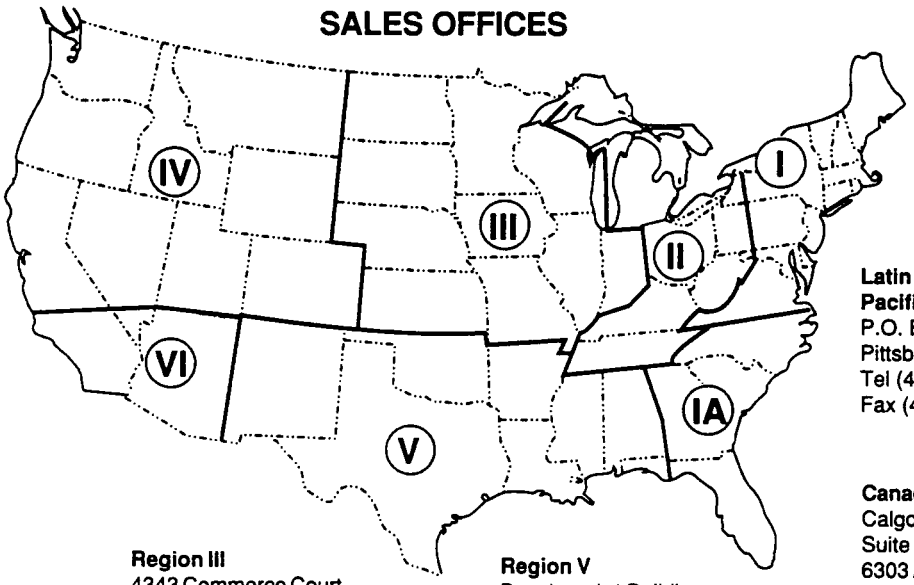
The Purchaser's exclusive remedy for any cause of action arising out of purchase and use of the FlowSorb, including but not limited to breach of warranty, negligence and/or indemnifications, is expressly limited to a maximum of the purchase price of the FlowSorb unit as sold. All claims of whatsoever 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

(1)	Model 0001 Hose assembly consisting of 5/8" O.D. rubber tubing with female quick connect couplings on each end.	$25.00
(1)	Model 0001 Fitting assembly consisting of 1/2" O.D. male tubing connector, 90 degree brass elbow and male quick disconnect nipple.	$8.25
	SYSTEM TOTAL	**$3,140.00**

Notes: 1) The well cap and in well exhaust valve assembly will be pre-assembled to 13.5 feet of tubing, with the pump attached, so the whole system can be lowered into the well for immediate installation.

2) Freight charges would be added to the above total. (F.O.B. Medina, NY)

3)Warranty: All equipment manufactured by GEOGUARD will carry a five year unconditional warranty. The air compressor will carry a one year warranty.

If you have any questions, or require additional assistance, please call. Your continued interest in GEOGUARD is appreciated.

Sincerely,

GEOGUARD, Inc.

Jim Mirand

James Mirand
Sales Engineer

cc: Area Representative
R.W. Deverell Co.
Weedsport, NY
315-834-9466

CALGON

DISPOSORB™

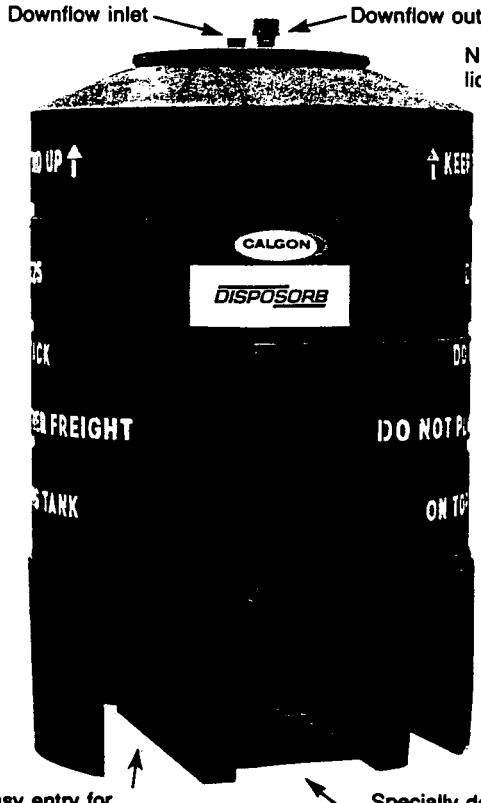
ACTIVATED CARBON PRODUCT BULLETIN

DISPOSORB has been developed by Calgon Carbon Corporation for cleanup of off-spec product batches, accidental spills, contaminated rainwater in tank-farm containment dikes, and many other uses. It is the first disposable, compact, granular activated carbon adsorber providing all the essentials of a full-scale system. Available in two sizes, 350 gallon capacity and 55 gallon capacity.

DISPOSORB APPLICATIONS

- Hazardous/Toxic Dissolved Organic Removal
  - ☐ Process Stream Purification
  - ☐ In-Plant Spill Treatment
  - ☐ Laboratory Bench Drains
  - ☐ Storage Tank Washdown
  - ☐ Monitoring Well Discharges
  - ☐ Dechlorination
  - ☐ Decolorization of Liquids
  - ☐ Small Wastewater Streams
- Evaluation of Adsorption for Liquid Processes
  - ☐ Feasibility Studies
  - ☐ Laboratory Investigation
  - ☐ Pilot Plant Studies
- Tandem KLENSORB 100/Granular Activated Carbon Operation
  - ☐ Multicomponent Treatment
  - ☐ Gasoline From Groundwater
  - ☐ Hazardous Waste Lagoons

incinerated or landfill



350 gal and 55 gal DISPOSORBS—The unique, low-cost approach for on-the-spot liquid phase uses. Pollution Control, Process Purification.

DISPOSAL

Depending upon what materials are adsorbed on the carbon, the storage, transportation and disposal of the spent carbon may be subject to federal, state and local regulations as a hazardous material.

TRANSPORTING ADSORBER MATERIALS

DISPOSORB adsorber units may be easily moved by sling or forklift.

Shipping weight for the 350 gallon DISPOSORB units containing granular activated carbon is approximately 2500 pounds. Spent units can be expected to weigh about 2500 pounds after water is drained via siphon on the effluent line or 1 psi air pressure connected to the influent line.

For 350 gallon DISPOSORB units which contain Klensorb 100, shipping weight is approximately 2800 pounds.

Shipping weight for the 55 gallon DISPOSORB units containing granular activated carbon is approximately 350 pounds. Spent units can be expected to weigh approximately 350 pounds after water drain.

For 55 gallon DISPOSORB units which contain Klensorb 100, shipping weight is approximately 400 pounds.

PRECAUTIONS

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

WARRANTY

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

For information regarding incidents involving human and environmental exposure, call (412) 787-6700 and ask for the Regulatory and Trade Affairs Department.

For further information, phone (412) 787-6700, or contact:
Calgon Carbon Corporation, P.O. Box 717, Pittsburgh, PA 15230-0717

CALGON

CALGON CARBON CORPORATION

HOW DISPOSORB WORKS

DISPOSORB contains granular activated carbon which removes dissolved pollutants from water by a process called adsorption. As water passes through the porous granules of activated carbon, molecules of the organic pollutants are attracted to the surface of the pores and are held there by weak physical forces. The phenomenon is somewhat similar to iron filings being held by a magnet.

The ability of granular activated carbon to remove large quantities of organic impurities is a function of its highly developed internal pore structure. This unique pore structure is created during the manufacturing process, which involves the crushing and thermal "activation" of select grades of bituminous coal under carefully controlled conditions. As a result of this processing, an extensive network of pores is created inside each carbon granule, providing an enormous internal surface area.

Granular activated carbon's great porosity is responsible for its high capacity for trapping and holding organic molecules. For example, just one pound of carbon granules has an effective total (external and internal) surface area equal to that of a 100-acre farm.

In general, the adsorption capacity for non-polar organic compounds increases with concentration, molecular weight and decreased solubility. Compounds which adsorb well are aromatic and unsaturated aliphatic compounds and halogenated solvents.

Low-molecular-weight (less than 50) and/or high-polar compounds, highly soluble in water—such as formaldehyde, alcohols, glycols-will not be readily adsorbed.

When the concentration of organic wastes in the effluent equals the concentration in the influent, the DISPOSORB unit is saturated with the maximum organic loading possible.

THE INSIDE STORY

Each 350 gallon DISPOSORB is filled with approximately 1000 pounds of either Filtrasorb 300 or Filtrasorb 400 products. These carbons are manufactured from select grades of bituminous coal to produce a high density, high surface area, durable granular product suitable for use in either potable or wastewater applications.* The 55 gallon DISPOSORB is filled with approximately 165 pounds of these carbons. The DISPOSORB may be ordered with other types of carbons for use in unique applications. In addition, DISPOSORB units can be provided with Klensorb 100. Klensorb 100 is a granular absorbent media which removes insoluble oil (both free and emulsified) and similar heavy organic compounds from water. Klensorb 100 units can be used for treatment independently or in tandem with carbon units.

