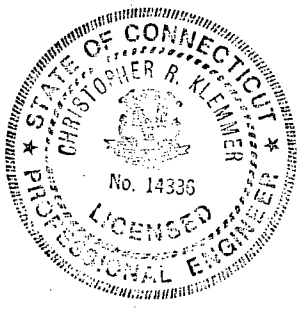
DESIGN REPORT
INTERIM REMOVAL TREATMENT SYSTEM
FOR
LINEMASTER SWITCH CORPORATION
WOODSTOCK, CONNECTICUT

DECEMBER, 1991



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Corres.

FUSS&O'NEILL inc
consulting engineers
146 Hartford Road, Manchester, Connecticut 06040
Telephone (203) 646-2469 FAX (203) 643-6313

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TRANSMITTAL LETTER

FUSS&O'NEILL INC
consulting engineers

December 18, 1991

Ms. Naomi Davidson
Senior Environmental Analyst
Department of Environmental Protection
Water Enforcement Section
165 Capitol Avenue
Hartford, CT 06106

RE: Linemaster Switch Corporation
Interim Removal Treatment System

Dear Ms. Davidson:

In conjunction with your letter of March 1, 1991 requiring that Linemaster implement measures to control the flow of contaminated ground water leaving the site, enclosed are the design plans and supporting documentation for the proposed interim removal treatment system which includes the following:

1. Treatment System Plans
   - Interim Removal Action Collection System
   - Interim Removal Treatment System Details
   - Proposed Outlet and Outlet Structure for Pond 3
   - Elementary Wiring Diagram (6 sheets)
   - Enclosure and Back Panel Layout
   - Enclosure Layout

2. Description of system operation (with Process and Instrument Diagram)

3. Design criteria.

4. Catalog cuts and manufacturers' literature for the components of the system.

5. Emergency discharge request and NPDES permit application.

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146 HARTFORD RD. / MANCHESTER, CT 06040-5921 / TEL: (203) 646-2469, FAX: (203) 643-6313

As you are aware Linemaster is committed to implement the Interim Treatment System as quickly as possible. Your prompt review of the information enclosed will allow orders to be placed for the equipment and expedite operation of the system. If additional information is required, we will provide it immediately.

Very truly yours,

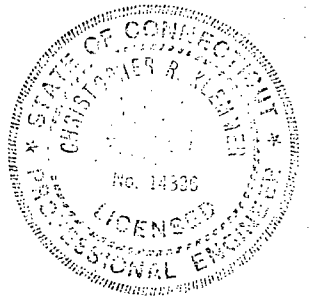
David L. Bramley, P.E.
Senior Environmental Engineer

Reviewed by,

Christopher R. Klemmer, P.E.
Associate

enclosure

cc. John Maloney, Linemaster
Gary Kennett, Linemaster
Alfred E. Smith, Esq., Murtha, Cullina, Richter & Pinney
Lucy Conley, US EPA



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DESCRIPTION OF SYSTEM OPERATION

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DESCRIPTION OF SYSTEM OPERATION

The proposed treatment system will use a combination of air stripping and granular activated carbon filtration to achieve the required discharge concentration of 1 ppb total volatile organic compounds at the discharge from the system.

From the individual monitoring wells (MW) and water supply wells (GW), ground water will be pumped, through individual force mains, to an equalization tank in the proposed treatment building. As each line enters the building there will be a sampling tap followed by a flow sensor. This will allow sampling and analysis of each well and will record instantaneous and total flow from each well. A filter will be installed on the line from MW-15db because the suspended solids concentration is high due to the fractured bedrock condition.

The equalization tank will be controlled by low, high and high-high level switches as described in the control description included on the drawings. From the equalization tank Transfer Pump 1 will deliver the flow to the top of the air stripping tower. A sampling tap has been provided to determine the VOC concentration of the equalized flow to the stripper. A flow sensor will indicate the flow rate to the tower.

The air stripping tower is designed to treat a water stream of variable VOC concentration. The anticipated TCE and VOC concentrations expected from the well complex are 3,550 and 4,700 ppb respectively. The air stripper has been designed however, to achieve an effluent VOC concentration of 5 ppb with an influent VOC concentration as high as 40,000 ppb, the concentration possible if only GW-10db was contributing to the system.

The treated water from the tower is returned to a clearwell at the base of the tower. The liquid level in the clearwell is controlled by probes which control the operation of transfer pumps and the air blower. The control description outlines the sequence of operations.

Transfer Pump 2 delivers the flow from the air stripper clearwell to the granular activated carbon filters. This pump operates on the water level in the clearwell. It also contains a sampling tap and flow sensor. The tap will allow collection of a sample to determine the effectiveness of the stripper. The flow sensor will allow recording of instantaneous flow rate as well as total flow through the system for the recording period.

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The carbon filters are designed to operate in series and will be plumbed to allow either filter to function as the primary unit. Flow will enter the primary unit at the top and be forced out the bottom via Transfer Pump 2. The flow will continue under pressure through the secondary unit discharging from the bottom of the unit. Ultimately, the flow will discharge by gravity to Pond 3. To keep both units full when the system is not active, the discharge pipe from the secondary unit will be elevated to the ceiling of the treament building before turning down to the discharge connection in the floor. A sampling tap will be located on the discharge side of both of the filters to determine the effectiveness of the filtration system and to the monitor water quality before it leaves the treatment building and the site.

The Control Sequence is delineated on the detail drawing of the treatment system. The building has been designed and the slab constructed with a 6-inch high containment wall around the perimeter of the slab. This will result in the ability to contain approximately 2,200 gallons of liquid within the building foundation. This is more than twice the volume of the equalization tank and clearwell combined. In addition the control system contains a sensor to detect the presence of as little as 1/32 inch of water on the floor. Should the floor alarm be activated, a signal will stop all the well pumps.

Other alarm conditions include high-high level in either the equalization tank and the clearwell. An alarm under high-high level will stop the entire in sequence as delineated in the Control Description.

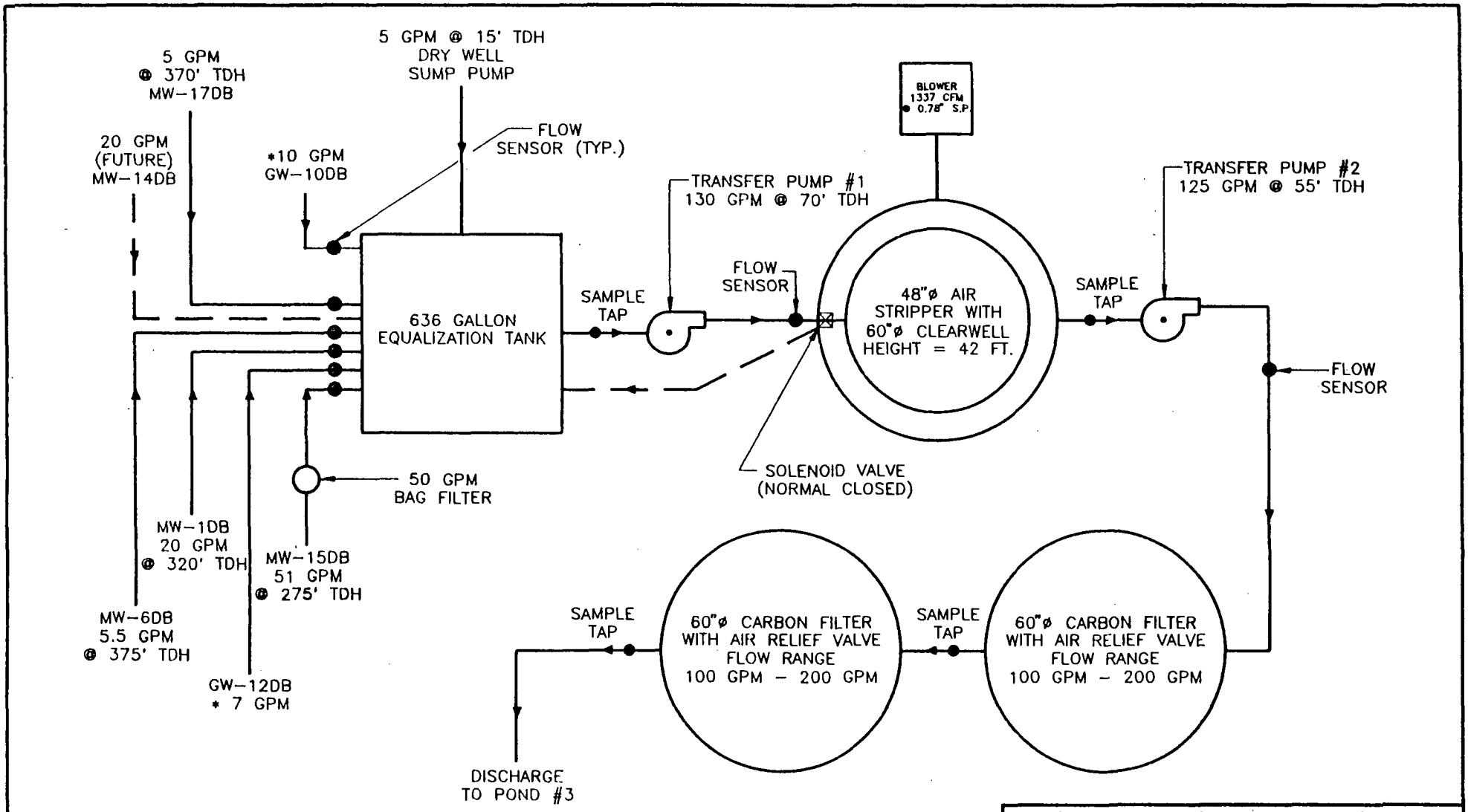
An additional safety feature will drain the influent line to the stripping tower if the temperature of the water in the line reaches 35°F. This condition could occur in the winter if Transfer Pump 1 was inoperative. An inline sensor will monitor the water temperature. If the water temperature reaches 35°F a signal will open a normally closed solenoid valve which will drain the influent line back into the equalization tank, a total volume of approximately 22 gallons.

The system has been designed to be simple to operate yet include sufficient control and monitoring functions to assess the effectiveness. The control system will include a programmable controller and a graphic display panel to allow evaluation of the operating status a glance. The programmable controller will permit easy alteration of system parameters to adjust to changing conditions (eg. faster or slower ground-water recharge to the monitoring wells).

The total daily flow through the treatment system, assuming continuous operation (which is unlikely for all of the wells), is estimated at approximately 130,320 gpd (0.20 cfs). The maximum flow rate through the treatment system as currently designed is 130 gpm (0.29 cfs). The runoff calculated for the area tributary to Pond 3 is approximately 2.7 cfs for the 10-year storm. The total rate of discharge to Pond 3, therefore, is not expected to exceed 3 cfs for the 10-year storm.

The proposed discharge structure and pipe is designed to convey the flow from at least a 10-year recurrence frequency storm, the discharge from the treatment system and the non-contact cooling water from the production facility (approximately 3,600 gallons per day). The throat of the outlet control structure has a capacity of 20.4 cfs. The proposed 12" PVC discharge pipe has a minimum capacity of 5 cfs without a surcharge condition. Thus both the outlet structure and the discharge pipe have sufficient capacity to convey the volume of water that will be discharged to the pond.

The proposed outlet structure will maintain the pond elevation at approximately 474 feet. This elevation was selected for two reasons. First, aesthetically, the appearance of the pond is more pleasing with a greater depth of water. Deeper water also inhibits the growth of nuisance aquatic plants. Second, the elevation of the ground at the southeast edge of the pond is approximately 475 feet. Maintaining a maximum water surface of 474 feet will result in a 1-foot freeboard.



* SUBMERSIBLE WELL PUMP INSTALLED

FUSS & O'NEILL
consulting engineers
MANCHESTER, CONNECTICUT

INTERIM TREATMENT SYSTEM PROCESS
AND INSTRUMENT DIAGRAM

LINEMASTER SWITCH CORP.

PLAINE HILL ROAD WOODSTOCK, CT

PROJ NO. 86-88/27 DATE: DEC 1991 SCALE: NONE

FILENAME: 868827

DESIGN CRITERIA

LINEMASTER SWITCH CORPORATION
INTERIM REMOVAL ACTION TREATMENT SYSTEM
DESIGN CRITERIA

	Average	Maximum
Flow (gpm)		
MW-1db	20	30
MW-6db	5.5	8
MW-15db	51	74
MW-17db	5	8
GW-10	10	10
GW-12	7	7
Equalization Tank		
Type	Circular, FRP	
Diameter (ft.)	5	
Height (ft.)	4.33	
Capacity (gal)	635	
Transfer Pump 1		
Type	Close-coupled, centrifugal, 5.125" impeller	
Capacity (gpm @ ft TDH)	130 @ 70	
Horsepower	3	
Speed (rpm)	3500	
Motor	Open, drip-proof	
Air Stripper		
Flow (gpm)	130	
Water Temperature (°F min.)	48	
VOC Concentration (ppb)		
Influent	3,550	40,000
Effluent	5	5
Tower		
Height (ft)		42
Diameter (in)		4
Packing		
Type	3.5" Lanpac	
Depth (ft)		33
Clearwell		
Depth (ft)		3.5
Diameter (ft)		5
Capacity (gal)		510
Blower		
Flow (cfm @ in S.P.)	1337 @ 0.78	
Motor	1.5 HP TEFC	

LINEMASTER SWITCH CORPORATION
INTERIM REMOVAL ACTION TREATMENT SYSTEM
DESIGN CRITERIA (cont'd)

Transfer Pump 2	
Type	Close-coupled, centrifugal, 4.75" impeller
Capacity (gpm @ ft TDH)	125 @ 55
Horsepower	3
Speed (rpm)	3500
Motor	Open, drip-proof
Dry Well Pump	
Type	Sub. sump
Capacity (gpm @ ft TDH)	20 @ 15
Horsepower	1/3
Speed (rpm)	3400
Motor	115V, 1PH
Carbon Filter	
Number	2 (in series)
Type	Culligan HR-60
Diameter (ft)	5
Depth (ft)	5
Capacity (cf ea.)	48
Retention Time (min. total)	5.7
Carbon	
Size (mm)	0.4x1.7
Mesh	12x40
Density (pcf, wet drained)	25
VOC Concentration (ppb)	
Influent	5
Effluent	<1
Anticipated Life	
Primary (days)	333

FUSS&O'NEILL consulting engineers

PREPARED BY	DATE	CHECKED BY	DATE	PROJECT NO.
DHD	10/1/91 12/4/91	DLB	10/1/91 12/4/91	86-88/27

LINEMASTER

SHEET NO. 1 of 2

MASS BALANCE FOR TCE & VOC LOADING

TCE & VOC concentrations from packer sampling for MW and periodic analyses for GW-10 & 12 db.

$Q \times C \times 8.34 =$ lb/day Q = flow in MGD, C = concentration mg/l

$\frac{gpm \times 1440}{10^6} = MGD \times 8.34 = 0.012009$

Well	Expected well Yield (gpm)	TCE conc. mg/l (VOC conc mg/l)	lb/d TCE (lb/d VOC)
MW-1db	20	0.55 (0.62)	0.0132 (0.0149)
MW-6db	5.5	2.5 (2.75)	0.1663 (0.1830)
MW-15db	51	0.31 (0.35)	0.1899 (0.2144)
MW-17db	5	5.1 (5.9)	0.3062 (0.3543)
GW-10db	10	29.0 (36.5)	3.482B (4.3835)
GW-12db*	7	0.5 (5.0)	0.0420 (0.4203)
MW-14db**	20	0.004 (0.05)	0.0010 (0.012.1)
TOTAL w/MW-14db	118.5 (0.171 MGD)		4.20 lb TCE/day 5.58 lb VOC/day
w/o MW-14db	98.5 (0.142 MGD)		4.20 lb TCE/day 5.57 lb VOC/day

* Likely will be developed by MW-15db or MW-1db

** Not included in initial design

FUSS&O'NEILL consulting engineers

PREPARED BY	DATE	CHECKED BY	DATE	PROJECT NO.
DHD	10/1/91 12/4/91	DLB	10/1/91 12/4/91	86-88/27

SHEET NO. 2 of 2

LINEMASTER - MASS BALANCE

Determine Average Concentration of TCE / VOC to Stripper

C = lb/day x 1/Q x 1/8.34

w/ MW-144b

TCE = 4.20 x 1/0.171 x 1/8.34 = 2.945 mg/l

VOC = 5.58 x 1/0.171 x 1/8.34 = 3913 mg/l

w/o MW-144b

TCE 4.20 x 1/0.142 x 1/8.34 = 3.546 mg/l

VOC 5.57 x 1/0.142 x 1/8.34 = 4.703 mg/l

Maximum VOC concentration assumed to be 40,000 ug/l based on conservative average of 1991 analyses (some samples collected during the GW-10db pump test). VOC concentrations ranged from ~28,000 to 50,000 ug/l with an average of approximately 35,000 ug/l

FUSS&O'NEILL inc
consulting engineers

PREPARED BY	DATE	CHECKED BY	DATE	PROJECT NO
DAY	12/13/91	DLB	12/16/91	86-98/27

LINEMASTER: ESTIMATED LIFE OF CARBON FILTER

SHEET NO. of

For HR-60 Culligan CARBON FILTER (Cullar D PLUS CARBON)

- VOLUME of CARBON = $48 ft^3$
- Density of CARBON = $25 lbs/ft^3$
- CARBON USAGE for Q = 125 gpm and influent TCE = 5ppb is 0.02 lbs of CARBON per 1000 gal (.02lbs/1000gal)

BASED ON the above information determine the Anticipated LIFE of the CARBON filter AND CONTACT TIME IN THE FILTER.

$$\text{CONTACT TIME} = \frac{48 ft^3}{125 gpm} \times \frac{7.48 gal}{ft^3} = 2.87 \text{ min/filter}$$

$$\text{lbs of CARBON in filter} = \frac{25 lbs}{ft^3} \times 48 ft^3 = 1200 lbs$$

$$1200 lbs \text{ CARBON} \times \frac{1000 gal}{0.02 lbs\ C} = 6.0 \times 10^7 gal$$

$$\frac{6.0 \times 10^7 gal}{125 gpm} \times \frac{DAY}{1440 min} = 333.33 \text{ days}$$

SAY 333 DAYS

Therefore, the anticipated life of the primary CARBON filter = 333 days

Design Data

CULLAR. FILTERS

		FLOW RATES						PIPE SIZE		MEDIA VOL.	DIMENSIONS[6]			WEIGHT		
		TASTE, ODOR, &[1] ORGANIC REMOVAL		DECHLORINATION[2]		BACK WASH	TANK[3] SIZE									
	MODEL	FLOW GPM	DROP PSI	FLOW GPM	DROP PSI	GPM	(IN)	SERVICE (IN)	DRAIN (IN)	STD. FT³	WIDTH IN.	DEPTH IN.	HEIGHT IN.	SHIP LB.	OPERAT. LB.	MODEL
HI-FLO 2	PV-12R	5	1.0	8	7	8	12x37	1½	¾	1.4	14	12	53	141	285	PV-12R
	PV-16R	7	1.0	14	4	15	16x48	1½	1	2.8	17	20	65	305	520	PV-16R
HI-FLO 5	HR-20	12	2.0	22	5	20	20x54	1½	1	6.0	21	36	69	670	1,275	HR-20
	HR-24	15	2.0	31	8	30	24x54	1½	1	8.0	25	40	69	835	1,625	HR-24
	HR-30	25	3.0	49	10	50	30x60	2	2½	14.0	31	46	77	1,330	2,525	HR-30
	HR-36	35	4.0	71	10	70	36x60	2	2½	20.0	37	54	84	1,810	3,575	HR-36
HI-FLO 50	HR-42	50	4.0	100	14	90	42x60	2½	2½	24.0	43	51	86	3,200	5,120	HR-42
	HR-48	65	4.0	125	16	130	48x60	2½	3	30.0	49	60	92	4,520	7,120	HR-48
	HR-54	80	6.0	150	18	160	54x60	2½	3	40.0	55	71	94	5,640	9,025	HR-54
	HR-60	100	4.0	200	13	210	60x60	3	3	48.0	61	98	98	6,900	11,160	HR-60

DEPTH FILTERS

		FLOW RATES							PIPE SIZE (IN)		MEDIA VOL.	DIMENSIONS			WEIGHT		
		CONTINUOUS[4]		PEAK[5]		BACKWASH		TANK[3] SIZE									
	MODEL	FLOW GPM	DROP PSI	FLOW GPM	DROP PSI	STD. GPM	QUAD. GPM	(IN)	INLET & OUTLET	DRAIN	STD. FT³	WIDTH IN.	DEPTH IN.	HEIGHT IN.	SHIP LB.	OPERAT. LB.	MODEL
HI-FLO 2	PV-12D	8	2	12	4	10	—	12x37	1½	¾	1.5	14	18	53	222	365	PV-12D
	PV-16D	14	3	21	7	20	—	16x37	1½	1	2.8	17	20	53	410	615	PV-16D
HI-FLO 5	HD-20	22	3	45	10	30	50	20x54	1½	1	6.0	21	36	69	975	1,600	HD-20
	HD-24	31	3	65	16	50	80	24x54	1½	2½	8.0	25	40	69	1,315	2,150	HD-24
	HD-30	49	5	100	16	70	120	30x60	2	2½	13.0	31	46	77	2,015	3,275	HD-30
	HD-36	71	5	140	16	90	160	36x60	2½	2½	19.0	37	54	84	2,970	4,750	HD-36
HI-FLO 50	HD-42	95-142	5-10	190	17	136	226	42x60	3	3	25.0	43	51	86	4,980	6,850	HD-42
	HD-48	125-187	6-10	250	16	188	324	48x60	3	3	34.0	49	62	92	6,300	8,850	HD-48
	HD-54	160-240	5-8	320	13	210	398	54x60	4	3	42.0	55	72	94	8,000	11,290	HD-54
	HD-60	200-300	4-9	400	14	270	430	60x60	4	3	52.0	61	77	98	9,770	13,990	HD-60
	HD-72	290-425	4-9	560	14	400	—	72x60	6	4	75.0	73	88	94	14,150	20,100	HD-72
	HD-84	390-575	4-9	770	14	540	—	84x60	6	4	106.0	85	94	97	19,240	27,300	

(1) Taste, odor, and organic removal based on 5 gpm per square foot of filter area.
(2) Dechlorination flow rate can be set up to 10 gpm per square foot of filter area.
(3) Dimensions are diameter by straight side sheet.
(4) Normal Service Range based on 10 gpm per square foot of filter bed area.
(5) Peak Flow based on 20 gpm per square foot of filter bed area, not recommended for extended periods of time.
(6) Does not include operating and maintenance spaces, ASME code tanks are slightly taller.

NOTE: CONSULT FACTORY FOR WATER RECLAMATION APPLICATIONS.

Multi-Tech™ Systems

Design Data

MODEL	DAILY CAPACITY[1]	SERVICE FLOW RATE PER TANK[2]		BACKWASH FLOW RATE[3]	TANK DIAMETER	PIPE SIZE[4]	MODEL
		NORMAL	MAXIMUM				
MT-20	0.065 MGD	15 gpm	22 gpm	30 gpm	20 in.	1½ in.	MT-20
MT-24	0.095 MGD	22 gpm	30 gpm	50 gpm	24 in.	1½ in.	MT-24
MT-30	0.150 MGD	35 gpm	50 gpm	70 gpm	30 in.	2 in.	MT-30
MT-36	0.215 MGD	50 gpm	70 gpm	100 gpm	36 in.	2 in.	MT-36
MT-42	0.280 MGD	65 gpm	95 gpm	130 gpm	42 in.	2½ in.	MT-42
MT-48	0.367 MGD	85 gpm	125 gpm	170 gpm	48 in.	3 in.	MT-48
MT-54	0.475 MGD	110 gpm	160 gpm	220 gpm	54 in.	3 in.	MT-54
MT-60	0.580 MGD	135 gpm	190 gpm	270 gpm	60 in.	4 in.	MT-60
MT-72	0.842 MGD	195 gpm	280 gpm	400 gpm	72 in.	4 in.	MT-72
MT-84	1.15 MGD	265 gpm	380 gpm	530 gpm	84 in.	6 in.	MT-84
MT-96	1.52 MGD	350 gpm	500 gpm	700 gpm	96 in.	6 in.	MT-96
MT-120	2.37 MGD	550 gpm	780 gpm	1100 gpm	120 in.	6 in. (8 in.)	MT-120

(1) Daily Capacity based on 24 hour operation of 3 train system operating at normal service flow rate of 7 gpm/ft² per train.
(2) Service flow rates based on 7 gpm/ft² per train. When one train of the 3 train system is in backwash, the remaining 2 trains will operate at 10.5 gpm/ft².
(3) The backwash flow rate of both the clarifier and filter are approximately 14 gpm/ft². The clarifier eductor draws 2-3 cfm/ft² air during the scour cycle for additional mineral bed expansion.
(4) Pipe size selection is based on a maximum velocity of 5 fps at the Normal Service flow rate.
(5) Total water usage per train is 225 gallons per sq ft of filter tank area. This includes 140 gallons of influent water for clarifier backwash and system rinse plus 85 gallons of filtered water for depth filter backwash.

CULLAR D PLUS

GENERAL CHARACTERISTICS

Cullar D Plus is a general purpose granular activated carbon which contains a broad size range of pores capable of adsorbing a variety of molecular weight organics from water. Cullar D Plus is made from coal which is milled, compacted, sized, and steam activated.

PROPERTIES

The following are approximate values for Cullar D Plus:

Mesh Size	12x40
Surface Area (m^2/g)	1000
Moisture (%)	2
Ash (%)	8
Abrasion No.	70
Density (lb/cu.ft.)*	25
Iodine Index	1000
Methylene Blue Index	200
Bed Expansion @ 55°F	
gpm/sq.ft. for 50%	12
gpm/sq.ft. for 30%	8
Pressure Drop @ 55°F (psi/ft)	
@ 3 gpm/sq.ft.	0.2
@ 5 gpm/sq.ft.	0.3
@ 20 gpm/sq.ft.	1.5

*backwashed and drained

CAT. NO.	NET WT. (LBS)
1627-05	15
1627-04	21
1627-06	25
1627-03	35
1627-00	50

NOTE: While suitable for general applications, Cullar D Plus should not be used for medical applications. Consult the factory before using any activated carbon material for medical applications.

12/13/91 CARBON USAGE RATE per CULLIGAN

David Day

Flow Rate Max 125 G.P.M.

TCE	Per 1000 Gal	per 24 hr.
at 1 PPB	0.01 lbs	1.7 lbs
at 5 PPB	0.02	3.5
at 10 PPB	0.03	5.2

MTBE		
at 50 PPB	0.59	102 lbs
at 100 PPB	0.84	145

More details report to follow

Rich Yacuniello

CATALOG CUTS

Linemaster Switch Corporation
Interim Removal Treatment System
Equipment List

EQUIPMENT		MANUFACTURER
1.	Bag Filter	Rosedale Products
2.	Flow Sensor/Totalizer	Signet
3.	Equalization Tank	Ambi
4.	Transfer Pump #1&#2, Sump Pump	Goulds Pumps
5.	Air Stripping Tower & Blower	National Environmental Systems
6.	Solenoid Valve, Temp Switch & Bulb Sensor	Asco
7.	Carbon Filters	Culligan
8.	Lighting	Mercury
9.	Heater	Chromalox

DMD1216A91\86088
Corres.

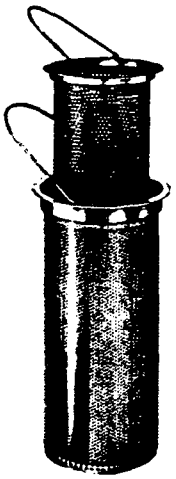
IN-LINE BAG FILTER
(FOR MW-15db)

Strainers or Bag Filters: Your Choice!

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

FEATURES

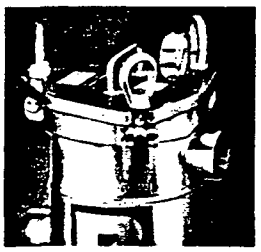
- Large-area, heavy-duty baskets
- Low pressure drops
- Housings are permanently piped
- Covers are O-ring sealed
- Carbon steel, or stainless steel (304 or 316) housings
- All housings are electropolished to resist adhesion of dirt and scale
- Adjustable-height legs, standard on Models 6 and 8; optional extra on Model 4
- Easy to clean
- ASME code stamp for 150 or 300 psi
- Liquid displacers for easier servicing
- Special options include filter bag hold-down devices, sanitary construction, different outlet connections, higher pressure ratings, extra-length legs, heat jacketing, and adapters for holding filter cartridges.
- Multiple-basket and duplex units are available



Dual Stage Straining/ Filtering

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

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



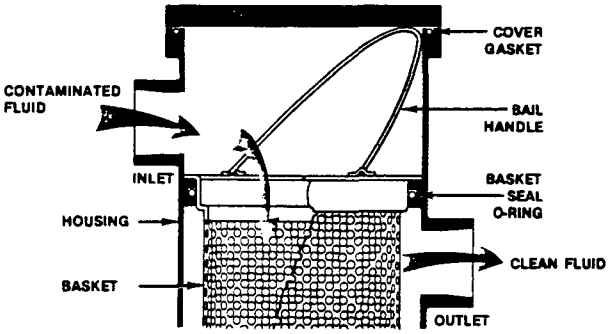
MULTI-BASKET MODELS

Larger units with multiple baskets (from 2 to 17) are also made. They can handle flows from 400 to 3500 gpm. Ask for Catalog MB.

DUPLEX MODELS

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

Operation

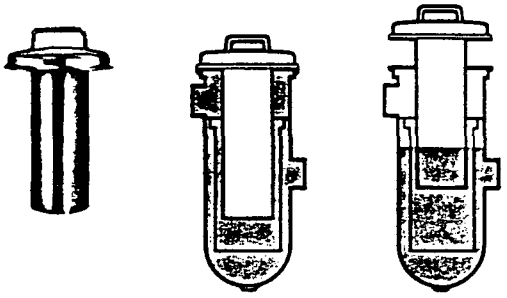


Unfiltered liquid enters the housing above the bag or basket and passes down through them. Solids are contained inside the bag or basket where they're easily and completely removed when the unit is serviced. A hinged basket bail is pushed down by the closed cover, to hold the basket against a positive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

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

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

Liquid Displacer Option



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

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

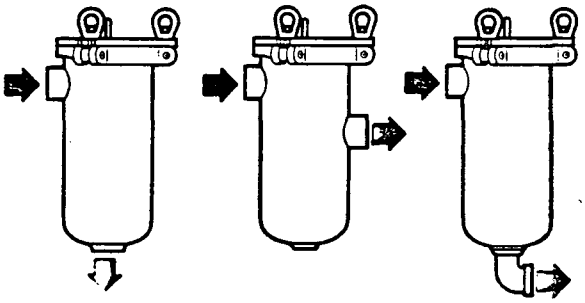
Construction Materials

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

Four different materials can be ordered for all seals involved.