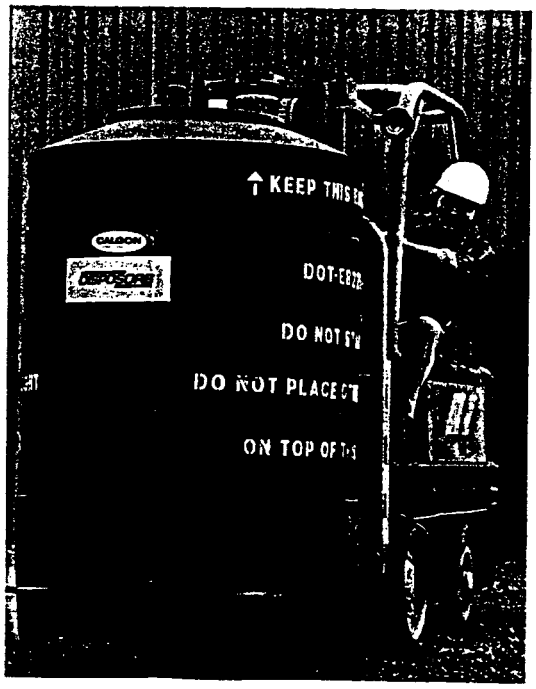
The internals of the DISPOSORB are a combination of PVC and stainless steel. In applications involving contaminants which attack these materials, alternative internal construction materials can be ordered.

DISPOSORB units are constructed of polyethylene. They are not suitable for applications where solvents of high-density polyethylene are present in large concentrations or at temperatures above 140°F.

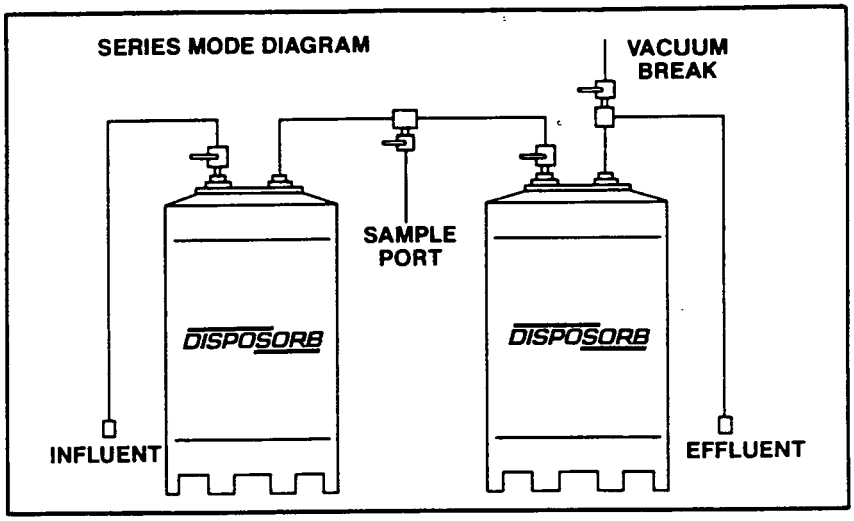
**The units can also be ordered with reactivated carbon providing an economical solution for wastewater applications. Reactivated carbon units are not for potable or food grade use.*

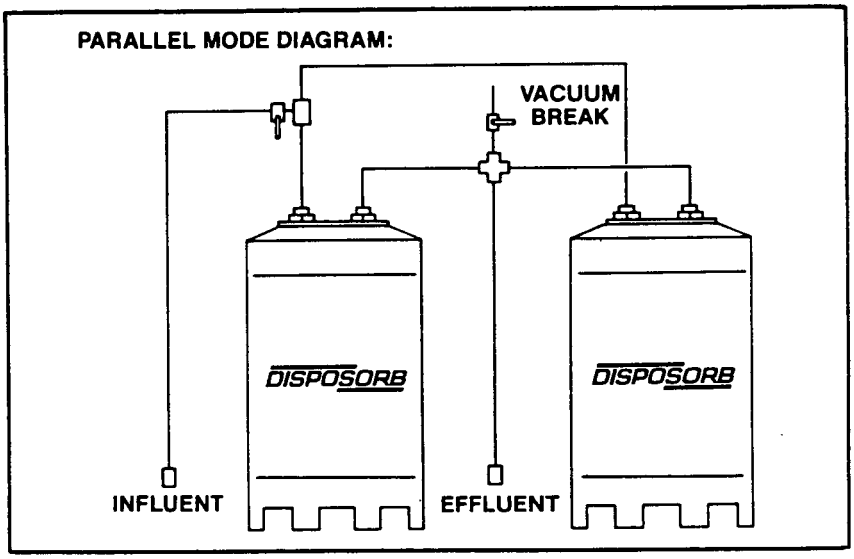
HOW TO ENSURE EFFICIENT UTILIZATION OF DISPOSORB

Generally, prefiltration will be necessary if the stream entering the DISPOSORB has more than 50 ppm of suspended solids. However, depending upon the nature of the suspended solids, prefiltration at lower suspended solids levels may be necessary. A flow of 30 gpm will provide 10 minutes contact time per 350 gallon DISPOSORB unit. Flow in the 350 gallon DISPOSORB unit should not exceed 30 gpm for an individual unit or create an operating pressure of >7.5 psig in single, series or parallel operation. This pressure rating may limit the maximum flow attainable in applications using multiple DISPOSORBS in series operation. A flow of 10 gpm will provide 5 minutes contact time per 55 gallon DISPOSORB unit. Flow in the 55 gallon DISPOSORB unit should not exceed 10 gpm for an individual unit, or create an operating pressure of >7.5 psig in single, series or parallel operation.



DISPOSORB units can be moved easily to treatment site.





Contact time and organic removal efficiency can be enhanced by using multiple DISPOSORB units in parallel or series mode operation. Depending upon the specific application, consideration should be given to using a vacuum-break or anti-siphon loop to ensure the DISPOSORB is flooded, and that a vacuum cannot be applied to it.

Monitoring the influent to the final DISPOSORB in series mode is a good precaution against effluent breakthrough.

350 gallon DISPOSORB units 44″ diameter by 67″ high may be prepared for operation using hose connections or hard pipe. Connections are male 1½″ NPT inlet and outlet. Calgon Carbon has available hose harnesses for this purpose as optional equipment. The *white* connection is the *inlet* for *downflow* operation. The outlet is grey. The DISPOSORB is not recommended for upflow operation.

55 gallon DISPOSORB units 23″ diameter by 36″ high may be prepared for operation using hose connections or hard pipe. Connections are ¾″ NPT inlet and 1″ NPT outlet.

DISPOSORB units are not designed for operation under high pressure or vacuum. The units have been tested under pressure and should not be operated at a pressure above 7.5 psig.

Granular activated carbon must be thoroughly wetted before use to dispel air and to assure proper contact with the influent stream. To facilitate use in the field Calgon Carbon has performed the wetting procedure prior to shipment. Before placing the DISPOSORB unit into service, fill the unit through the effluent line. The DISPOSORB is now ready for use in the normal operating mode.

FAX

Stetson Harza
A HARZA COMPANY
181 Genesee Street
Utica, New York 13501
(315) 797-5800

TELEFAX: (315) 797-8143

Date: 8/12/93

Message From: Paul Romano

Message To: Jim O'Brien

Company/Dept.: DOVatron

Telefax No.: (607) 772-1759

No. of Pages: 2 (Not including cover)

Reference/Proj. No.: 6691

Confirm:

Notes: Revised Proposal Quote

If there is a problem with this transmission, please call (315) 797-5800 immediately.

Telefax Message From
GEOGUARD
Dedicated To Ground Water Technology
P.O. Box 149 - 536 Orient Street
Medina, NY 14103
Phone (800) 645-7654 Fax (716) 798-0147

RECEIVED
AUG 12 1993
STETSON-HARZA
BY

To: Paul Romano

From: James Mirand

Company: Stetson-Harza

Date: 8/11/93

Fax No.: 315-797-8143

Ref: Dover Electronics, Quotation #G00190, Revision 1

Number of Pages Including Cover Page: 2

Dear Paul:

To follow are the changes you requested to be made to the price quotation.

Item	Description	Price
(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)	Model 50002 Pneumatic cycle controller with level control option (includes bubbler probe)	$1,695.00
(1)	Model 53015 In well quick exhaust valve	$65.00
(1)	Model 5422R Well Closure, 4" flat cap design, complete with 1/2" PVC threaded discharge elbow to accept hard piping	$35.00
(1)	Model 51019 Gas-drive pump, 2.88" O.D. x 33" long S.S.	$325.00
(13.5')	Model 5158 Discharge tubing, 3/4" O.D. PE @ $0.50/foot	$6.75
(200')	Model 5074 Air tubing, 1/2" O.D. PE @ $0.35/foot	$70.00
(200')	Model 52022 Bubbler tubing, 3/8" O.D. @ $0.30/foot	$60.00

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

FAX COVER SHEET

DATE: 8/10/93 TIME: 9:45

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

ATTENTION: PAUL ROMANO

SUBJECT: QUOTATION

FROM: DICK MICHAEL

NUMBER OF PAGES INCLUDING FAX COVER SHEET: 2

COMMENTS: PLEASE FIND ATTACHED THE REVISED QUOTE YOU REQUESTED. THIS WILL INCLUDE THE LEGS AND BUNA GASKET AT THE SAME PRICE.

RECEIVED
AUG 10 1993
STETSON-HARZA
BY

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

QUOTATION

COMPANY: Stetson Harza
ADDRESS: 181 Genesse Street
CITY : Utica
ATTN : Paul Romano

STATE: NY
DATE : 4-30-93

ZIP: 13501
QUOTE #: 1759-1774 Revised

TYPE OF SYSTEM : Filtration
MAXIMUM FLOW RATE: 1-2 GPM

QTY	MODEL	DESCRIPTION	UNIT PRICE	TOTAL
1	PF2.5	Progressive Epoxy-Coated Bag Filter, 1" inlet/outlet, including Legs and Buna Gasket.		$ 440.00
6	PE20-5G3S	20 Micron inside 5 Micron Polyester Felt Disposable Filter Bags.	$ 4.00	$ 24.00
			TOTAL	$ 464.00

Housing in House need Epoxy Bags

SHIP DATE: 2 to 4 Weeks Usual A.R.O.
TERMS : Net 30 days
F.O.B. : Point of Shipment

freight $7 per bag

$471 ?