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

Convenient Piping Arrangements



Style 1
Bottom outlet

Style 2
Side outlet

Style 3
Bottom outlet with elbow

Many basket options

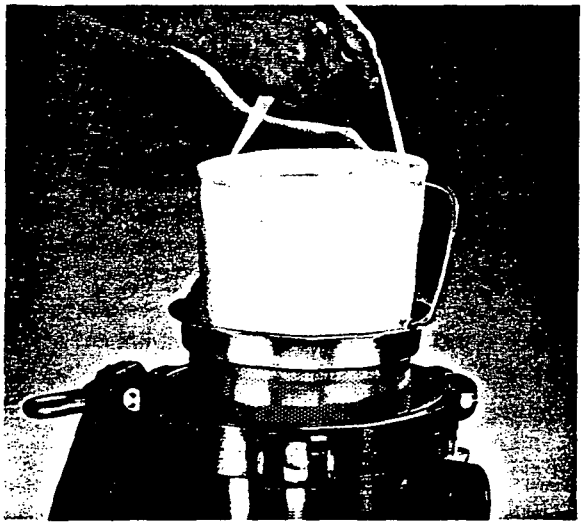
The baskets offered will permit the straining and filtering of a wide variety of fluids, to retain solids of almost any size.

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

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

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

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



Choosing a basket strainer or bag filter

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

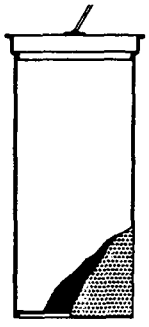
PRESSURE DROP DATA
Basket strainers and bag filters are usually selected so that the pressure drop does not exceed 2 psi, when they are clean. Higher pressure drops may be tolerated when contaminant loading is low.

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

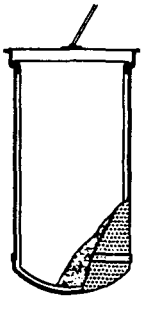
Follow these easy steps:
1. Using the desired pipe size and approximate flow rate, determine the basic pressure drop from the appropriate graph.
2. Multiply the pressure drop obtained in step 1 by the viscosity correction factor found in the accompanying table. This is the adjusted (clean) pressure drop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

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

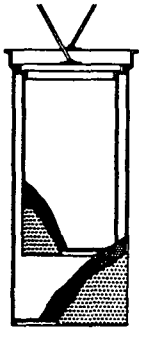
SINGLE-STAGE BASKETS
(all models)



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

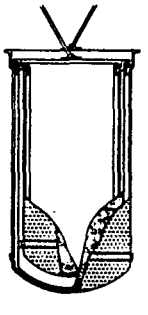


Single-stage filter bag, within perforated basket. Can also be wire mesh lined, or be made entirely of heavy wire mesh.

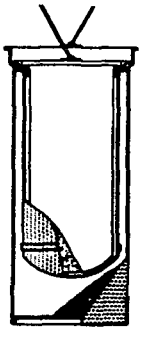


Dual-stage straining can be done with two perforated strainer baskets, with or without wire mesh linings.

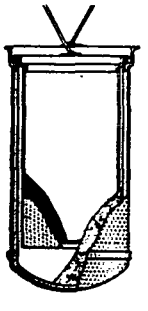
TWO-STAGE BASKETS
(Model 8 only)



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



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



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

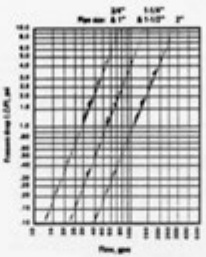
The following model descriptions and flow tables can be used to aid in selection, and make comparisons between the various styles.

Model 4—For flow rates to 50 gpm

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

BASKET DATA

Depth Nominal (inches)	Diameter (inches)	Surface Area (sq. ft.)	Volume (cu. in.)
6	3.9	0.5	65
12	3.9	1.0	130

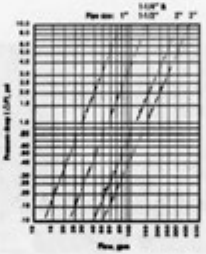


Model 6—For flow rates to 100 gpm

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

BASKET DATA

Depth Nominal (inches)	Diameter (inches)	Surface Area (sq. ft.)	Volume (cu. in.)
12	8	1.3	235
18	8	2.0	350
30	8	3.4	590

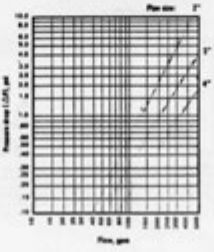


Model 8—For flow rates to 220 gpm

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

BASKET DATA

Depth Nominal (inches)	Diameter (inches)	Surface Area (sq. ft.)	Volume (cu. in.)
15	6.7	2.3	500
30	6.7	4.4	1000

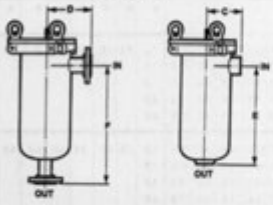


OUTLET STYLES

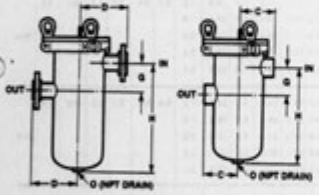
FLANGED (150 lb. ANSI)

THREADED (NPT)

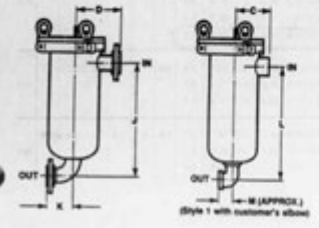
STYLE 1



STYLE 2

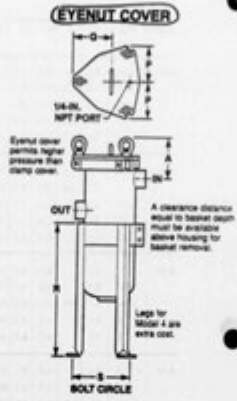


STYLE 3

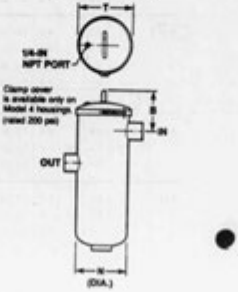


COVER TYPES

EYENUT COVER



CLAMP COVER



DIMENSIONS (IN.)

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

HOW TO ORDER

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

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

Linemaster : G 30 3P 2 150 NC N BAB

EXAMPLE: 8 15 3P 1 150 NCD 8 S – M 200 – 2M 50

HOUSING — BASKET — OPTIONAL INNER BASKET

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

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

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

OUTLET STYLE
Bottom = 1
Side = 2
Bottom elbow = 3

PRESSURE RATING[2]
300 psi = 300
500 psi = 500
200 psi (steamjacketed) = 200
150 psi = 150
210 psi = 210

ASME CODE STAMP
None = NC
Code = SM

HOUSING MATERIAL
Carbon steel = C
304 stainless steel = S
316 stainless steel = S16

FOR MODEL 8 ONLY

OPTIONAL INNER BASKET, MEDIA SIZE
No symbol if type 2B basket was selected
Perforation diameters (Not type 2P baskets): 1/4, 3/16, 3/64, 3/32, 1/16
Mesh sizes (Not type 2M and 2MH baskets): 20, 30, 40, 50, 60, 70, 80, 100, 150, 200

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

BASKET, MEDIA SIZE
No symbol if type B basket was selected
Perforation diameters (Not type P baskets): 1/4, 3/16, 3/64, 3/32, 1/16
Mesh sizes (Not type M and BM baskets): 20, 30, 40, 50, 60, 70, 80, 100, 150, 200

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

BASKET SEAL
S = Seal (never on Models 4 & 6 bag type baskets)
S = Seal required (always on Model 8 bag type baskets)

COVER GASKET
N = Buna N
E = Ethylene Propylene
V = Viton Fluoroelastomer
T = Teflon Fluorocarbon Resin

DISPLACER
N = No displacer
D = Displacer

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

2. Higher pressure ratings available. Consult factory.
3. Filter bags are specified separately. See Rosedale Filter Bag Catalog FB.

ROSEDALE PRODUCTS, INC.
Box 1085, Ann Arbor, MI 48106
Tel: 313-665-8201 Fax: 313-665-2214

HIGH-CAPACITY FILTER BAGS FOR ALL ROSEDALE BAG FILTERS

CONSTRUCTION

Felt Bags

Felt construction is generally chosen where smaller particle retention is required, in the 1 to 100 micron range. It offers higher solids loading capacity than mesh. **General-purpose** felt bags are offered in polyester and polypropylene materials. **Special-purpose** felt bags include **high temperature service** (to 500°F) bags of Nomex nylon or Teflon. For **removal of oil,** bags made of special felted polypropylene microfibers, known as Oil-Adsorb, are available. A size 2 Oil-Adsorb bag will remove approximately a half-pound of oil from a water-oil liquid. It is only available with a 25 micron rating.

If finer filtration is needed in an oil removal task, Rosedale Model 8 filters can be fitted with two bags in series. The inner one an Oil-Adsorb bag and the outer one a finer standard bag. Installed this way, true two-stage filtration is achieved. (Two-stage filtering can be done for longer intervals between servicing.)

Mesh Bags

Mesh is a woven construction, generally used where micron ratings of 5 to 800 (660 to 20 mesh) are required.

Two types are offered. The **multifilament mesh** is a low cost, disposable material, offered in polyester or nylon. **Monofilament mesh** has higher strength, and is available in polypropylene or nylon. (It should be considered cleanable.)

FELT BAG FINISHES & COVERS

Standard finish. Plain, as manufactured, without treatment or covers.

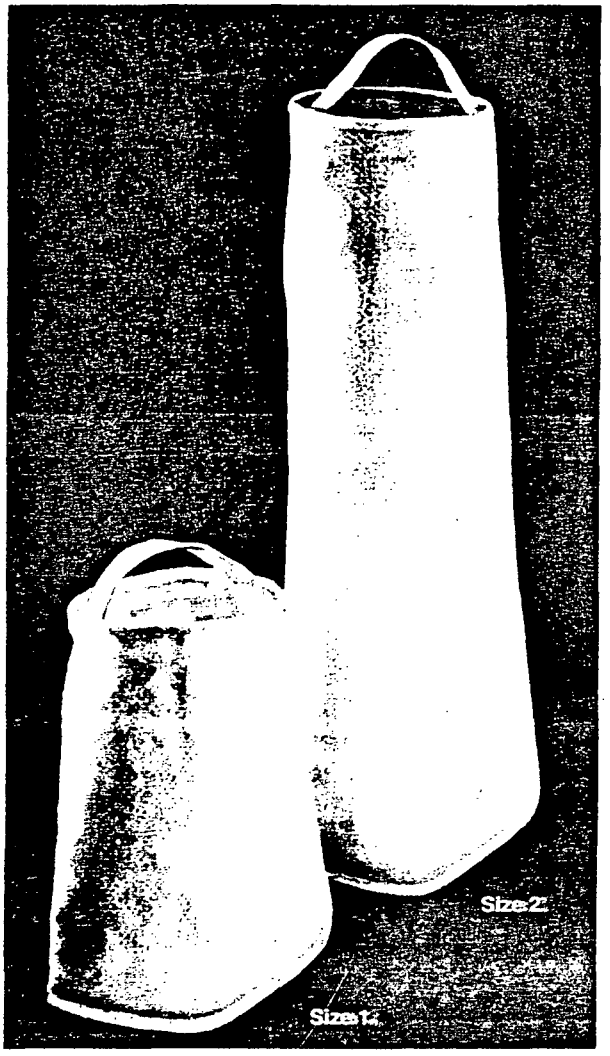
Glazed finish. The outermost surface fibers are melted by the momentary application of high heat. This bonds them to one another and effectively reduces the possibility of their breaking off. (Not available on high-temperature bags.)

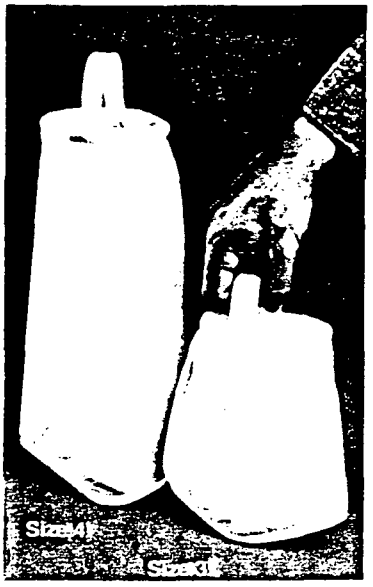
Mesh covers. Covers are available that completely encase the bag. Made of woven polyester mesh, nylon mesh, spun-bonded nylon (Cerex), or spun-bonded polyester (Remay), they act to contain any fibers that may separate from the filter bag.

DESIGN DETAILS

All Rosedale filter bags have a metal retaining ring at their openings. Standard ring material is cadmium-plated carbon steel, with 316 stainless steel optional.

Heavy-duty handles, sewn to the reinforced bag lip, are a standard feature. They make bag removal faster and easier.





COMPARATIVE PARTICLE SIZE

U.S. MESH	INCHES	MICRONS
3	.265	6730
3½	.223	5660
4	.187	4760
5	.157	4000
6	.132	3360
7	.111	2830
8	.0937	2380
10	.0787	2000
12	.0661	1680
14	.0555	1410
16	.0469	1190
18	.0394	1000
20	.0331	841
25	.0280	707
30	.0232	595
35	.0197	500
40	.0165	420
45	.0138	354
50	.0117	297
60	.0098	250
70	.0083	210
80	.0070	177
100	.0059	149
120	.0049	125
140	.0041	105
170	.0035	88
200	.0029	74
230	.0024	63
270	.0021	53
325	.0017	44
400	.0015	37

STANDARD FIBERS AND MICRON RATINGS

CONSTRUCTION	FIBER	AVAILABLE MICRON RATINGS: 1	3	5	10	15	25	50	75	100	125	150	175	200	250	300	400	600	800
	Polyester	•	•	•	•	•	•	•	•	•				•					
	Oil-Adsorb (pp)						•												
Felts	Polypropylene	•	•	•	•		•	•		•									
	Nomex (Nylon)			•	•		•	•		•									
	Teflon				•														
Multifilament meshes	Polyester								•	•	•	•		•	•	•	•		•
	Nylon									•		•							•
Monofilament meshes	Polypropylene															•		•	
	Nylon			•	•		•	•	•	•	•	•	•	•	•	•	•	•	•

COMPATIBILITY AND TEMPERATURE LIMITS FOR STANDARD BAG MATERIALS *

FIBER	COMPATIBILITY WITH: ORGANIC SOLVENTS	ANIMAL VEGETABLE & PETRO OILS	MICRO-ORGANISMS	ALKALIES	ORGANIC ACIDS	OXIDIZING AGENTS	MINERAL ACIDS	TEMPERATURE LIMITATIONS (max. deg F)
Polyester	Excellent	Excellent	Excellent	Good	Good	Good	Good	325
Polypropylene	Excellent	Excellent	Excellent	Excellent	Excellent	Good	Good	225
Nylon	Excellent	Excellent	Excellent	Good	Fair	Poor	Poor	325
Nomex Nylon	Excellent	Excellent	Excellent	Good	Fair	Poor	Poor	475
Teflon	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	500

* Chart is to be used as a guide. User should make tests with specific media to assure compatibility.