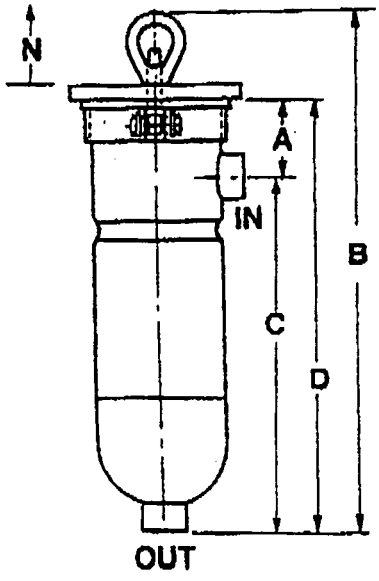
PROGRESSIVE EQUIPMENT CORPORATION

SUBMITTED BY: Dick Michael
Dick Michael, Sales/Customer Service

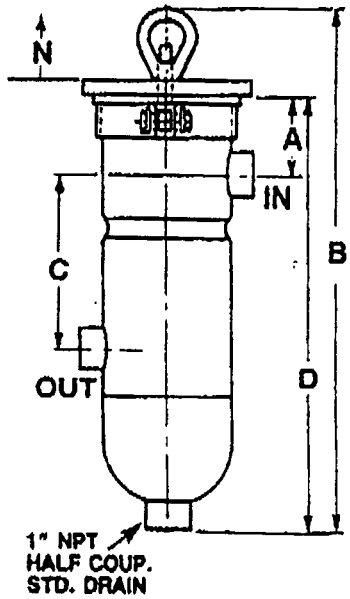
Progressive Equipment Corp.
413 East 9th Street
Erie, PA 16503 • 814/452-4363
Fax. (814) 459-3094

MODELS PF25 AND PF04

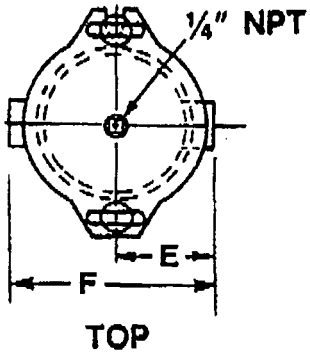
SINGLE BAG ORDER INFORMATION SHEET



STYLE 1 NPT FITTINGS SIDE INLET — BOTTOM OUTLET



STYLE 4 NPT FITTINGS SIDE INLET — SIDE OUTLET



PF25 (SIDE INLET/BOTTOM OUTLET)

NPT	A	B	C	D	E	N
¾"	2⅜"	18⅜"	13"	15⅜"	3 3/16"	9"
1"	2½"	18 9/16"	13"	15 9/16"	3⅜"	9"
1¼"	2¾"	18½"	12 13/16"	15½"	3⅜"	9"
1½"	2⅞"	18⅝"	12 9/16"	15⅝"	3¼"	9"
2"	3⅛"	18¼"	12⅛"	15½"	3⅛"	9"

PF25 (SIDE INLET/SIDE OUTLET)

NPT	A	B	C	D	E	F	N
¾"	2⅜"	18½"	5⅜"	15½"	3 3/16"	6⅜"	9"
1"	2½"	18½"	5⅜"	15½"	3⅜"	6¾"	9"
1¼"	2¾"	18½"	5⅜"	15½"	3⅜"	6¾"	9"
1½"	2⅞"	18½"	5⅜"	15½"	3¼"	6½"	9"
2"	3⅛"	18½"	5⅜"	15½"	3⅛"	6¼"	9"

PF04 (SIDE INLET/BOTTOM OUTLET)

NPT	A	B	C	D	E	N
¾"	2⅜"	23⅝"	18¼"	20⅝"	3 3/16"	15"
1"	2½"	23 3/16"	18¼"	20 13/16"	3⅜"	15"
1¼"	2¾"	23¾"	18 1/16"	20¾"	3⅜"	15"
1½"	2⅞"	23⅝"	17 13/16"	20⅝"	3¼"	15"
2"	3⅛"	23½"	17⅜"	20½"	3⅛"	15"

PF04 (SIDE INLET/SIDE OUTLET)

NPT	A	B	C	D	E	F	N
¾"	2⅜"	23¾"	10⅛"	20¾"	3 3/16"	6⅜"	15"
1"	2½"	23¾"	10⅛"	20¾"	3⅜"	6¾"	15"
1¼"	2¾"	23¾"	10⅛"	20¾"	3⅜"	6¾"	15"
1½"	2⅞"	23¾"	10⅛"	20¾"	3¼"	6½"	15"
2"	3⅛"	23¾"	10⅛"	20¾"	3⅛"	6¼"	15"

*S = Snap Ring
P = Poly Loc®

Note: Designed to ASME Code. UM Stamp available as an option.

**"Dimension C can be varied on Style 4.

ORDER INFORMATION Check appropriate boxes

Design Pressure:
- ☐ 150 PSIG
- ☐ 300 PSIG
- ☐ Other _____

Design Temperature: Degrees F _____

Construction Materials:
- ☐ Carbon Steel
- ☐ 304 Stainless Steel
- ☐ 316 Stainless Steel
- ☐ Other _____

Basket Materials:
- ☐ CS (Std. on CS Vessels)
- ☐ 304 SS (Std. on SS Vessels)
- ☐ 316 SS
- ☐ Other _____

Gasket Material:
- ☐ Buna-N (Standard)
- ☐ Viton
- ☐ Neoprene
- ☐ EPR
- ☐ Teflon Encapsulated
- ☐ Other _____

Lifting Mechanism:
- ☐ Hinge is Standard

Options:
- ☐ Corr. Allowance _____
- ☐ Coating _____
- ☐ Heating Jacket

BUDA
EQUIPMENT AND CONTROLS, INC.

August 10, 1993

Attn: Paul Romano
Stetson Harza
Phone: 1-797-8143
FAX: 1-797-5800

Our Quotation #2719

Buda Equipment and Controls, Inc. is pleased to submit the following proposal for your review and consideration.

One (1)	MK578 Signet batch accumulator.	**PRICE: $520.00 each**
One (1)	MK515-PO Signet paddlewheel flow sensor.	**PRICE: $220.00 each**
One (1)	PV8T015 Signet 1-1/2" PVC tee installation fitting.	**PRICE: $ 95.00 each**

TERMS OF QUOTATION:
Terms: Net 30 days, pending credit approval.
F.O.B. E. Syracuse, New York.
Delivery: 1-3 weeks after receipt of order.
PRICING FIRM FOR THIRTY (30) DAYS.

If you have any questions or need additional information, please don't hesitate to contact myself or John Ryan, your Area Sales Representative, at 1-800-828-3800.

Thank you for your consideration and we look forward to receiving your purchase order.

Regards,

James G. McKenna
Inst. Sales Coordinator

JGM:mgt

cc: John Ryan, Area Sales Representative
Ray Brindley, Sales Manager

FLOWSENSORS

The Heart of the Flow System

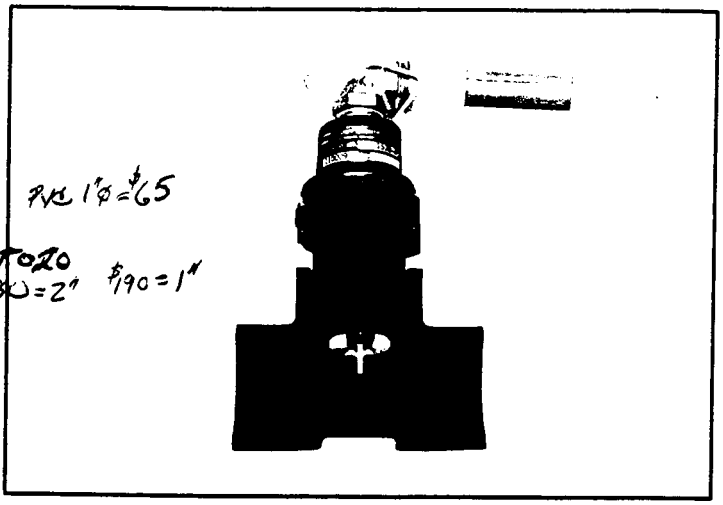
These versatile flowsensors are designed to meet virtually any flow requirements from complex batching and mixing, to simple flowmonitoring. Designed for maximum versatility, Signet flowsensors can be used with a variety of pipe sizes and a wide range of liquids.