FILTER BAG SIZES

USED ON ROSEDALE MODEL NO.	BAG SIZE	LENGTH (inches)	DIAMETER (inches)	SURFACE AREA (sq. ft.)	BAG VOLUME (gallons)
4-6	3	8	4.12	0.5	0.5
4-12	4	14	4.12	1.0	1.0
6-12	7	15	5.10	1.3	1.3
6-18	8	21	5.10	2.0	1.5
6-30	9	32	5.10	3.4	2.8
8-15	1	16.5	7.06	2.0	2.1
	1 (inner)	14.5	5.75	1.6	1.7
8-30	2	32	7.06	4.4	4.6
and 16 thru 36	2 (inner)	30	5.75	3.6	3.8

PRESSURE DROP DATA

The graph shows pressure drop through clean filter bag media of various micron ratings. **The curves do not consider pressure drop through the filter housing.**

BAG SIZE CORRECTION

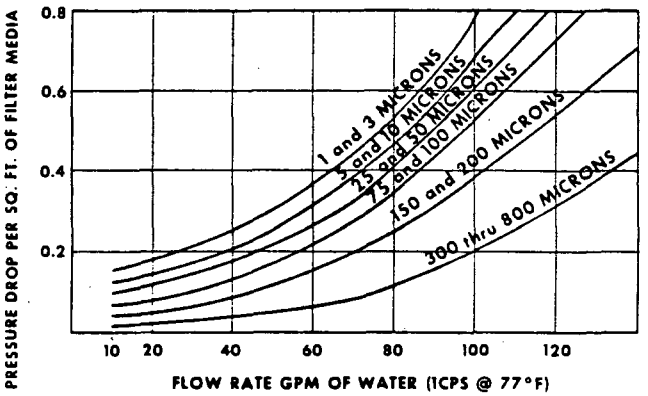
To obtain pressure drop correction for a specific bag size, divide the pressure drop obtained from the graph by the square foot area of the bag.

VISCOSITY CORRECTION

If viscosity is higher than one, multiply the corrected pressure drop as obtained above by the appropriate viscosity correction factor.

SELECTING A ROSEDALE FILTER BAG

1. Determine which type of filter bag material and which fiber best suits your needs.
2. Determine the micron rating you require.
3. Refer to the "How to order" chart below, and build an ordering code.



Bag Size	Surface Area (sq. ft.)
1	2.0
1 (inner)	1.6
2	4.4
2 (inner)	3.6
3	0.5
4	1.0
7	1.8
8	2.0
9	3.4

Viscosity (cps)	Correction Factor
50	4.5
100	8.3
200	16.6
400	27.7
800	50.0
1000	56.2
1500	77.2
2000	113.6
4000	161.0
6000	250.0
8000	325.0
10000	430.0

HOW TO ORDER FILTER BAGS

Build an ordering code as shown in this example:

Linemaster: PE 1 P 9 S

Example: PE 25 P 7 S-SS

FIBER AND MICRON RATINGS

Felt, polyester = **PE**
Microns: (1) 3, 5, 10, 15, 25, 50, 75, 100, 200

Felt, polypropylene = **PO**
Microns: **1, 3, 5, 10, 25, 50, 100**

Felt, Oil-Adsorb, 25-micron = **OA 25**

Felt, Nomex nylon = **HT**
Microns: **5, 10, 25, 50, 100**

Felt, Teflon, 10-micron = **TE 10**

Mesh, monofilament nylon = **NMO**
Microns: **5, 10, 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 400, 600 800**

Mesh, monofilament polypropylene = **PMO**
Microns: **300, 600**

Mesh, multifilament polyester = **PEM**
Microns: **75, 100, 125, 150, 200, 250, 300, 400, 800**

Mesh, multifilament nylon (light) = **NM**
Microns: **100, 150**

Mesh, multifilament nylon (heavy) = **HNM**
Microns: **800**

Inner Bags for Model 8 or Multibag Filters

To order inner bags, use a second, separate ordering code. It should be built using the system shown above, but prefixed by the symbol "IN". **Example: IN – PE 25 P 2 S-SS**

ADDITIONAL OPTIONS

SS = Stainless steel ring

BAG STYLE

(S) = Carbon steel plated ring

BAG DIMENSIONS

Symbol	Diam. (in.)	Length (in.)	Housing Model
1 =	7-1/16	x 16-1/2	8-15
2 =	7-1/16	x 32	8-30
3 =	4-1/8	x 8	4-6
4 =	4-1/8	x 14	4-12
7 =	5-1/8	x 15	6-12
8 =	5-1/8	x 21	6-18
(9) =	5-1/8	x 32	6-30

BAG FINISH OR COVER

(P) = None
G = Fiber-free glazed finish
PEM = Polyester multifilament mesh cover
NM = Nylon multifilament mesh cover
C = Spun-bonded nylon (Cerex) cover
R = Spun-bonded polyester (Remay) cover

ROSEDALE PRODUCTS, INC.
Box 1085, Ann Arbor, MI 48106
(313) 665-8201

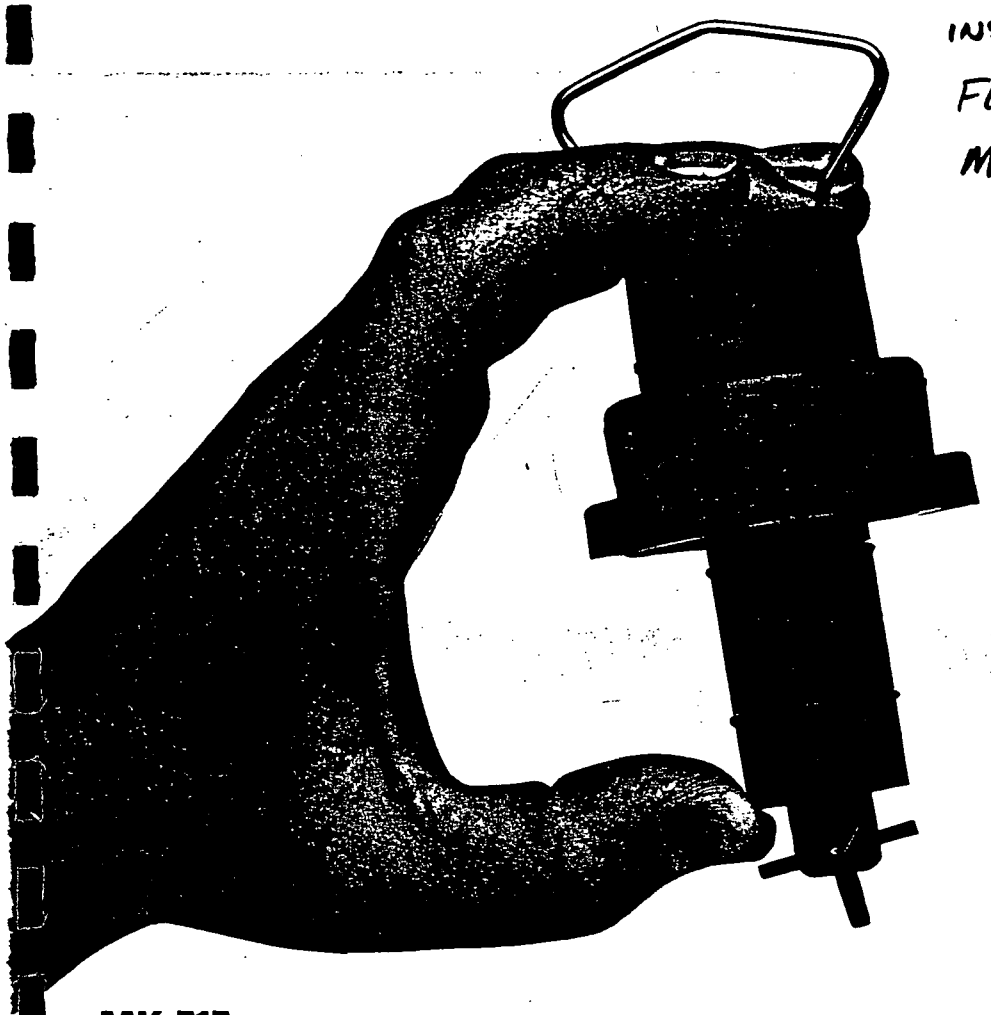
Catalog 6002-FB-2 Litho in USA

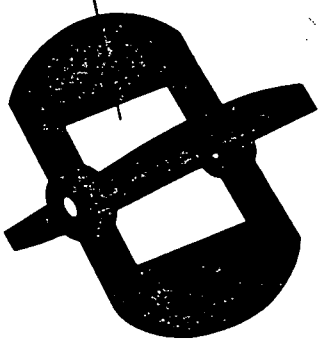
FLOW SENSOR/TOTALIZER

per Burt Process Equipment
508-649-9660

The Flow Sensor That Makes Short Work Of Your Flow Measurement

INSTALLATION Fitting = $100
Flow Sensor = 200
MK-575 = $500
$800





Patented, "flow-through" rotor design ensures accurate, linear output to ±1%.

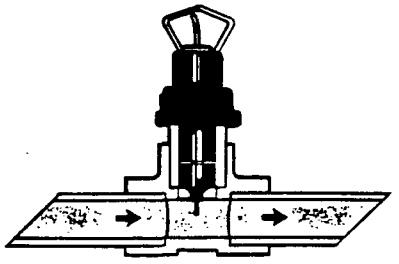
MK 515
ROTOR-X™ FLOW SENSOR

Streamline your flow measurement operation with the MK 515 ROTOR-X™ Flow Sensor. By using this compact flow sensor, a matched sensor installation fitting, a Signet flow meter or controller, and ordinary hand tools, you'll have a complete flow monitoring or controlling system—*in minutes.* Accurate to ±1% of full scale, with repeatability at ±0.5% of full scale, this insertion sensor operates on a simple electromechanical principle. And, it's proven in thousands of liquid flow applications worldwide. It all adds up to precision, dependability, and convenience—basic advantages that are quickly outdating its in-line counterparts.

A TIMESAVER YOU CAN BANK ON
Convert your maintenance hours into minutes, with the ROTOR-X™. Should a sensor, rotor, or O-ring need to be replaced, it takes only seconds. Reduce your system downtime substantially with a stand-alone MK 515 sensor. Or, simply *add an MK 319 Wet Tap Assembly and completely eliminate downtime.* Combined with the ROTOR-X™ during initial installation, the MK 319 Wet Tap allows sensor removal without system shut-down.

Optional local or remote capability lets you place your meter up to 200 feet away without signal amplification. And, you can install the MK 515 in **pipe sizes ranging from ½ inch to 36 inches** without a lot of additional cost, because the ROTOR-X price increases only slightly for larger pipe sizes.

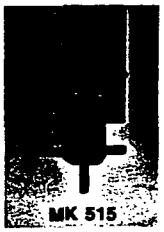
RUGGED CONSTRUCTION FOR LONG WEAR
Available in a choice of chemically resistant, non-contaminating housing materials, the ROTOR-X **stands up to the harshest environments.** The glass-filled polypropylene housing version is lightweight—but strong. A feature which makes it ideal for handling a wide range of liquids, including corrosive fluids in chemical processing. For processes containing acids and solvents, the PVDF (polyvinylidene fluoride) housing version is a tough fluorocarbon that is highly resistant to more severe fluids, such as acids and solvents. (See PVDF section for more information on Signet's all PVDF flow monitoring systems.)



*Price quoted refers to ½" to 4" line sizes. For further pricing information see

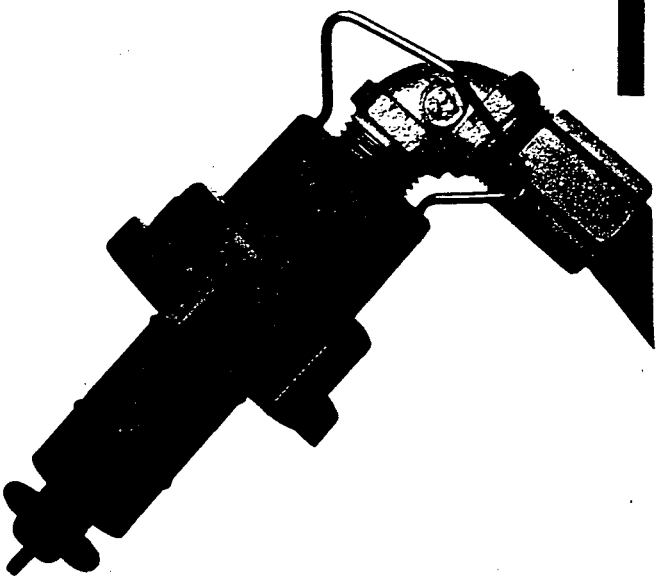
FLOW MEASUREMENT SIMPLE AND ACCURATE

The ROTOR-X works on a simple, but precise, electro-mechanical principle based on measuring the rate and volume of flow in your pipe. Four permanent magnets, imbedded in the rotor blades, spin past a coil in the sensor body. As the fluid flow causes the rotor to rotate, a sine wave signal is produced, directly proportional to the flow rate. **The patented "open cell" feature of the rotor ensures a linear, repeatable output** up to 30 fps—with accuracy of ±1% of full scale. The result—minimal head loss and no cavitation. Additionally, you can combine the ROTOR-X Flow Sensor with an intrinsic safety barrier (contact the factory for a list of suggested barriers) for use in hazardous environments.


MK 515

QUICK, EASY CONDUIT INSTALLATION

Designed to allow optional conduit installation, the MK 515 lets you easily comply with local codes requiring conduit protection. For instance, pry off the plug on top of the sensor. Underneath it you'll find a ½ inch (F) NPT thread. Now, using an optional conduit adapter fitting kit, connect your conduit. And, either an optional instrument back-cover kit, or a specially prepared NEMA box, will provide everything you need for quick conduit connection to a meter or controller. Additionally, you can **adapt to both rigid and flexible liquid-tight conduit**, protecting your system hookup from harsh elements and mechanical damage.



SPECIFICATIONS:

Output Signal:	1V p-p/fps nominal
Output Frequency:	5-6 Hz/fps nominal
Flow Rate Range:	1 to 30 fps
Linearity:	±1% of full range
Output Accuracy:	±1% of full range
Repeatability:	±0.5% of full range
Maximum % Solids:	1% of fluid volume
Standard Cable Length:	25 feet

HOW TO ORDER

ROTOR-X™ FLOW SENSORS

Part No.	Housing Material	Shaft Material	Pipe Size (in.)	Sensor O.D. (in.)	Sensor Length (in.)
P51530-P0	Polypro	Titanium	½–4	1.05	3.50
P51530-P1	Polypro	Titanium	5–8	1.05	5.00
P51530-P2	Polypro	Titanium	10–UP	1.05	7.75
P51530-V0	PVDF	Hastelloy C	½–4	1.05	3.50
P51530-V1	PVDF	Hastelloy C	5–8	1.05	5.00
P51530-V2	PVDF	Hastelloy C	10–UP	1.05	7.75

ROTOR-X with WET-TAP ASSEMBLY

For more options to the MK 319/P51530, see page 40.

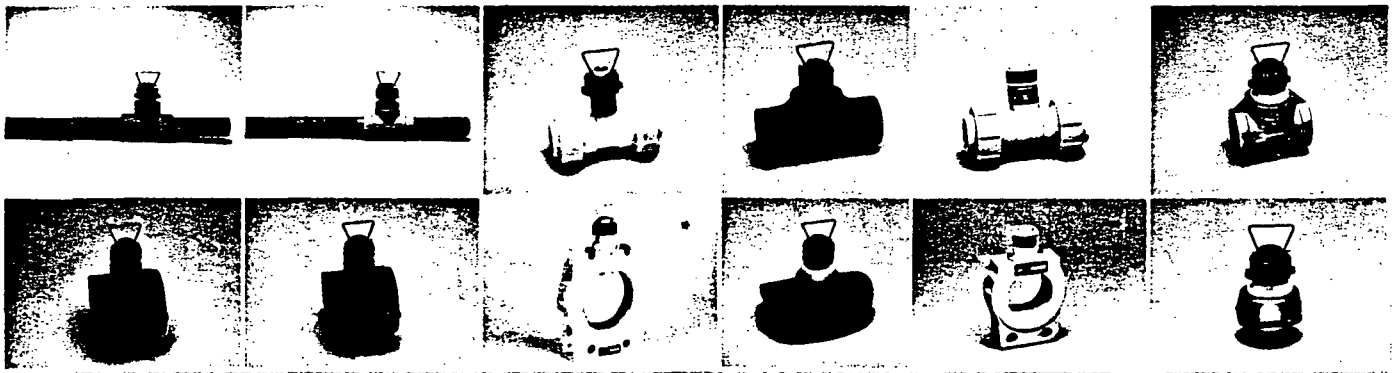
Wet-Tap (Pipe Installation Fitting not included.)