MK 515 ROTOR-X™ FLOSENSOR

Signet's patented Rotor-X™ Flosensor features a unique open-cell design that provides a repeatable, linear output over the entire range including:

- Linear repeatable output of ± 1% over full range (1-50 ft/sec)
- Simple installation & easy maintenance (will operate in almost any pipe size or material)
- Corrosion resistant materials do not affect flow characteristics of fluid measured
- 220° F (105°C) max. temp.
- 200 psig max. pressure at ambient temp.
- Variety of signal outputs available

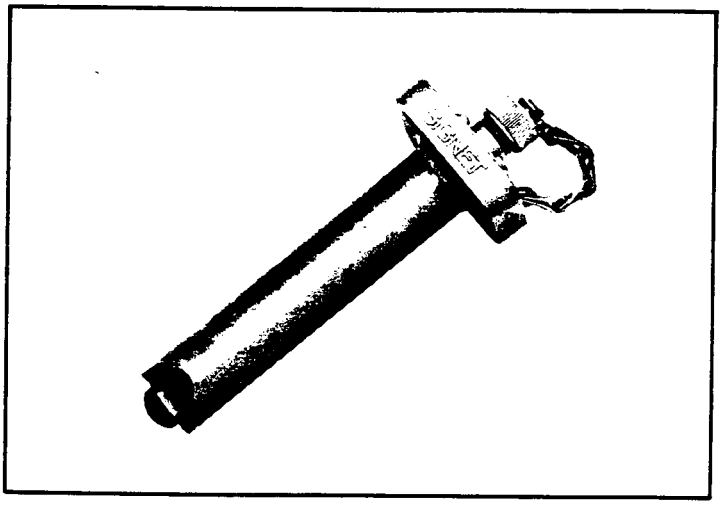
(Wet Tap Installation fitting also available)
Conduit Adapter shown here is optional.



MK 525 METALEX™ FLOSENSOR

The METALEX™ features all stainless steel construction for high pressure and high temperature applications that require accurate input at environmental extremes, and includes:

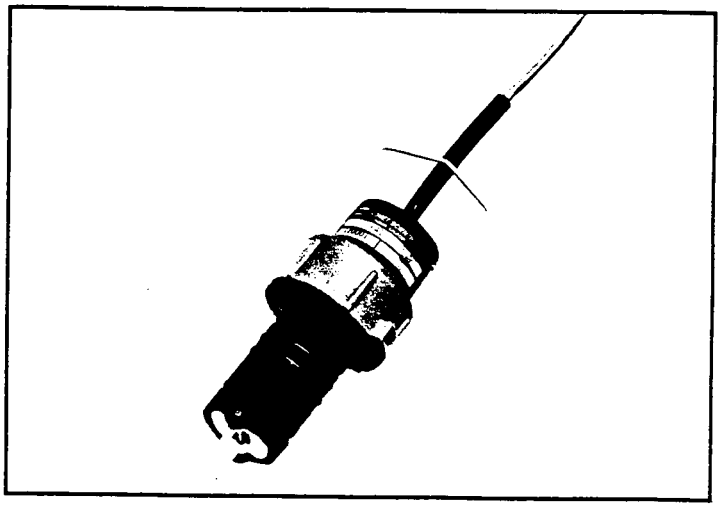
- All stainless steel construction with durable, compounded carbon-fiber rotor bearing
- High pressure/high temperature ratings to 1500 psi and 300°F
- Linear repeatable flow output of ± 1% of full scale
- Precision "open-cell" rotor eliminates cavitation at velocities from 1 to 30 ft/sec
- Compact, insertion-type sensor provides simple installation and easy maintenance
- Designed for measuring fluids containing up to 10% particulate matter-in line sizes from ½" to 12"
- Economically priced
- Variety of fittings available including hot-tap fitting



MK 415 HIGH CLEARANCE FLOSENSOR

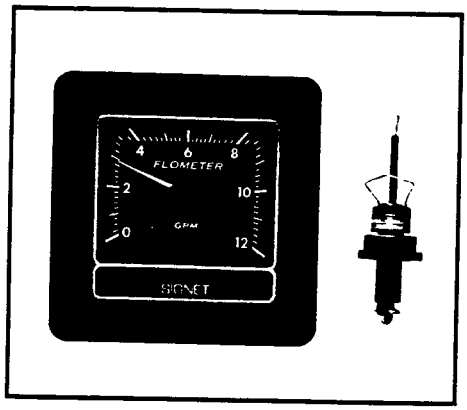
The High Clearance Flosensor features the same precision open-cell design as the 515, and is specially designed for fluids containing up to 10% particulate matter. The 415 includes:

- Greater clearance between the paddlewheel and housing for measuring fluids containing up to 10% particulate matter
- Linear repeatable flow output of ± 1% over full range (1-50 ft/sec)
- Corrosion resistant materials for long-life usage
- Line sizes from 2" to 12"
- 220° F (105°C) max. temp. at 25 psig
- 200 psig max. pressure at ambient temp.
- Variety of signal outputs available



FLOW INDICATORS

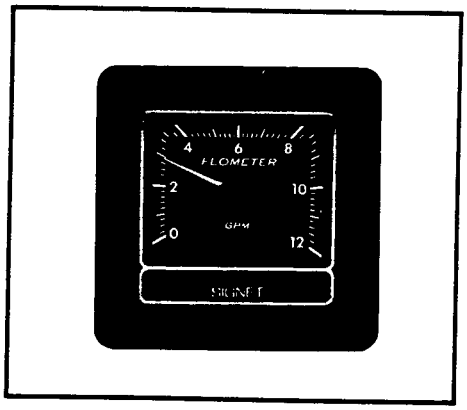
Versatile and Reliable Flowmeters for Measuring and Recording Flow



MK 509 SELF-POWERED FLOMETER

The MK 509 Flometer features a high reliability design that requires no external power to operate. This self-powered flometer is ideal for hazardous as well as normal conditions:

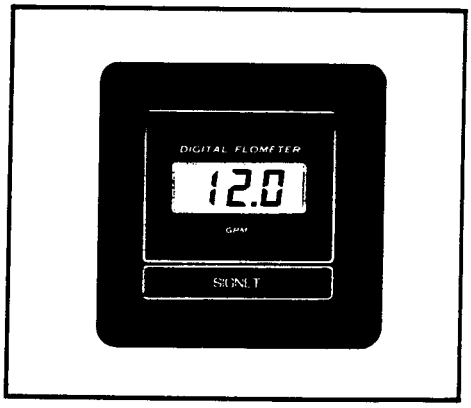
- Instrinsically safe design requires no electrical hookup for operation (up to velocities of 14 FPS)
- Accuracy ± 2% of full scale (±1% between 30% and 70%of full scale)
- Repeatability ±1% of full scale
- Ambient operating temperature 0°C to 60°C (32°F to 140°F)



MK 584 POWERED FLOMETER

The MK 584 Flometer features a unique, high torque meter movement that provides precision reading in high vibration environments, and includes:

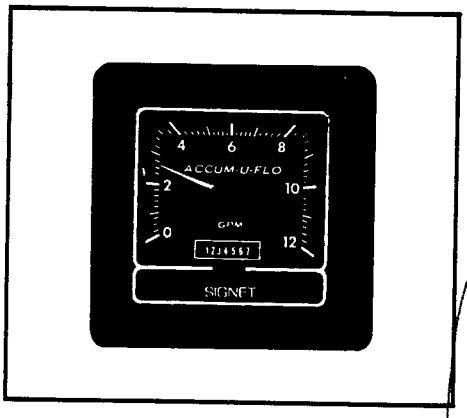
- High torque meter movement for use in vibration environments
- Can be located up to 200 ft. from sensor
- Accuracy ± 1% of full scale
- Repeatability ± 1/2% of full scale
- Operates on 12VDC (Power Converter supplied)



MK 577 DIGITAL FLOMETER

The MK 577 Digital Flometer features microprocessor based control for consistent, accurate results, including:

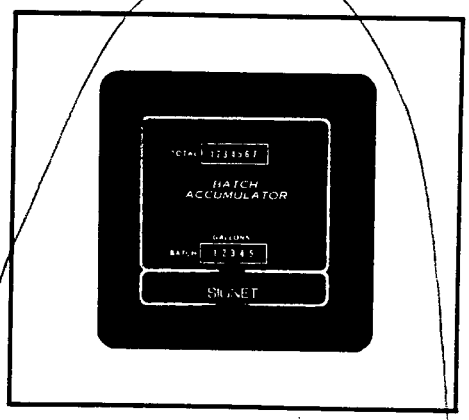
- Fixed averaging — averages flow over a fixed period of time (4 sec. interval)
- Accuracy ± 1% of full scale
- May be located up to 200 ft. from sensor
- Repeatability ± 1/2% of full scale
- Digital output signal for interface applications (TTL compatible)
- Operates on 12VDC (Power Converter supplied)



MK 575 ACCUM-U-FLO

The Accum-u-flo displays flow rate and volume at a glance and includes a high torque, damped meter movement for rugged industrial environments. The MK 575 also includes:

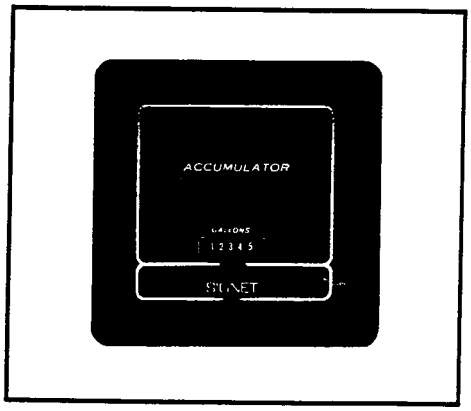
- Accuracy — Meter accuracy ± 1% of full scale
- Totalizer accuracy ± 2% of reading at calibrated flow rate
- Repeatability (meter) ± 1/2% of full scale
- Digital output signal for interface applications (TTL compatible)
- Operates on 12VDC (Power Converter supplied)



MK 578 BATCH ACCUMULATOR

The Signet Batch Accumulator is designed for use where both total fluid and separate batch volume must be monitored, including:

- A seven-digit, non-resettable totalizer
- Five-digit, front resettable totalizer
- Used where both total fluid volume and separate batch volumes must be monitored
- Accuracy ± 2% of reading at calibrated flow rate
- Digital output signal for interface applications (TTL compatible)
- Operates on 12VDC (Power Converter supplied)



MK 579 ACCUMULATOR

The MK 579 Accumulator is an accurate and economical accumulator designed for monitoring total fluid volume, including:

- A seven-digit, non-resettable totalizer
- Economic accumulator for monitoring total fluid volume
- Totalizer accuracy ± 2% of reading at calibrated flow rate
- Digital output signal for interface applications (TTL compatible)
- Operates on 12VDC (Power Converter supplied)

(The MK 579R Accumulator shown here features a five-digit front resettable totalizer)

Chemtrol®
A DIVISION OF NIBCO INC.