Part No.	Valve Assembly Material	Sensor Housing Material	Shaft Material	Pipe Size (in.)	Sensor O.D. (in.)	Sensor Length (in.)
MK 319/ 515-P3	PVC	Polypro	Titanium	½–4	1.05	11.75
MK 319/ 515-P4	PVC	Polypro	Titanium	5–8	1.05	13.00
MK 319/ 515-P5	PVC	Polypro	Titanium	10–UP	1.05	16.00

Sensor Installation Fittings

MK 515/565/8500

PIPE MATL	PVC 40 & 80	CPVC 80	PVDF	FIBERGLASS		POLYPROPYLENE	STAINLESS 316
PIPE SIZE	P/N	P/N	P/N	P/N	PRICE	P/N	P/N
1/2"	PV8T005	CPV8T005	SFMT005	N/A		PPMT005	CR4T005
3/4"	PV8T007	CPV8T007	SFMT007	N/A		PPMT007	CR4T007
1"	PV8T010	CPV8T010	SFMT010	N/A		PPMT010	CR4T010
1 1/4"	PV8T012	CPV8T012	SFMT012	N/A		PPMT012	CR4T012
1 1/2"	PV8T015	CPV8T015	SFMT015	FPT015	$210	PPMT015	CR4T015
2"	PV8T020 PV8S020	CPV8T020	SFMT020	FPT020	$210	PPMT020	CR4T020
2 1/2"	PV8T025 PV8S025	CPV8T025	SFMT025*	N/A		PPMT025*	CR4W025
3"	PV8T030 PV8S030	CPV8T030	SFMT030*	FPS030	$240	PPMT030*	CR4W030
4"	PV8T040 PV8S040	CPV8T040	SFMT040*	FPS040	$295	PPMT040*	CR4W040
5"	Use IR85050	N/A	SFMT050*	N/A		PPMT050*	CR4W050
6"	PV8S060	Use PV8S060 or IR8S060	SFMT060*	FPS060	$410	PPMT060*	CR4W060
8"	PV8S080	Use PV8S080 or IR8S080	SFMT080*	FPS080	$440	PPMT080*	CR4W080
10"	Use IR8S100	Use IR8S100	N/A	FPS100	$610		CR4W100
12"	Use IR8S120	Use IR8S120	N/A	FPS120	$775		CR4W120



Part Number:

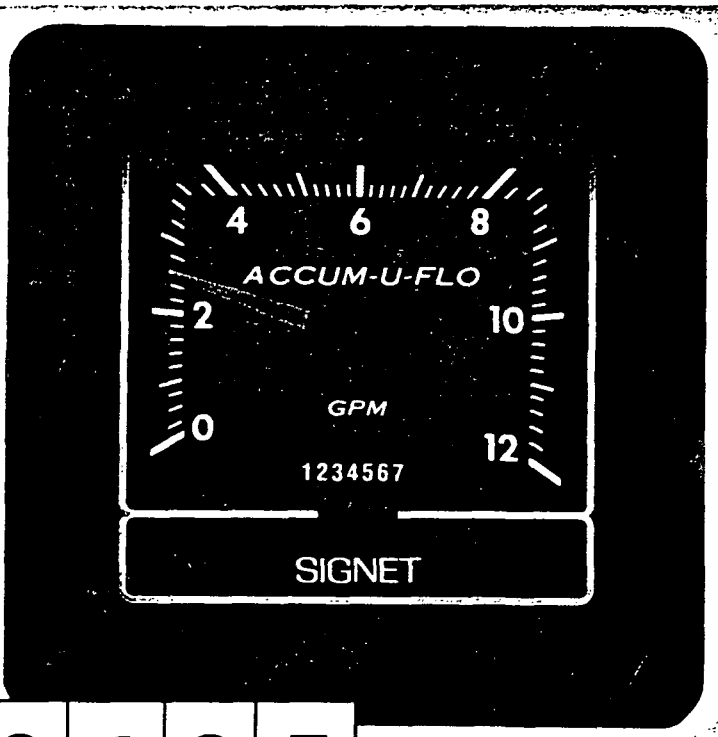
PV8T020

- Pipe/Tubing Size
- Type
- Schedule
- Material or Type

Fitting Styles:

T = "TEE"	PVC, CPVC and fiberglass have slip ends, PVDF (metric) has socket ends; copper (for copper and brass tubing) has "sweat-on" ends; iron, brass, carbon steel, and stainless steel have threaded ends.
S = Saddle	"Cement-on" for PVC & CPVC; "double strap-on" for iron; "cement-on" for fiberglass. Please specify wall thickness and O.D. for fiberglass; and pipe schedule for PVC or iron.
W = Weldolet	Weld to existing pipe; please specify pipe schedule.
B = Brazolet	Braze to existing pipe; please specify pipe schedule.

Accurate, Low-Maintenance Flow Volume Indicators



MK 575/MK 575R ACCUM-U-FLO

Just a quick glance at Signet's MK 575 Accum-u-flo gives you **accurate fluid flow rate and totalized flow volume readings.** By having both these essential flow functions combined on one convenient unit, you'll save space and eliminate additional expense. Flow rate is displayed on an easy-to-read 5½ inch analog dial. While totalized volume is presented on a low-maintenance, electro-mechanical counter. Choose from a 7-digit non-resettable counter (MK 575) for continuous totalizing or a 5-digit front resettable counter (MK 575R) for periodic totalizing. The MK 575's 245 degree, high-torque meter gives you *greater resolution in high-vibration areas.* With a resulting flow rate accuracy of ±1% of full scale—and totalized volume accuracy of ±2% of calibrated flow rate. And, you can easily interface the Accum-u-flo with other TTL compatible equipment. Includes a 117 VAC to 12 VDC power converter.

D	0	4	3	5

SPECIFICATIONS:

Display Accuracy (MK 575):	±1% of full scale
Display Repeatability (MK 575):	±0.5% of full scale
Volume Display Accuracy:	±2% of full scale
Pulse Output:	
TTL Compatible:	Source, 6.5 mA at 4.6 V Sink, 25 mA at 0.4 V
Counter:	
TTL Compatible:	Source, 5 mA Sink, 5 mA
Power Requirements:	Nominal 8 to 18 VDC, at 315 mA Not damaged by voltage spikes as high as 25 VDC. (Power converter included) Includes reverse voltage protection.
Dimensions:	5½ inch square bezel (requires 5.1 inch panel cutout) 4.75 inches deep

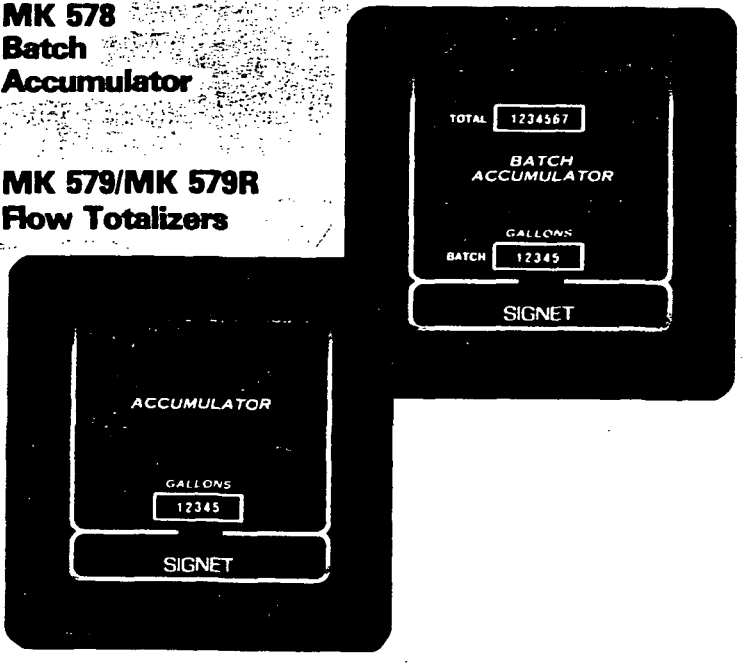
HOW TO ORDER

Part No.

P57540
P57540R Resetable
P57840
P57940
P57940R Resetable

MK 578 Batch Accumulator

MK 579/MK 579R Flow Totalizers



When monitoring **total fluid volume AND separate batch volume** is required, choose Signet's MK 578 Batch Accumulator. Its 5-digit resettable counter is perfect for periodic batch monitoring. In addition, its 7-digit non-resettable counter allows on-going measurement. For *single flow volume accumulation*, order Signet's low-cost MK 579. This totalizer gives you the option to choose either the 7-digit non-resettable counter or the 5-digit resettable (specify MK 579R). All instruments are TTL compatible for easy interfacing with external equipment. Each includes a 117 VAC to 12 VDC power converter.

EQUALIZATION TANK

Ambi INCORPORATED

December 5, 1991 Project Number #3211

** IMPORTANT QUOTATION **
Mr. David Day
Fuss and O'Neill Consulting Engineers
146 Hartford Road
Manchester, CT 06040

Reference: Linemaster Switch Company
Subject : FRP Tank
Telephone No.: 203 646-2469 FAX No.: 203 643-6313

Dear David:

Ambi, Incorporated takes great pleasure in submitting the following proposal to Fuss and O'Neill Consulting Engineers for fabricated plastic equipment:

PROPOSAL AND SPECIFICATIONS

---

1. One (1) 635 GALLON CYLINDRICAL TANK measuring 5'-0" dia. by 4'-4" deep with flat top, flat bottom, constructed from FRP (fiberglass reinforced plastic) and including:
   a. All hand lay-up construction using Hetron 197 premium grade polyester resin
   b. Interior surface with one (1) layer of "C" glass for maximum corrosion resistance
   c. Exterior surface pigmented "Ambi Blue" with surfacing agent and ultra violet inhibitor
   d. FRP threaded half couplings including:
      Eight (8) 1 1/2" dia.
      Two (2) 3" dia.
      One (1) 4" dia.
   e. Bolt-on cover to have 1/3 hinged opening

   Price: $2,030.00

2. Option: replace Eight (8) 1 1/2" and Two (2) 3" dia. FRP couplings with PVC bulk head fittings

   Price deduct: $300.00

* * * CONDITIONS OF SALE * * *

DESCRIPTION

For FRP, unless stated otherwise in the quotation, material of fabrication is our Hetron 197 polyester resin which is corrosion resistant and fire retardent. Exterior of product is coated with pigmented polyester resin colored Ambi Blue, unless noted otherwise in quotation. Other colors are available upon request, some at extra cost. Construction, in general, conforms with NBS Product Standard 15-69. For PVC and polypropylene fabrication, unless stated otherwise in the quotation, PVC is Type I and polypropylene is natural or white pigmented. Construction, in general, conforms with SMACNA standards. Hardware and gasketing are not included except for that which is specifically mentioned in the quotation or as required to assemble our equipment together.

DELIVERY

Delivery of Ambi, Incorporated manufactured products will be approximately four to eight weeks unless a separate schedule is negotiated or as stated in the quotation. Delivery of outside purchased parts required for resale or as an integral part of Ambi, Incorporated manufactured products will be the best available from the respective manufacturer of those parts. In no event shall Ambi, Incorporated be liable for any damages caused by failure to deliver or delay in delivery occasioned by causes whatsoever beyond the control of Ambi, Incorporated. Shop drawings, when required for approval, require at least two weeks and delivery shall commence upon receipt of the approved shop drawings.

TERMS

Prices are F.O.B. factory. Risk of loss shall pass to customer on delivery to carrier at point of shipment. State, local and federal taxes are not included. Terms, if not specifically stated in the quotation, are 1% ten days, net 30 days to customers of acceptable credit risk. Progress payments to be made for those segments of the order completed and in some instances acceleration of payment or deposit shall be required. Crating charges are extra. Prices are subject to change without notice. A 1 1/2% per month interest charge will be added to balances due over 30 days. The customer agrees to pay for collection expenses, if collection is deemed necessary by Ambi, Incorporated, on any overdue balances.

WARRANTY AND DISCLAIMER

Warranty and application of product limited to that specifically stated in this quotation and/or as per material and/or component manufacturer's recommendation, which is available upon request. Warranty period against defects in labor and materials are one year for non-corrosive, non-mechanized products, six months for corrosion resistant non-mechanized products, three months for corrosion resistant mechanized products. Warranty is limited to repair or replacement, at option of Ambi, Incorporated, of defective product, F.O.B. factory. Ambi, Incorporated is not liable for any special or consequential damages resulting from a defective product. This warranty is in lieu of all other warranties, expressed or implied.

CONDITIONS

This contract shall be governed by and shall be construed according to the laws of the State of Rhode Island. This agreement constitutes the entire agreement between the parties and may not be modified except in writing duly signed by the parties hereto. Acceptance of the quotation by the customer is limited to these Conditions of Sale. Any inconsistency or conflict in these Conditions of Sale and those of any customer purchase order or communications, these Conditions of Sale shall control.

Should we receive a purchase order, delivery to be arranged. Terms are 40% deposit, 40% at completion prior to shipment and 20% net 30 days. Prices quoted are f.o.b. plant Lincoln, RI. The CONDITIONS OF SALE on the back of the front page form an integral part of this quotation.

David, I will contact you shortly to discuss the status of this proposal and how we can further serve Fuss and O'Neill Consulting Engineers.

Very truly yours,

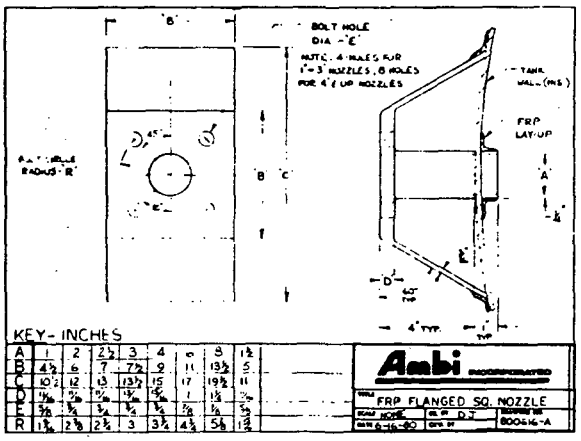
Edward B. Medeiros

Edward B. Medeiros, Sales Manager
Ambi, Incorporated

DAS:tw

This is our 24th year manufacturing corrosion resistant equipment! Thank you for considering Ambi, Incorporated.

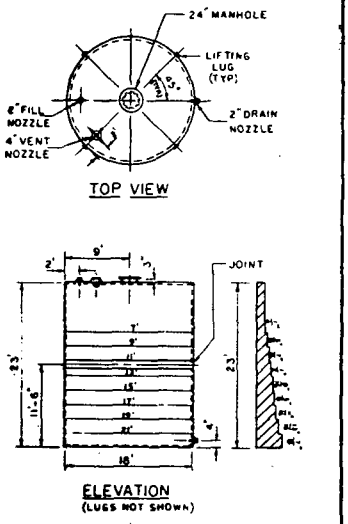
Ambi INCORPORATED



The unique Ambi square faced flange with wing gussetts

We have determined from our long history that **the best tank armored against corrosion is hand lay/spray up.**

The process of **hand lay/spray-up affords the greatest reliability** over other methods such as filament wound. For hand lay-up, Ambi strictly adheres to quality standards including Voluntary Product Standards PS 15-69 for Custom Contact-Molded Reinforced-Polyester Chemical-Resistant Process Equipment and ASTM D 4097-82 Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Chemical-Resistant Tanks. When you select Ambi for your tank supplier, you receive the highest quality hand lay/spray-up FRP tanks with inherent reliability and at modest cost.



Typical tank construction showing staggared wall

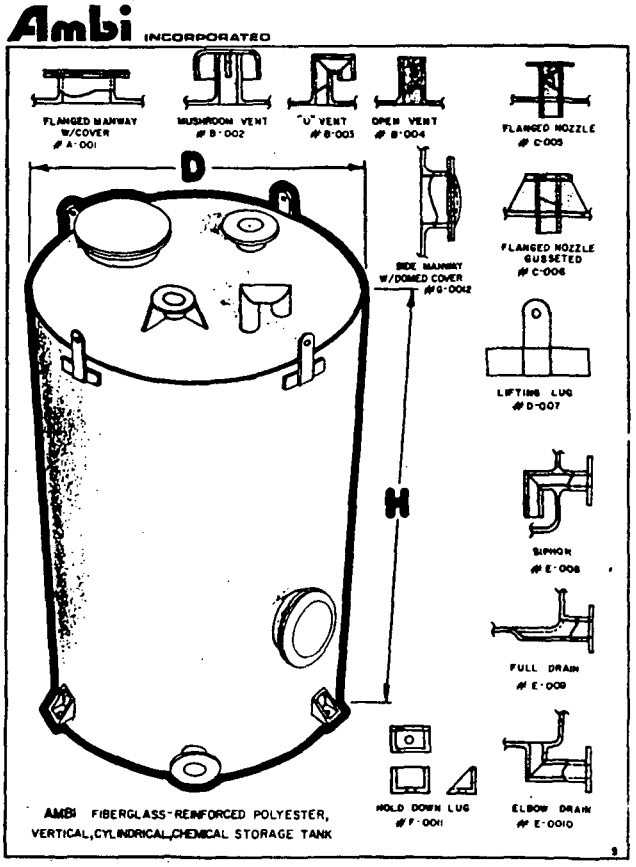
All flanged nozzles on Ambi tanks utilize the **unique Ambi square faced flanged nozzles** with wing gussetts, a great innovation over conventional flanged nozzles.

Single piece construction of the flange, nozzle and the wing gussetts insure extraordinary strength under severe mechanical loading.

You can forget leaks from flange/nozzle/tank joints due to mechanical failure with this unique Ambi flange.

In order to best select the proper resin for your application, we must have the following information:

1. All chemicals and concentrations to which the tank will be exposed 2. maximum and minimum pH values 3. Maximum and minimum temperature 4. Solution abrasiveness 5. Mixing requirements 6. Insulation requirements for thermal stability



Many accessories are available on an Ambi Tank

Consider the Ambi FRP chemical process tank for your next installation. Remember:

- **Engineered Quality and Reliability**
- **Experience and Modest Cost**
- **Configured to your Application Needs**
- **Wide Selection of Resins**
- **The Extra Ambi Touch... Of Course!**

PUMPS

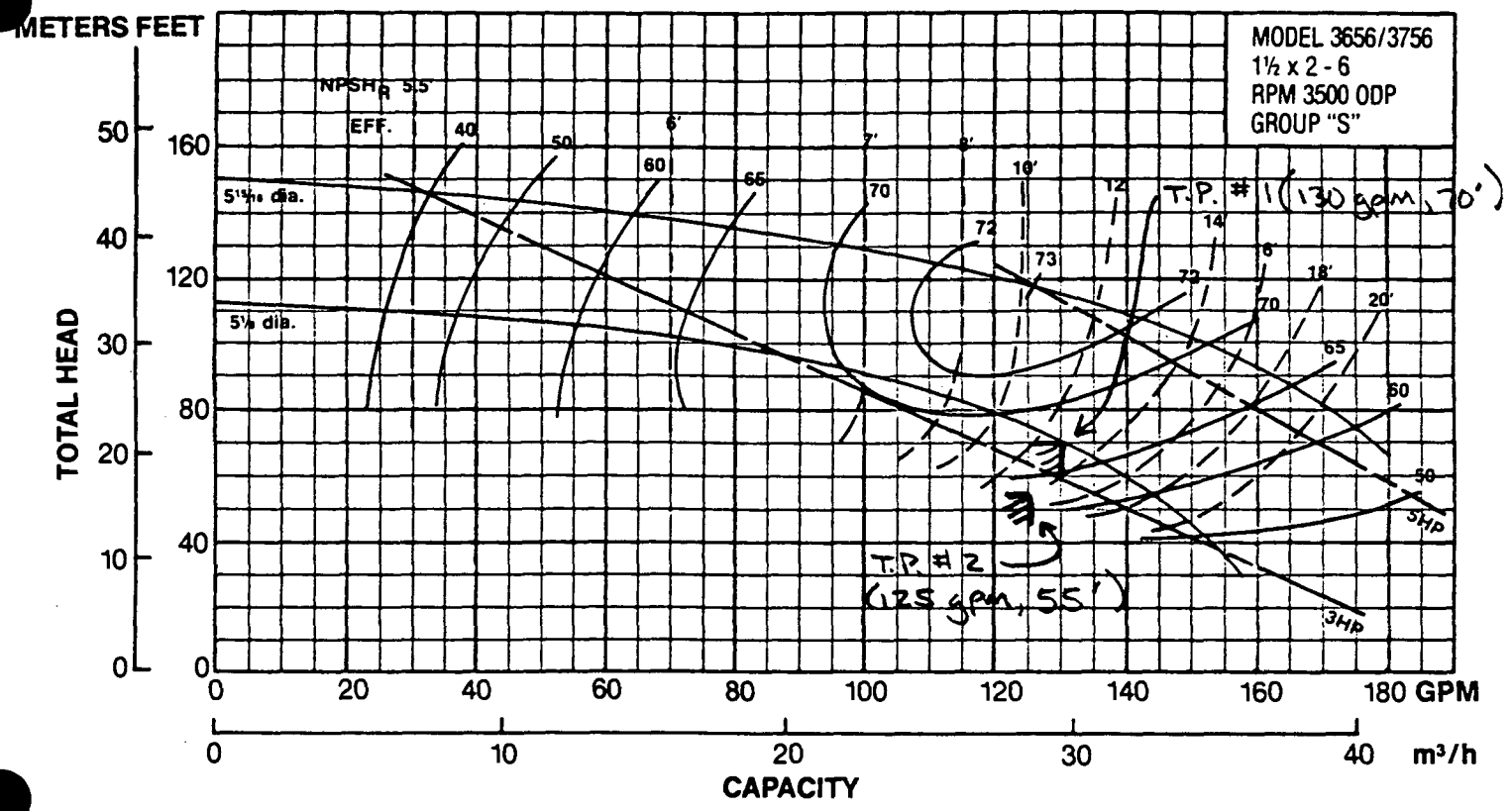
- TRANSFER PUMP #1
- TRANSFER PUMP #2
- DRY WELL SUMP PUMP

T.P. #1 : 5⅛" Impeller Dia

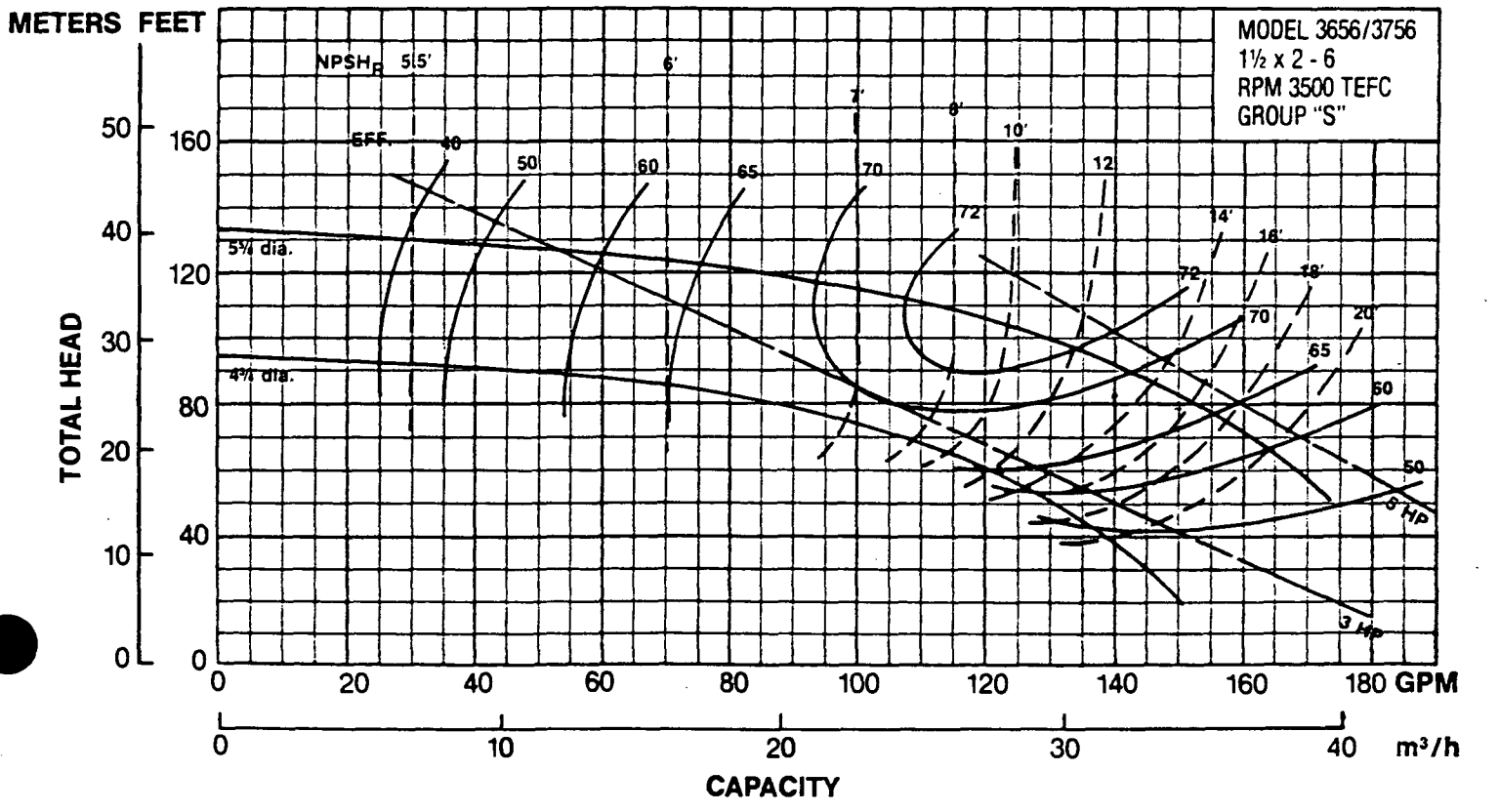
T.P. #2 : Special Impeller Trim @ 4¾"

Performance Curves

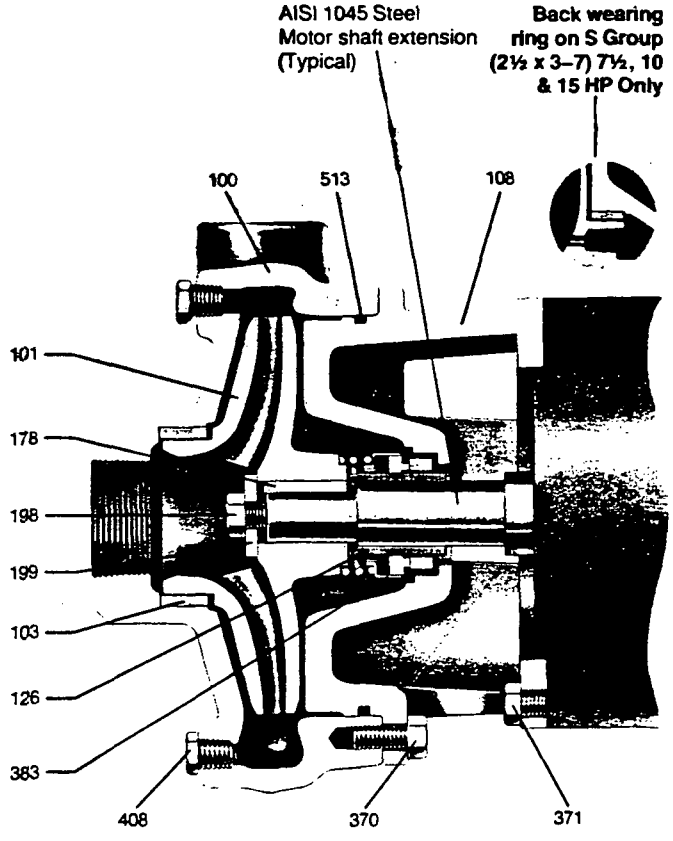
"S" Group Pumps



GOULDS PUMPS, INC.
SENECA FALLS, NEW YORK 13148



C3656-6



MATERIALS OF CONSTRUCTION

Item No.	Part Name	Material: All Iron	Material: Bronze Fitted	Material: All Bronze
100	Casing	1001	1001	1102
101	Impeller		1102	
103	Casing Wear Ring		1102	
108	Adapter		1001	1001
184	Seal Housing①	1-pc. w/adapter		1102
126	Shaft Sleeve	AISI TYPE 300 SERIES Stainless Steel		
178	Impeller Key			
198	Impeller Bolt			
199	Impeller Washer			
370	Hex HD Cap Screw Adapter to Case	SAE 1200 Series Steel Grade 5		
371	Hex HD Cap Screw Adapter to Motor			

	Mechanical Seal	Part No.	Service	Rotary	Stationary	Elastomers	Metal Parts
383	STD.	10K13	General	Carbon	Ceramic	Buna	TYPE 316 S.S.
	OPT.	10K19	Hi-Temp		Ni-Resist	EPR	
	OPT.	10K25	Chem. Duty		Ceramic	Viton	
408	Pipe Plug ¼"			Steel			Brass
513	O-Ring				Buna-N		

Materials of Construction	Material Code	Engineering Standard
	1001	Cast Iron ASTM A48 CL20
	1102	Bronze ASTM B584

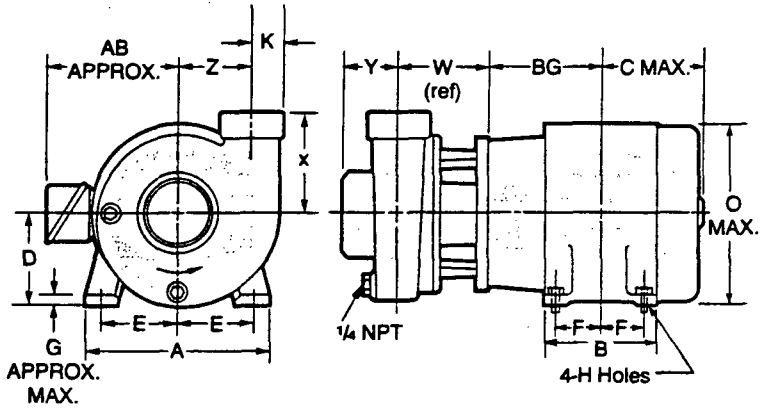
①For separate seal housing and adapter construction, All bronze material only, see repair parts page.

Note: Pumps will be shipped with top-vertical discharge position as standard. For other orientations, remove casing bolts—rotate discharge to desired position—replace and tighten bolts to 25 ft. lbs. Note that discharge may extend below motor mounting surface in bottom-horizontal position; adequate clearance must be provided.