Effective April 1, 1993
Supersedes PP-7 dated 12-7-92

PP-8

Suggested List Prices
Subject to change without notice

Chemtrol®
A DIVISION OF NIBCO INC.

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Indianapolis, IN 46268
(800) 343-5455
(800) 541-3841 Fax

Polypropylene Schedule 80 Pipe, Valves & Fittings Black and Chem-Pure™ Natural

PIPE – SCHEDULE 80 – (F)

SIZE (IPS)	OUTSIDE DIAMETER (IN.)	MINIMUM WALL (IN.)	WEIGHT PER FOOT (LBS)	FEET PER BUNDLE	MAXIMUM WORKING PRESSURE AT 73°F (WATER) (PSI)	Fig. 6100 - 80 BLACK PP LIST PRICE PER 100 FEET $	Fig. 6200 - 80 Chem-Pure LIST PRICE PER 100 FEET $
1/2	0.840	0.147	0.132	500	410	$88.00	$93.00
3/4	1.050	0.154	0.179	500	330	116.00	121.00
1	1.315	0.179	0.263	500	310	166.00	174.00
1 1/4	1.660	0.191	0.364	100	250	199.00	—
1 1/2	1.900	0.200	0.441	480	230	210.00	239.00
2	2.375	0.218	0.611	480	200	254.00	314.00
3	3.500	0.300	1.248	240	185	508.00	580.00
4	4.500	0.337	1.824	180	160	729.00	832.00
6	6.625	0.432	3.484	80	140	1,503.00	—

PIPE – SCHEDULE 40 – (F)

SIZE (IPS)	OUTSIDE DIAMETER (IN.)	MINIMUM WALL (IN.)	WEIGHT PER FOOT (LBS)	FEET PER BUNDLE	MAXIMUM WORKING PRESSURE AT 73°F (WATER) (PSI)	Fig. 6100 - 40 BLACK PP LIST PRICE PER 100 FEET $	Fig. 6200 - 40 Chem-Pure * LIST PRICE PER 100 FEET $
1 1/2	1.900	0.145	0.335	480	160	98.00	172.00
2	2.375	0.154	0.449	480	130	133.00	209.00
3	3.500	0.216	0.928	240	125	279.00	423.00
4	4.500	0.237	1.321	180	105	396.00	565.00
6	6.625	0.280	2.328	80	85	667.00	—

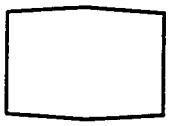
* Chem-Pure schedule 40 pipe is a non-stock item. Please consult Customer Service for delivery.

PIPE NOTES

- Add 10% (1.1 x net price multiplier) for broken bundles.
- Pipe is 20 feet long in plain ends. For other lengths and pipe ends, please consult our customer service department.
- Black polypropylene is a homopolymer resin pigmented to resist ultra-violet degradation. Chemtrol's pipe is completely compatible to Chemtrol's line of polypropylene fittings and valves.
- All pipe is packaged in fully enclosed reinforced cardboard containers.
- Threading polypropylene schedule 80 pipe reduces working pressure to approximately 20 psi (drainage). Threading polypropylene schedule 40 pipe is not recommended.
- Larger diameter pipe is available upon request. Please consult customer service.
- These products are not recommended for compressed air or gas systems.

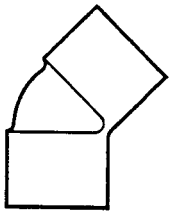
SOCKET FITTINGS – Ⓐ

FIGURE NO. 6101 / 6201
COUPLING – SOCKET



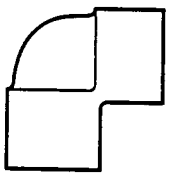
PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2829-005	$10.75	7829-005	$11.23
3/4	10	2829-007	12.00	7829-007	12.54
1	10	2829-010	12.88	7829-010	13.46
1 1/2	10	2829-015	13.90	7829-015	17.05
2	10	2829-020	19.47	7829-020	26.50
3	5	2829-030	39.79	7829-030	45.36
4	5	2829-040	80.51	7829-040	91.78
6	2	2829-060	113.91	—	—

FIGURE NO. 6106 / 6206
45° ELBOW – SOCKET



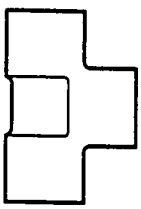
PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2817-005	$10.00	7817-005	$12.60
3/4	10	2817-007	14.65	7817-007	14.70
1	10	2817-010	16.18	7817-010	19.15
1 1/2	10	2817-015	18.75	7817-015	25.45
2	10	2817-020	23.94	7817-020	27.55
3	5	2817-030	106.77	7817-030	121.72
4	5	2817-040	172.64	7817-040	196.81
6	2	2817-060	266.26	—	—

FIGURE NO. 6107 / 6207
90° ELBOW – SOCKET



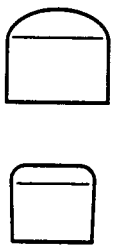
PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2806-005	$8.67	7806-005	$10.25
3/4	10	2806-007	12.86	7806-007	12.83
1	10	2806-010	14.15	7806-010	14.11
1 1/2	10	2806-015	19.65	7806-015	23.10
2	10	2806-020	23.94	7806-020	29.65
3	5	2806-030	85.37	7806-030	93.20
4	5	2806-040	120.15	7806-040	136.97
6	2	2806-060	263.83	—	—

FIGURE NO. 6111 / 6211
TEE – SOCKET



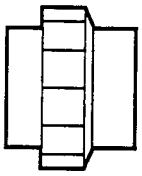
PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2801-005	$10.45	7801-005	$11.80
3/4	10	2801-007	12.58	7801-007	13.15
1	10	2801-010	13.79	7801-010	15.72
1 1/2	10	2801-015	20.63	7801-015	23.52
2	10	2801-020	27.57	7801-020	31.45
3	5	2801-030	133.74	7801-030	150.95
4	5	2801-040	201.82	7801-040	230.08
6	2	2801-060	479.02	—	—

FIGURE NO. 6117 / 6217
CAP – SOCKET



PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2847-005	$19.53	7847-005	$20.41
3/4	10	2847-007	20.62	7847-007	21.55
1	10	2847-010	22.10	7847-010	23.10
1 1/2	10	2847-015	24.31	7847-015	25.40
2	10	2847-020	37.23	7847-020	38.90
3	5	2847-030	68.08	7847-030	77.62
4	5	2847-040	93.88	7847-040	107.03
6	2	2847-060	169.00	—	—

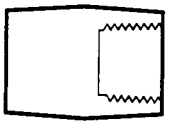
FIGURE NO. 6133 / 6233
UNION – SOCKET



PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2897-005	$37.94	7897-005	$39.64
3/4	10	2897-007	41.50	7897-007	43.36
1	10	2897-010	59.19	7897-010	61.85
1 1/2	5	2897-015	90.63	7897-015	94.71
2	5	2897-020	111.06	7897-020	116.06

Transition unions are available by ordering the desired size union and the appropriate end connector (page 5).

FIGURE NO. 6103 / 6203
FEMALE ADAPTER – SOCKET x F.P.T.



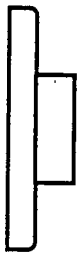
PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2835-005	$9.15	7835-005	$10.43
3/4	10	2835-007	14.11	7835-007	16.03
1	10	2835-010	14.78	7835-010	16.85
1 1/2	10	2835-015	16.85	7835-015	19.21
2	10	2835-020	24.78	7835-020	28.25
3	5	2835-030	44.83	7835-030	51.11
4	5	2835-040	86.21	7835-040	98.28

FIGURE NO. 6151 W
FLANGE – SOCKET (WEBBED-HONEYCOMB STYLE)

PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2851-005	$20.06	—	—
3/4	10	2851-007	20.87	—	—
1	10	2851-010	23.40	—	—
1 1/2	10	2851-015	31.40	—	—
2	10	2851-020	39.15	—	—
3	5	2851-030	95.39	—	—
4	5	2851-040	130.10	—	—
6	2	2851-060	171.43	—	—

SOCKET FITTINGS – (A)

FIGURE NO. 6151H / 6251H
FLANGE – SOCKET (HEAVY DUTY-SOLID STYLE)



PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2851-H05	$25.08	7851-H05	$28.30
3/4	10	2851-H07	26.09	7851-H07	29.75
1	10	2851-H10	29.25	7851-H10	33.35
1 1/2	10	2851-H15	39.25	7851-H15	44.75
2	10	2851-H20	48.94	7851-H20	55.75
3	5	2851-H30	119.24	7851-H30	135.94
4	5	2851-H40	162.61	7851-H40	185.38
6	2	2851-H60	214.28	—	—

FIGURE NO. 6119-W
BLIND FLANGE – (WEBBED-HONEYCOMB STYLE)

PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2853-005	$32.22	—	—
3/4	10	2853-007	32.96	—	—
1	10	2853-010	35.31	—	—
1 1/4	10	2853-012	52.30	—	—
1 1/2	10	2853-015	58.37	—	—
2	5	2853-020	64.44	—	—
3	5	2853-030	104.53	—	—
4	5	2853-040	127.66	—	—
6	2	2853-060	207.91	—	—

FIGURE NO. 6119-H / 6219-H
BLIND FLANGE – (HEAVY DUTY-SOLID STYLE)

PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2853-H05	$40.27	7853-H05	$45.91
3/4	10	2853-H07	41.19	7853-H07	46.96
1	10	2853-H10	44.13	7853-H10	50.30
1 1/4	10	2853-H12	65.37	—	—
1 1/2	10	2853-H15	72.96	7853-H15	83.17
2	5	2853-H20	80.55	7853-H20	91.82
3	5	2853-H30	130.66	7853-H30	148.96
4	5	2853-H40	159.57	7853-H40	181.91
6	2	2853-H60	259.86	—	—

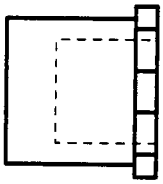
FIGURE NO. 6151-A
VANSTONE FLANGE – SOCKET
(WEBBED-HONEYCOMB STYLE)

Aluminum Ring with NPVDF coating

PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
6	1	2854-060	$173.15	—	—

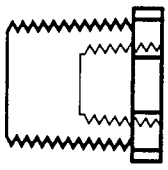
THREADED FITTINGS * – (A)

FIGURE NO. 6118 / 6218
REDUCER BUSHING – SPIG x SOCKET



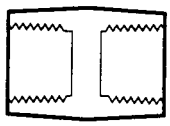
PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
3/4 x 1/2	10	2837-101	$15.82	7837-101	$16.53
1 x 1/2	10	2837-130	18.75	7837-130	19.59
1 x 3/4	10	2837-131	18.90	7837-131	19.75
1 1/2 x 1	10	2837-211	33.55	7837-211	35.06
2 x 1	10	2837-249	46.28	7837-249	48.90
2 x 1 1/2	10	2837-251	46.28	7837-251	48.90
3 x 2	5	2837-338	51.79	7837-338	54.12
4 x 3	5	2837-422	71.78	7837-422	81.40
6 x 4	2	2837-532	149.55	—	—

FIGURE NO. 6118-3-4
REDUCER BUSHING – M.P.T. x F.P.T.



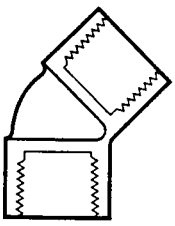
PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
3/4 x 1/2	10	2839-101	$12.88	—	—
1 x 1/2	10	2839-130	15.64	—	—
1 x 3/4	10	2839-131	15.64	—	—
1 1/4 x 3/4	10	2839-167	27.60	—	—
1 1/4 x 1	10	2839-168	27.60	—	—
1 1/2 x 1	10	2839-211	27.60	—	—
1 1/2 x 1 1/4	10	2839-212	27.60	—	—
2 x 1	10	2839-249	39.98	—	—
2 x 1 1/2	10	2839-251	39.98	—	—
3 x 2	5	2839-338	41.36	—	—
4 x 3	5	2839-422	63.46	—	—

FIGURE NO. 6101-3-3
COUPLING – THREADED



PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2830-005	$8.32	—	—
3/4	10	2830-007	10.35	—	—
1	10	2830-010	11.41	—	—
1 1/4	10	2830-012	13.34	—	—
1 1/2	10	2830-015	14.97	—	—
2	10	2830-020	17.95	—	—
3	5	2830-030	39.79	—	—
4	5	2830-040	80.66	—	—

FIGURE NO. 6106-3-3
45° ELBOW – THREADED



PIPE SIZE (in.)	STD. PKG.	Black PP PART NUMBER	Black PP PRICE EACH	Chem-Pure PART NUMBER	Chem-Pure PRICE EACH
1/2	10	2819-005	$10.95	—	—
3/4	10	2819-007	12.38	—	—
1	10	2819-010	13.05	—	—
1 1/4	10	2819-012	15.38	—	—
1 1/2	10	2819-015	17.75	—	—
2	10	2819-020	24.13	—	—
3	5	2819-030	106.77	—	—
4	5	2819-040	172.64	—	—

*NOTE: All threaded fittings are recommended for intermittent drainage pressure not exceeding 20psi.

Material	Fig. No.	Size (inch)	Amount
Schedule 80 - Black PP Pipe	6100	0.5	200 ft.
Coupings (black PP)	6101	0.5	10
Elbows (black PP)	6107	0.5	22
Tees (black PP)	6111	0.5	5
* Female Adapter (S x FPT)	6103	0.5	13
1/2" Nipple- 2" Length	6129	0.5	13
1" Nipple - 3" Length	6129	1.0	4
Reducing Bushing	6118-3-4	0.75 - 0.5	2
Reducing Bushing	6118-3-4	1.0 - 0.5	4
Reducing Bushing	6118-3-4	2.0 - 1.0	4
** Union - Socket	6133	0.5	5
PVC 3-way/2-pos. Diverter Valve	T45D2-V	0.5	2

* Connections to the following devices with threaded female inlets and/or outlets will be made:

air releave valves - 3 connections
bag filter - 2
carbon adsorbers - 4
diverter valves - 4

** Unions placed at carbon units inlets/outlets and at well closure (5)

3-Way/3-Position (Multiport) and 3-Way/2-Position (Diverter) True Union Ball Valves PVC/CPVC

150 psi at 73°F water — non-shock — full port*

The Chemtrol True Union Multiport Valve is a 3-way/3-position ball valve. It is ideally suited for applications where flow direction and on-off control are needed. When the handle is rotated 180°, the three (3) positions of on-off-on may direct flow from the center-inlet to one run-outlet, to shutoff (at the 90° position), and then to the opposite run-outlet. The Multiport may also be used to alternately direct flow from either of the side run-ports to the branch center-port with shutoff at the mid-position (when handle is perpendicular to body).

The Chemtrol True Union Diverter Valve is a 3-way/2-position ball valve. It is used for applications where a quarter-turn will achieve diversion of flow, but shutoff control is not required. When the handle is rotated 90°, the two (2) positions of on-on may direct flow from the center-inlet to first one run-outlet and then the opposite run-outlet. The Diverter may also be used to alternately divert flow from either of the side run-ports to the branch center-port. The internal porting of the Diverter makes no provision for shutoff. Therefore, the valve can be used for proportional mixing.

*1½" valve has conventional port on center outlet.

Features

- Unique triple union design permits removal of valve with no disruption of connected piping.
- FLOW externally molded onto body to indicate the fixed end containing a seat. Flow can be blocked at this port while adjacent piping is disconnected for repair or alteration.
- ADJ externally molded onto body to indicate open end used for assembly. Adjustment of this union nut can compensate for wear of Teflon seats — no production loss to adjust valve internally.
- Distinctive handle indicates direction of flow at a glance and is easily operated within fixed stops.
- Selection of elastomeric seals and thermoplastics for construction offer broadest range of chemical resistance and operating temperature.
- Interference-fit handle — no corroded screw to prevent removal or replacement.
- Actuator operation is a standard offering.

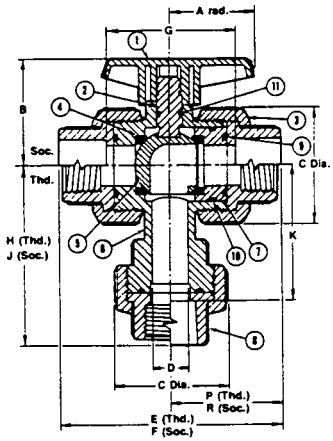
CHEMTROL FIGURE NUMBER

Valve Style	Elastomeric Trim	PVC		CPVC	
		Soc.	Thd.	Soc.	Thd.
Multiport	FPM	S45M3-V	T45M3-V	S51M3-V	T51M3-V
(3-Way 3-Position)	EPDM	S45M3-E	T45M3-E	S51M3-E	T51M3-E
Diverter	FPM	S45D2-V	T45D2-V	S51D2-V	T51D2-V
(3-Way 2 Position	EPDM	S45D2-E	T45D2-E	S51D2-E	T51D2-E

REPLACEMENT PARTS LIST

PART	MATERIAL
1. Handle — Lever‡	PVC
2. Stem	PVC or CPVC
3. Union Nut (2)	PVC or CPVC
4. Seat* (2)	TFE (Teflon)
5. Ball — Multiport	PVC or CPVC
or Diverter	PVC or CPVC
6. Body	PVC or CPVC
7. Seal Carrier	PVC or CPVC
8. End Connector — Socket, (3)	PVC or CPVC
or Thread, (3)	PVC or CPVC
9. "O"-Ring** — End Seal (3)	FPM (Viton) or EPDM
10. "O"-Ring** — End Carrier (TU or SU)	FPM (Viton) or EPDM
11. "O"-Ring** — Stem Seal	FPM (Viton) or EPDM

‡ Round Safety Handle available as optional accessory in sizes ½" - 2".
* TFE Seats are packaged in pairs as a replacement kit.
** "O"-Ring Replacement Kit contains all the "O"-Rings required to refurbish any Tru-Bloc (TU & SU), Ball Check, True Union, or 3-Way (Multiport or Diverter) Ball Valve of one size.