PUMP DIMENSIONS AND WEIGHTS

Pump	NPT THRD. Suct.	NPT THRD. Disch.	W	X	Y	Z	K	Wt. (lbs.)
1½ x 2-6	2	1½	4¼	4½	2⅝	3½	1¼	30
2½ x 3-7	3	2½		6		4	1 13/16	45
1½ x 2-8	2	1½		5		4¼	1¼	50
3 x 4-7	4	3	4⅜	6	2½	5	3¾	78

Note: 3 x 4-7 only has 125 lb. ANSI flat-faced flanged connections.



TRANSFER Pump # 1 and T.P. # 2

MOTOR FRAMES/HORSEPOWER

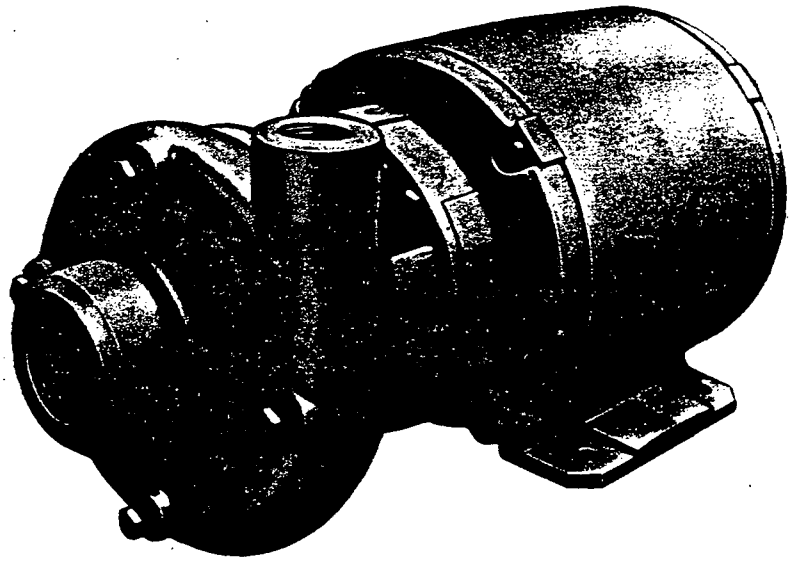
Motor Frame	MOTOR HORSEPOWER 3500 RPM 1ϕ ODP	3500 RPM 1ϕ TEFC	3500 RPM 3ϕ ODP	3500 RPM 3ϕ TEFC	1750 RPM 1ϕ ODP	1750 RPM 1ϕ TEFC	1750 RPM 3ϕ ODP	1750 RPM 3ϕ TEFC
143	—	—	—	—	—	1	—	1
145	3	—	3	—	1½	1½	2	2
182	3	—	5	3	2	2	3	3
184	5	3	7½	5	3	3	—	—
213	7½	5	10	7½	—	—	—	—
215	10	—	15	10/15	—	—	—	—
†254TCZ	—	—	20	—	—	—	—	—
†256TCZ	—	—	25	20	—	—	—	—

250 TCZ frames with 210 series JM shaft extension.

MOTOR DIMENSIONS AND WEIGHTS

Frame JM	A*	B*	C* BG	C* Max	D	E	F	G*	H	O* Max	AB*	Wt. Max. (lbs.)
143	6½	6	4⅞	6	3½	2¾	2	¼	11/32	7¼	5⅞	44
145			5⅜	6⅛			2½					57
182	8⅞	6⅜	5⅞	6¾	4½	3¼	2¼	½	13/32	9¼	8⅛	75
184		7⅜	6⅜	7¼			2¾					92
213	10⅛	7⅝	7¼	8	5¼	4¼	2¾	⅝		11¼	9 1/16	144
215		9⅛	8	8¾			3½					170
254TCZ	12⅜	11½	9⅛	10	6¼	5	4⅛		17/32	13 5/32	10 11/16	253
256TCZ			10	11			5					305

*Dimensions may vary with manufacturers
(All dimensions in inches and weights in lbs. Do not use for construction purposes.)



Goulds

Close-Coupled Centrifugal Pumps

MODEL

3656

S-Group

FEATURES

CLOSE COUPLED DESIGN
Compact design saves space and simplifies maintenance.

BACK PULL-OUT
Reduces maintenance down-time.

MECHANICAL SEAL
Standard John Crane Type 21.

MATERIALS OF CONSTRUCTION
Available in All Iron, Bronze Fitted or All Bronze material for maximum application flexibility.

REPLACEABLE WEARING COMPONENTS
- AISI TYPE 303 Stainless Steel shaft sleeve.
- Iron or Bronze casing wear ring.

DESIGNED FOR MAXIMUM EFFICIENCY
Enclosed impeller design, dynamic balancing and renewable wear rings reduce losses affecting performance and pump life.

MOTOR ADAPTER
Rigid cast iron motor adapter provides support and registered fits maintain positive unit alignment.

SUCTION & DISCHARGE PIPE CONNECTIONS
Threaded NPT connections EXCEPT 3 x 4-7 Model only with 125 Lb. ANSI flat faced flanges.

MOTORS
Standard NEMA Frame, JM shaft extension, C-Face mounting.
1- or 3-Phase, 3500 or 1750 RPM.
Open Drip-proof and Totally Enclosed Fan Cooled.

SPECIFICATIONS

CAPACITIES TO...
550 GPM (125 m³/hr) at 3500 RPM
200 GPM (45 m³/hr) at 1750 RPM

HEADS TO...
280 ft. TDH (85m) at 3500 RPM
67 ft. TDH (20m) at 1750 RPM

WORKING PRESSURE...
175 PSIG (12 bars)

MAXIMUM SUCTION PRESSURE TO...
100 PSIG (7 bars)

MAXIMUM TEMPERATURES TO...
212°F (100°C) with standard seal
OR
250°F (121°C) with optional high temperature seal for water applications.

DIRECTION OF ROTATION...
Clockwise when viewed from motor end.

MOTORS...
NEMA Frame, JM shaft extension, C-Face.
Open Drip-proof or Totally Enclosed Fan Cooled, High Efficiency 60 Hz., with 1.15 Service Factor.

1-Phase, 115/230 volt
3500 RPM 3 to 10 HP
1750 RPM to 3 HP

3-Phase, 208-230/460 volt through 215JM Frames

230/460 volt 250JM and Larger Frames

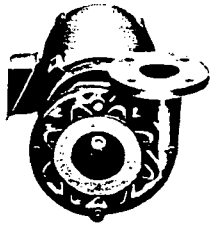
3500 RPM 3-20 HP
1750 RPM to 3 HP

Optional Explosion Proof or Premium High Efficiency motors available in 3-Phase only.

MECHANICAL SEALS...
Standard ceramic/carbon faces, 316 S/S metal components and Buna-N elastomers. Optional High Temperature and severe duty seal materials are available.

APPLICATIONS

Specifically designed for:
- Water circulation
- Booster service
- Liquid transfer
- Spraying systems
- Irrigation
- General purpose pumping



125 Lb. Flanged Connections 3 x 4 – 7 Model Only

Close-Coupled Centrifugal Pumps
All Iron, Bronze Fitted or
All Bronze Construction

Listed

Pump Price List

SECTION 5

MODEL

3656

S-Group

Effective January 7, 1991

T.P. #2 (same as #1) special impeller trim ∴ cost = additional $40
total = 410+765 = $805.00

3500 RPM 3 Phase Units

Pump Size	Motor Enclosure	Impeller Diameter (in.)	HP @ 3500 RPM	1.15 SF, 3 Phase, 208-230/460 Volt						Wt. lbs.
				All Iron		Bronze Fitted		All Bronze		
				Order No.	Price	Order No.	Price	Order No.	Price	
T.P. #1	ODP	5 1/8	3	3AI13035	$765.00	3BF13035	$765.00	3AB13035	$885.00	80
	TEFC	4 3/4		3AI23035	885.00	3BF23035	885.00	3AB23035	1,005.00	95
1 1/2 x 2-6	ODP	5 15/16	3 "H"	3AI13035H	765.00	3BF13035H	765.00	3AB13035H	885.00	80
	TEFC	5 5/8		3AI23035H	885.00	3BF23035H	885.00	3AB23035H	1,005.00	95
	ODP	5 15/16	5	3AI15035	865.00	3BF15035	865.00	3AB15035	985.00	110
	TEFC	5 5/8		3AI25035	965.00	3BF25035	965.00	3AB25035	1,085.00	
2 1/2 x 3-7	ODP	4 1/8	3	4AI13035	800.00	4BF13035	800.00	4AB13035	1,005.00	100
	TEFC	3 7/8		4AI23035	920.00	4BF23035	920.00	4AB23035	1,125.00	125
	ODP	4 5/8	5	4AI15035	905.00	4BF15035	905.00	4AB15035	1,110.00	120
	TEFC	4 7/16		4AI25035	1,005.00	4BF25035	1,005.00	4AB25035	1,205.00	140
	ODP	5 3/8	7 1/2	4AI17535	1,045.00	4BF17535	1,045.00	4AB17535	1,240.00	135
	TEFC	5 1/16		4AI27535	1,210.00	4BF27535	1,210.00	4AB27535	1,410.00	165
	ODP	5 7/8	10	4AI11135	1,190.00	4BF11135	1,190.00	4AB11135	1,390.00	165
	TEFC	5 1/2		4AI21135	1,350.00	4BF21135	1,350.00	4AB21135	1,550.00	205
	ODP	6 3/4	15	4AI11635	1,340.00	4BF11635	1,340.00	4AB11635	1,540.00	190
	TEFC	6 3/8		4AI21635	1,445.00	4BF21635	1,445.00	4AB21635	1,645.00	225
1 1/2 x 2-8	ODP	6 1/4	7 1/2	5AI17535	1,030.00	5BF17535	1,030.00	5AB17535	1,195.00	130
	TEFC	5 3/4		5AI27535	1,200.00	5BF27535	1,200.00	5AB27535	1,370.00	160
	ODP	6 3/4	10	5AI11135	1,180.00	5BF11135	1,180.00	5AB11135	1,340.00	160
	TEFC	6 1/4		5AI21135	1,340.00	5BF21135	1,340.00	5AB21135	1,510.00	200
	ODP	7 5/8	15	5AI11635	1,330.00	5BF11635	1,330.00	5AB11635	1,500.00	185
	TEFC	7		5AI21635	1,435.00	5BF21635	1,435.00	5AB21635	1,600.00	220
	ODP	8 1/16	20*	5AI12135	1,510.00	5BF12135	1,510.00	5AB12135	1,670.00	255
	TEFC	7 3/4		5AI22135	1,610.00	5BF22135	1,610.00	5AB22135	1,775.00	310
3 x 4-7	ODP	5 1/8	7 1/2	6AI17535	1,170.00	6BF17535	1,170.00	Not Available		155
	TEFC	4 11/16		6AI27535	1,335.00	6BF27535	1,335.00			185
	ODP	5 1/2	10	6AI11135	1,315.00	6BF11135	1,315.00			185
	TEFC	5 1/8		6AI21135	1,450.00	6BF21135	1,450.00			225
	ODP	6 3/8	15	6AI11635	1,460.00	6BF11635	1,460.00			210

* 215JM Shaft Extension Motor

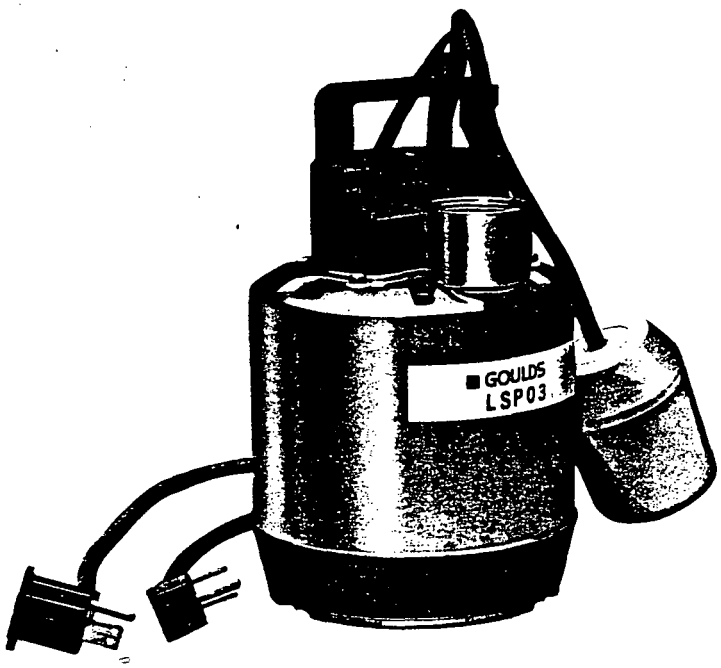
OPTIONAL MECHANICAL SEALS

Materials				Part No.	Seal Type	Service	List Price Adder	Casing O-Ring
Rotary	Stationary	Elastomer	Metal Parts					
Carbon	Ni-Resist	EPR	316 S.S.	10K19	21	Hi-Temperature	$21.00	Buna
	Ceramic	Viton		10K25		Chemical	52.00	Viton
	Tungsten Carbide			10K27		Hi-Temperature Mild Abrasive	202.00	

NOTE: Optional high temperature mechanical seal for temperatures up to 250°F.
Casing O-Ring, item 513, up-grade to Viton material provided as standard with purchase of 10K25 seal option.

Price covers pump with standard diameter impeller, as shown, for a particular motor size. If other than standard diameter is required add $40.00 list.

Dry Well Sump Pump



Goulds

Submersible Sump Pump

MODEL

LSP03

APPLICATIONS

Specially designed for the following uses:

- Basement Draining
- Water Transfer
- Dewatering

SPECIFICATIONS

Pump:

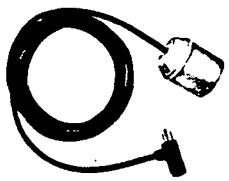
- Discharge size: 1 ½" NPT.
- Capacities: to 40 GPM.
- Maximum head: 21 feet TDH.

Power cord:

- Heavy duty 3-wire 16/3 SJT with NEMA 5-15 P 3-prong grounding plug, 115 volts.
- Power cord length: 10 feet.
- Temperature: 104°F (40°C) maximum liquid temperature.

Motor:

- ⅓ HP, 115 volt, 60 Hz, Single phase, 3400 RPM.
- Built-in thermal overload protection with automatic reset.
- Permanent-Split-Capacitor type.
- Amps: 2.6 maximum.
- Class F insulation.
- Stainless steel shaft.



- **Separate Float Switch is supplied with pump.**
- **Heavy duty 3-wire 16/3 SJT electrical cord with NEMA 5-15P 3-prong grounding plug Series-connected ("Piggy-back" type).**
- **Switch cord length: 10 feet.**

FEATURES

Corrosion-resistant construction. 304 Stainless Steel motor casing and fastners.

Glass-filled thermoplastic impeller and volute.

Ball bearing construction. Both upper and lower bearings are greased for life.