DIMENSIONS — WEIGHTS

Valve Size	Soc. & Thd. Figures				Socket Figures						Threaded Figures				Fluid Flow Coefficient
	A[1]	B	C	D	F	G	J	K	R	Approx.[2] Wt. Lbs.	E	H	P	Approx.[2] Wt. Lbs.	Cv[3]
½	1.70	1.94	2.00	.50	4.19	2.44	3.56	2.69	2.13	.64	4.00	3.50	2.06	.60	8
¾	2.12	2.50	2.44	.75	4.94	2.94	4.19	3.19	2.50	1.15	4.56	4.00	2.31	1.05	19
1	2.12	2.69	2.87	1.00	5.44	3.19	4.63	3.50	2.75	1.59	5.13	4.44	2.63	1.50	36
1¼	2.56	3.50	4.12	1.25	6.44	3.94	5.88	4.63	3.25	3.43	6.00	5.63	3.06	3.24	55
1½	2.56	3.50	4.12	1.25	6.75	4.00	6.00	4.63	3.38	3.62	6.00	5.63	3.06	3.37	55
2	2.56	4.25	5.25	2.00	7.94	4.94	7.13	5.63	4.00	7.02	7.19	6.81	3.63	6.25	149

[1] Handle is not symmetrical about stem centerline. Dimension shown represents the longest operational radius.
[2] Weights shown for socket figures are CPVC models. Weights for threaded figures are PVC models.
[3] Cv values computed using equivalent cylinder length for 90° turn with full bore.
NOTES: A complete listing of optional accessories for ball valves begins on page 25. Installation and maintenance instructions for these valves appear on page 20.
For specific relationship of pressure/temperature ratings, refer to ENGINEERING DATA, page 6. And for CHEMTROL VALVE STANDARDS, see page 10.

Do not use or test the products in this catalog with compressed air or other gases. See Chemtrol Chem-Aire™ literature for information about shatter-resistant thermoplastic piping system specifically designed for compressed air and other gases.

NIPPLES* – ©

Fig. No. 6129 THREADED – BOTH ENDS

NOM. PIPE SIZE (IN.)	STD. PKG	PART NO. PRICE	CLOSE	SHORT	LENGTH (INCHES) 2	3	4	5	6
1/2	10	Part No.	2861-077	2861-078	2861-080	2861-081	2861-082	2861-083	2861-084
		Price	$1.00	$1.08	$1.27	$1.50	$1.73	$1.99	$2.27
3/4	10	Part No.	2861-104	2861-105	—	2861-106	2861-107	2861-108	2861-109
		Price	$1.40	$1.54	—	$1.86	$2.18	$2.51	$2.86
1	10	Part No.	2861-133	2861-134	—	2861-135	2861-136	2861-137	2861-138
		Price	$1.77	$1.95	—	$2.41	$2.81	$3.26	$3.67
1 1/4	10	Part No.	2861-170	2861-171	—	2861-172	2861-173	2861-174	2861-175
		Price	$2.04	$2.51	—	$2.73	$3.22	$3.77	$4.26
1 1/2	10	Part No.	2861-213	2861-214	—	2861-215	2861-216	2861-217	2861-218
		Price	$2.27	$2.63	—	$2.91	$3.45	$4.04	$4.59
2	10	Part No.	2861-251	2861-252	—	2861-253	2861-254	2861-255	2861-256
		Price	$3.04	$3.36	—	$3.77	$4.50	$5.13	$5.91
3	5	Part No.	2861-338	2861-340	—	—	2861-341	2861-342	2861-343
		Price	$6.99	$8.44	—	—	$8.44	$10.66	$12.22
4	5	Part No.	2861-422	2861-423	—	—	—	2861-425	2861-426
		Price	$9.53	$11.77	—	—	—	$14.31	$16.85

PLANE END NIPPLES FOR FLANGING FITTINGS & VALVES (WITH BEVEL)* – ©

NOM. PIPE SIZE (IN.)	STD. PKG	LENGRH (IN.)	PART NO. PRICE	POLYPROPYLENE FIG. NO. – 6131
1/2	6	1 3/4	Part No.	2871-070
			Price	$2.21
3/4	10	2	Part No.	2871-100
			Price	$2.84
1	10	2 1/4	Part No.	2871-130
			Price	$3.79
1 1/4	10	2 1/2	Part No.	—
			Price	
1 1/2	10	2 3/4	Part No.	2871-200
			Price	$7.53
2	10	3	Part No.	2871-250
			Price	$9.79

NOM. PIPE SIZE (IN.)	STD. PKG	LENGRH (IN.)	PART NO. PRICE	POLYPROPYLENE FIG. NO. – 6131
2 1/2	3	3 1/2	Part No.	—
			Price	
3	6	3 3/4	Part No.	2871-330
			Price	$22.90
4	6	4 1/2	Part No.	2871-400
			Price	$31.74
6	3	6	Part No.	2871-600
			Price	$79.84
8	3	9	Part No.	—
			Price	

* All nipples are black polypropylene schedule 80.

APPENDIX D

LAB DATA

BUCK ENVIRONMENTAL LABORATORIES INC.
ACCREDITED ENVIRONMENTAL ANALYSIS
100 TOMPKINS ST. • CORTLAND, N.Y. 13045
607-753-3403

LABORATORY REPORT

Client: HAGOPIAN ENGINEERING ASSOCIATES
28 Alice Street
Binghamton, NY 13901
Site: Dover - Conklin Site
Sample: Water - MW-1

Report Date: 6/18/91
Sampling Date: 6/04/91
Sampled By: P. Shaffner
Analysis Date: 6/14/91
Lab Log No: 9106045

TARGET COMPOUND LIST
(EPA 8240 GC/MS Methodology)

CAS No.	Compound	DL	RESULT
75-27-4	bromodichloromethane	5	ND
75-25-2	bromoform	5	ND
74-83-9	bromomethane	10	ND
56-23-5	carbon tetrachloride	5	ND
108-90-7	chlorobenzene	5	ND
75-00-3	chloroethane	10	194
100-75-8	2-chloroethylvinylether	10	ND
67-66-3	chloroform	5	7.3
74-87-3	chloromethane	10	22.0
124-38-1	dibromochloromethane	5	ND
95-50-1	1,2-dichlorobenzene	5	ND
541-73-1	1,3-dichlorobenzene	5	ND
106-46-7	1,4-dichlorobenzene	5	ND
75-34-3	1,1-dichloroethane	5	2,450
75-35-4	1,1-dichloroethene	5	3,100
107-06-2	1,2-dichloroethane	5	ND
156-60-5	trans-1,2-dichloroethene	5	505
78-87-5	1,2-dichloropropane	5	ND
10061-01-5	cis-1,3-dichloropropene	5	ND
10061-02-6	trans-1,3-dichloropropene	5	ND
75-09-2	methylene chloride	5	ND
79-34-5	1,1,2,2-tetrachloroethane	5	ND
127-18-4	tetrachloroethene	5	149
71-55-6	1,1,1-trichloroethane	5	17,500
79-00-5	1,1,2-trichloroethane	5	12.0
79-01-6	trichloroethene	5	31,100
75-69-4	trichlorofluoromethane	5	ND
75-01-4	vinyl chloride	10	400

Continued on Page 2

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ACCREDITED ENVIRONMENTAL ANALYSIS
100 TOMPKINS ST. • CORTLAND, N.Y. 13045
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LABORATORY REPORT

Client: HAGOPIAN ENGINEERING ASSOCIATES
28 Alice Street
Binghamton, NY 13901
Site: Dover - Conklin Site
Sample: Water - MW-1

Report Date: 6/18/91
Sampling Date: 6/04/91
Sampled By: P. Shaffner
Analysis Date: 6/14/91
Lab Log No: 9106045

TARGET COMPOUND LIST
(EPA 8240 GC/MS Methodology)

CAS No.	Compound	DL	RESULT
71-43-2	benzene	5	ND
100-41-1	ethylbenzene	5	7.0
108-88-3	toluene	5	64.0
1330-20-7	xylenes (m, o, & p)	5	21.0
67-64-1	acetone	100	ND
75-15-0	carbon disulfide	100	ND
78-93-3	2-butanone	100	ND
108-05-4	vinyl acetate	50	ND
108-10-1	4-methyl-2-pentanone	50	ND
591-78-6	2-hexanone	50	ND
100-42-5	styrene	5	ND
Additional Compound			
cis 1,2-dichloroethene			est. 30,300

All concentrations are reported as ug/L. ND indicates that no amount greater than the detection limit (DL) was detected.

These analyses are certified as conforming to generally accepted laboratory practices, the analytical method cited, requirements of the New York State Health Department ELAP program, and the New York State Department of Environmental Conservation.

John H. Buck, P.E.
Laboratory Director

BUCK ENVIRONMENTAL LABORATORIES INC.
ACCREDITED ENVIRONMENTAL ANALYSIS
3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
P.O. BOX 5150 607-753-3403

LABORATORY REPORT

Client: **STETSON-HARZA**

Site: Dover Electronics
Sample No: DMW1
Sample: Water

Report Date: 8/21/92
Sampling Date: 8/13/92
Sampled By: P.Romano
Analysis Date: 8/19/92
Lab Log No: 9208114

TARGET COMPOUND LIST
(EPA 8240 GC/MS Methodology)

CAS No.	Compound	DL	RESULT
75-27-4	bromodichloromethane	1,000	ND
75-25-2	bromoform	1,000	ND
74-83-9	bromomethane	2,000	ND
56-23-5	carbon tetrachloride	1,000	ND
108-90-7	chlorobenzene	1,000	ND
75-00-3	chloroethane	2,000	ND
100-75-8	2-chloroethylvinylether	2,000	ND
67-66-3	chloroform	1,000	ND
74-87-3	chloromethane	2,000	ND
124-48-1	dibromochloromethane	1,000	ND
95-50-1	1,2-dichlorobenzene	1,000	ND
541-73-1	1,3-dichlorobenzene	1,000	ND
106-46-7	1,4-dichlorobenzene	1,000	ND
75-71-8	dichlorodifluoromethane	1,000	ND
75-34-3	1,1-dichloroethane	1,000	2,720.
75-35-4	1,1-dichloroethene	1,000	1,650.
107-06-2	1,2-dichloroethane	1,000	ND
156-60-5	trans-1,2-dichloroethene	1,000	1,650.
78-87-5	1,2-dichloropropane	1,000	ND
10061-01-5	cis-1,3-dichloropropene	1,000	ND
10061-02-6	trans-1,3-dichloropropene	1,000	ND
75-09-2	methylene chloride	1,000	ND
79-34-5	1,1,2,2-tetrachloroethane	1,000	ND
127-18-4	tetrachloroethene	1,000	ND
71-55-6	1,1,1-trichloroethane	1,000	32,700.
79-00-5	1,1,2-trichloroethane	1,000	ND
79-01-6	trichloroethene	1,000	35,200.
75-69-4	trichlorofluoromethane	1,000	ND
75-01-4	vinyl chloride	2,000	ND

Continued on Page 2

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LABORATORY REPORT

Client: **STETSON-HARZA**

Site: Dover Electronics
Sample No: DMW1
Sample: Water

Report Date: 8/21/92
Sampling Date: 8/13/92
Sampled By: P.Romano
Analysis Date: 8/19/92
Lab Log No: 9208114

TARGET COMPOUND LIST
(EPA 8240 GC/MS Methodology)

CAS No.	Compound	DL	RESULT
71-43-2	benzene	1,000	ND
100-41-1	ethylbenzene	1,000	ND
108-88-3	toluene	1,000	ND
1330-20-7	xylenes (m, o, & p)	1,000	ND
67-64-1	acetone	20,000	ND
75-15-0	carbon disulfide	20,000	ND
78-93-3	2-butanone	20,000	ND
108-05-4	vinyl acetate	10,000	ND
108-10-1	4-methyl-2-pentanone	10,000	ND
591-78-6	2-hexanone	10,000	ND
100-42-5	styrene	1,000	ND
Additional Compounds:			
1634-04-4	MTBE	1,000	ND
156-59-4	cis-1,2-dichloroethene	1,000	17,500.

All concentrations are reported as ug/L. ND indicates that no amount greater than the detection limit (DL) was detected.

These analyses are certified as conforming to generally accepted laboratory practices, the analytical method cited, requirements of the New York State Health Department ELAP program, and the New York State Department of Environmental Conservation.

John H. Buck, P.E.
Laboratory Director

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ACCREDITED ENVIRONMENTAL ANALYSIS
3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
P.O. BOX 5150 607-753-3403

LABORATORY REPORT

Client: **STETSON-HARZA**

Site: Dover Electronics
Sample No: DMW2
Sample: Water

Report Date: 8/21/92
Sampling Date: 8/13/92
Sampled By: P.Romano
Analysis Date: 8/19/92
Lab Log No: 9208114

TARGET COMPOUND LIST
(EPA 8240 GC/MS Methodology)

CAS No.	Compound	DL	RESULT
75-27-4	bromodichloromethane	50	ND
75-25-2	bromoform	50	ND
74-83-9	bromomethane	100	ND
56-23-5	carbon tetrachloride	50	ND
108-90-7	chlorobenzene	50	ND
75-00-3	chloroethane	100	ND
100-75-8	2-chloroethylvinylether	100	ND
67-66-3	chloroform	50	ND
74-87-3	chloromethane	100	ND
124-48-1	dibromochloromethane	50	ND
95-50-1	1,2-dichlorobenzene	50	ND
541-73-1	1,3-dichlorobenzene	50	ND
106-46-7	1,4-dichlorobenzene	50	ND
75-71-8	dichlorodifluoromethane	50	ND
75-34-3	1,1-dichloroethane	50	ND
75-35-4	1,1-dichloroethene	50	ND
107-06-2	1,2-dichloroethane	50	ND
156-60-5	trans-1,2-dichloroethene	50	ND
78-87-5	1,2-dichloropropane	50	ND
10061-01-5	cis-1,3-dichloropropene	50	ND
10061-02-6	trans-1,3-dichloropropene	50	ND
75-09-2	methylene chloride	50	ND
79-34-5	1,1,2,2-tetrachloroethane	50	ND
127-18-4	tetrachloroethene	50	ND
71-55-6	1,1,1-trichloroethane	50	231.
79-00-5	1,1,2-trichloroethane	50	ND
79-01-6	trichloroethene	50	506.
75-69-4	trichlorofluoromethane	50	ND
75-01-4	vinyl chloride	100	ND

Continued on Page 2

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3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
P.O. BOX 5150 607-753-3403

LABORATORY REPORT

Client: **STETSON-HARZA**

Site: Dover Electronics
Sample No: DMW2
Sample: Water

Report Date: 8/21/92
Sampling Date: 8/13/92
Sampled By: P.Romano
Analysis Date: 8/19/92
Lab Log No: 9208114

TARGET COMPOUND LIST
(EPA 8240 GC/MS Methodology)

CAS No.	Compound	DL	RESULT
71-43-2	benzene	50	ND
100-41-1	ethylbenzene	50	ND
108-88-3	toluene	50	ND
1330-20-7	xylenes (m, o, & p)	50	ND
67-64-1	acetone	1000	ND
75-15-0	carbon disulfide	1000	ND
78-93-3	2-butanone	1000	ND
108-05-4	vinyl acetate	500	ND
108-10-1	4-methyl-2-pentanone	500	ND
591-78-6	2-hexanone	500	ND
100-42-5	styrene	50	ND
Additional Compounds:			
1634-04-4	MTBE	50	ND
156-59-4	cis-1,2-dichloroethene	50	98.4

All concentrations are reported as ug/L. ND indicates that no amount greater than the detection limit (DL) was detected.

These analyses are certified as conforming to generally accepted laboratory practices, the analytical method cited, requirements of the New York State Health Department ELAP program, and the New York State Department of Environmental Conservation.

John H. Buck, P.E.
Laboratory Director

BUCK ENVIRONMENTAL LABORATORIES INC.
ACCREDITED ENVIRONMENTAL ANALYSIS
3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
P.O. BOX 5150 607-753-3403

LABORATORY REPORT

Client: **STETSON-HARZA**

Site: Dover Electronics
Sample No: DMW-3
Sample: Water

Report Date: 8/21/92
Sampling Date: 8/13/92
Sampled By: P.Romano
Analysis Date: 8/19/92
Lab Log No: 9208114

TARGET COMPOUND LIST
(EPA 8240 GC/MS Methodology)

CAS No.	Compound	DL	RESULT
75-27-4	bromodichloromethane	5	ND
75-25-2	bromoform	5	ND
74-83-9	bromomethane	10	ND
56-23-5	carbon tetrachloride	5	ND
108-90-7	chlorobenzene	5	ND
75-00-3	chloroethane	10	ND
100-75-8	2-chloroethylvinylether	10	ND
67-66-3	chloroform	5	ND
74-87-3	chloromethane	10	ND
124-48-1	dibromochloromethane	5	ND
95-50-1	1,2-dichlorobenzene	5	ND
541-73-1	1,3-dichlorobenzene	5	ND
106-46-7	1,4-dichlorobenzene	5	ND
75-71-8	dichlorodifluoromethane	5	ND
75-34-3	1,1-dichloroethane	5	ND
75-35-4	1,1-dichloroethene	5	ND
107-06-2	1,2-dichloroethane	5	ND
156-60-5	trans-1,2-dichloroethene	5	ND
78-87-5	1,2-dichloropropane	5	ND
10061-01-5	cis-1,3-dichloropropene	5	ND
10061-02-6	trans-1,3-dichloropropene	5	ND
75-09-2	methylene chloride	5	ND
79-34-5	1,1,2,2-tetrachloroethane	5	ND
127-18-4	tetrachloroethene	5	ND
71-55-6	1,1,1-trichloroethane	5	ND
79-00-5	1,1,2-trichloroethane	5	ND
79-01-6	trichloroethene	5	ND
75-69-4	trichlorofluoromethane	5	ND
75-01-4	vinyl chloride	10	ND

Continued on Page 2

BUCK ENVIRONMENTAL LABORATORIES INC.
ACCREDITED ENVIRONMENTAL ANALYSIS
3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
P.O. BOX 5150 607-753-3403

LABORATORY REPORT

Client: **STETSON-HARZA**

Site: Dover Electronics
Sample No: DMW-3
Sample: Water

Report Date: 8/21/92
Sampling Date: 8/13/92
Sampled By: P.Romano
Analysis Date: 8/19/92
Lab Log No: 9208114

TARGET COMPOUND LIST
(EPA 8240 GC/MS Methodology)

CAS No.	Compound	DL	RESULT
71-43-2	benzene	5	ND
100-41-1	ethylbenzene	5	ND
108-88-3	toluene	5	ND
1330-20-7	xylenes (m, o, & p)	5	ND
67-64-1	acetone	100	ND
75-15-0	carbon disulfide	100	ND
78-93-3	2-butanone	100	ND
108-05-4	vinyl acetate	50	ND
108-10-1	4-methyl-2-pentanone	50	ND
591-78-6	2-hexanone	50	ND
100-42-5	styrene	5	ND
Additional Compound:			
1634-04-4	MTBE	10	ND

All concentrations are reported as ug/L. ND indicates that no amount greater than the detection limit (DL) was detected.

These analyses are certified as conforming to generally accepted laboratory practices, the analytical method cited, requirements of the New York State Health Department ELAP program, and the New York State Department of Environmental Conservation.

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Laboratory Director