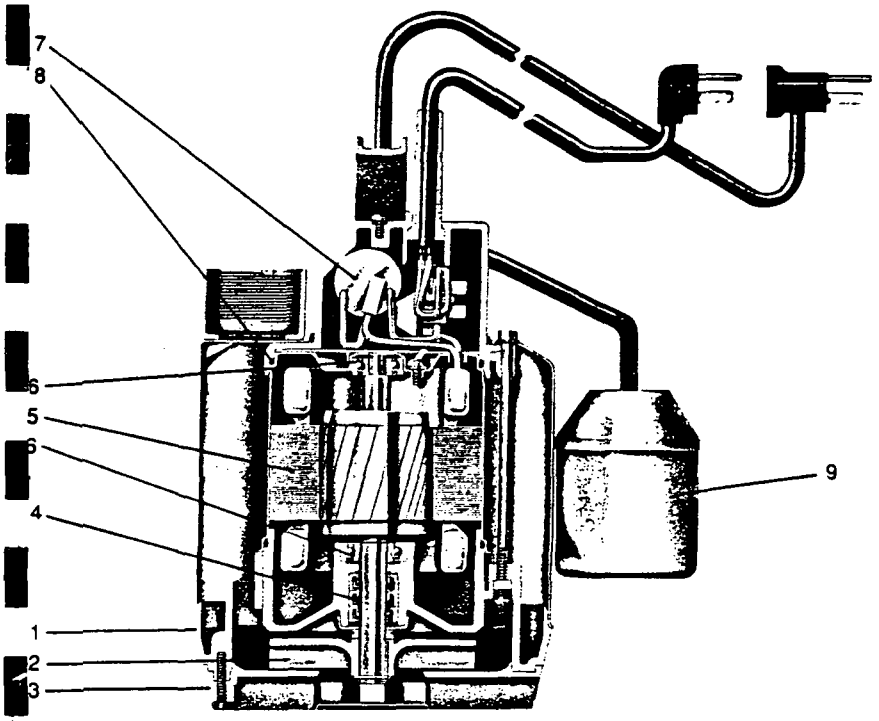
Motor is permanently lubricated for extended service life and is powered for continuous operation. All ratings are within the working limits of the motor.

303 Stainless Steel shaft.

Separate float switch is attached to the pump at the factory. Float switch is adjustable for various liquid levels. Easily removed for direct pump operation or switch replacement.

Complete unit is lightweight, portable and easy to service.

BLSP03
Effective March, 1991



Goulds
Submersible Sump Pump

MODEL

LSP03

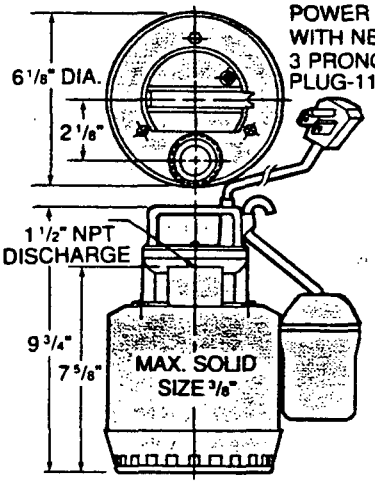
PARTS

Item No.	Part Description
1	Casing
2	Impeller
3	Suction Strainer
4	Shaft Seal with Cover
5	Motor
6	Bearing
7	Capacitor
8	O-Ring
9	Float Switch

DIMENSIONS AND WEIGHTS

Horsepower	1/3
Voltage	115
Amps	2.6 Max.
Phase	1
RPM	3400
Weight (lbs.)	9

(All dimensions in inches and weights in lbs. Do not use for construction purposes. Drawing is not to scale.)

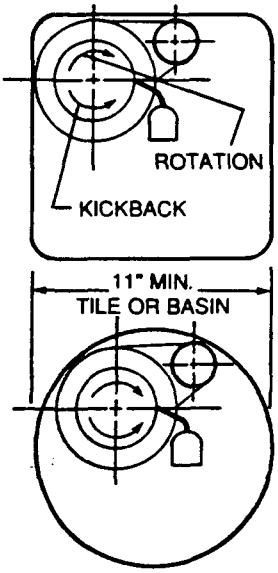


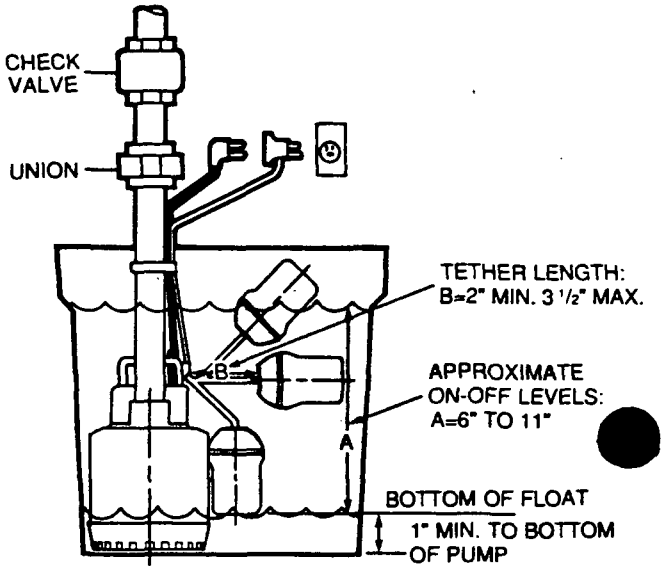
PERFORMANCE RATINGS

Total Head-Ft.*	20	15	10	5
Gallons Per Hour	300	1200	1740	2220

(In gallons per hour)
*Vertical distance from water level to highest point in discharge—plus pipe friction.
Maximum pump submergence is 10 ft.

INSTALLATION





SENECA FALLS, NEW YORK 13148

PRINTED IN U.S.A.

Price List

SECTION 4

SUMP PUMPS

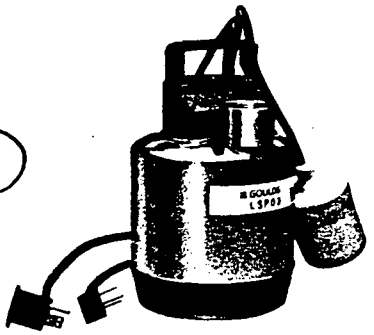
Effective January 7, 1991

Discount "D" Applies

GOULDS Sump Pumps

SPECIAL NOTE: Outside equipment not of our manufacture is subject to the same percentage of price increase as may be made by our supplier to us.

Model LSP03

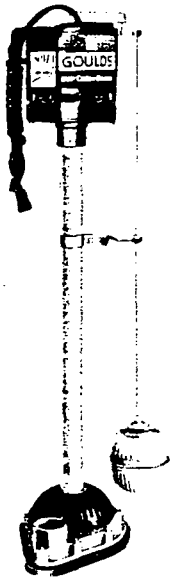


Also Available: 12 Volt Model LSP12V

HP	Order No.	List Price	Weight
1/3	LSP03	$152.00	9
12 Volt D.C.	LSP12V	368.00	14

LSP03 is assembled with one A2-9 Mercury Float Switch which is included in price.
*A2-9 1/2 HP, 115 V, 13 Amps Max., Mercury Float Switch, **$27.00** List, if ordered separately.

Model DVP
(with 8' cord)



HP	Order No.	List Price	Weight
1/3	DVP	$190.00	19

All prices are F.O.B. shipping point.
All prices are subject to change without notice and are subject to any increase which may be in effect on date of shipment.
GENERAL INFORMATION: The company reserves the right to substitute other materials than those specified in its catalog and price sheets whenever necessary under prevailing conditions. Every effort will always be made to insure the usual high quality of Goulds Pumps and Water Systems.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PRINTED IN U.S.A.
PSUMP

- AIR STRIPPING TOWER
- BLOWER

DMD1216A91\86088
Corres.

N A T I O N A L
ENVIRONMENTAL
S Y S T E M S INC

36 Maple Avenue • Seekonk, Massachusetts 02771
(508) 761-6611 FAX (508) 761-6898

October 16, 1991

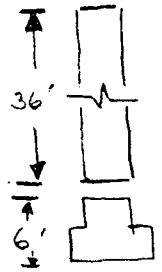
Mr. David Day
Fuss & O'Neil
146 Hartford Road
Manchester, CT 06040

SUBJECT: National Environmental Systems Proposal
No. 01-071191.07.01, Revision I
Woodstock, N.Y.

Dear Mr. Day:

Thank you for your interest in National Environmental's equipment for subsurface hydrocarbon contamination abatement. Per your request for quotation/design information, I am pleased to recommend the following equipment for this remediation project.

1 - National Environmental Air Stripping System to meet the following conditions:



Flow Rate	125 gpm
Water Temperature	48° F
Influent Water Concentrations:	
TCE	40000 ppb
Effluent Water Concentrations:	
TCE	5 ppb
Tower Diameter	48 inches 5'0"
Overall Height	42 feet including 3'6" Dia. ~~8~~ OVH Clearwell
Blower Motor	1½ H.P., 230 VAC, 1Ø, TEFC
Packing Media	3.5 inch Lanpac

This tower includes two visual cleanout port/inspection port, influent piping, influent spray assembly, top flange, flanged siphon drain, temperature gauge, pressure gauge, blower including stand, transition, and field installation kit, packing, mist eliminator, clearwell, drawings and installation manual.

$25,990.00

October 16, 1991

We appreciate the opportunity to assist you with this project. If you have any questions or if you need more information, please do not hesitate to contact me.

Very truly yours,

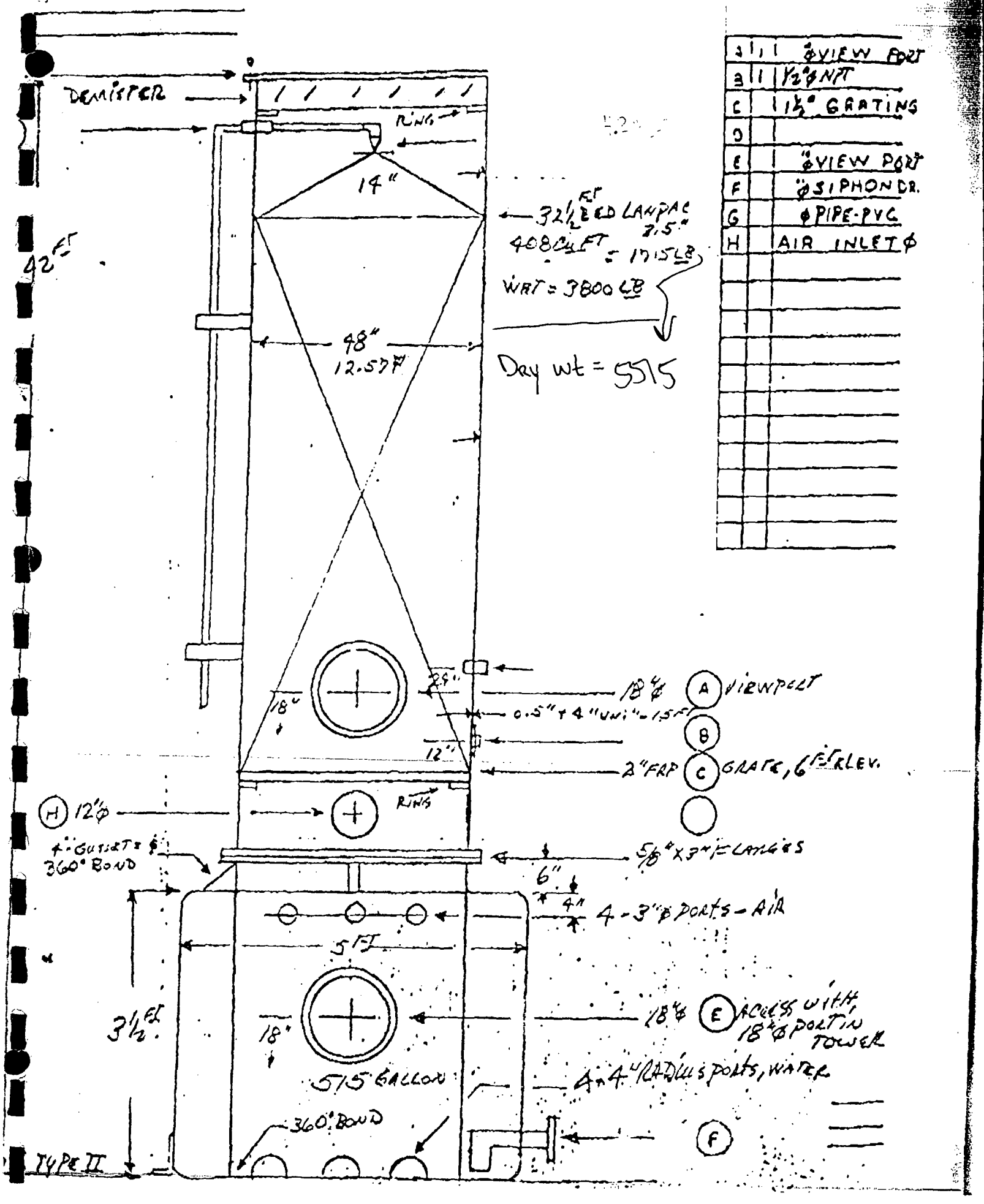
Pixie Terreault

Pixie Terreault

PT:es
QUOTE VALID FOR 60 DAYS
TERMS: NET 30, FOB: OUR PLANT

FM

WAT - 13000 LB



A	1	ϕVIEW PORT
B	1	½"ϕ NPT
C		1½" GRATING
D		
E		"ϕVIEW PORT
F		"ϕ SIPHON DR.
G		ϕ PIPE-PVC
H		AIR INLET ϕ

N A T I O N A L
ENVIRONMENTAL INC
S Y S T E M S

36 Maple Avenue • Seekonk, Massachusetts 02771
(508) 761-6611 FAX (508) 761-6898

EFFECTIVE 5/15/90

per Rixie this is performance and Structural warranty

WARRANTY CONDITIONS

This Warranty is a LIMITED warranty; anything in the warranty notwithstanding. Implied warranties for particular purpose and merchantability shall be limited to the duration of the express warranty. National Environmental Systems, Inc. expressly disclaims and excludes any liability of consequential or incidental damages for breach of any express or implied warranty.

National Environmental Systems, Inc. equipment is warranted as to workmanship, material, and performance when properly installed, used, and cared for provided that the original design parameters represent actual field parameters at the time of operation, subject to verification by an EPA certified laboratory. All electrical connections should be installed by an electrician licensed within the State of installation. Should any part prove defective within twelve (12) months from date of shipment, it will be replaced F.O.B. destination without charge, provided the part is returned to National Environmental Systems, Inc. transportation charges prepaid. Exception to this warranty will be pump hoses and pump seals; these items will be subject to the same warranty except for a period of six (6) months from date of shipment. Due to the wide variety of possible applications and conditions of use, no express or implied warranty is made for carbon adsorption systems for performance, safety, or suitability for particular purpose.

No allowance will be made for labor, transportation, or other charges incurred in the replacement or repair of defective parts by the customer. This warranty does not apply when damage is caused by sand or abrasive materials pumped with the fluids, lightning, improper voltage supply, careless handling, improper installation, improper well design, or corrosion due to substances that were unknown to National Environmental Systems, Inc. at the time of shipment.

Any alteration or disassembly of equipment without proper authorization from National Environmental Systems, Inc. voids all warranties stated herein.

Prices and Specifications are effective only in the continental USA and are subject to change without notice.
F.O.B. Point and Title: All material is sold F.O.B. factory. Title to all material sold shall pass to buyer upon delivery by Seller to carrier at shipping point.
Special data and Drawing charges are subject to Factory determination.

NATIONAL ENVIRONMENTAL SYSTEMS INC. AIR STRIPPING

PROJECT INFORMATION	
PROJECT NUMBER	01-071191-01
PROJECT NAME	Linemaster
FIRM NAME	Fuss & O'Neill
CONTACT NAME #1	Dave Day
CONTACT NAME #2	
TEL. NO.	203-646-2469

SITE PARAMETERS	
CONTAMINANT NUMBER #1	13
CONTAMINANT NAME	TCE
DATA AVAILABLE	YES
INFLUENT CONC. (ppb)	40000
EFFLUENT CONC. (ppb)	5
PERCENT REMOVAL	99.98750%
CONTAMINANT NUMBER #2	
CONTAMINANT NAME	
DATA AVAILABLE	
INFLUENT CONC. (ppb)	
EFFLUENT CONC. (ppb)	
PERCENT REMOVAL	
CONTAMINANT NUMBER #3	
CONTAMINANT NAME	
DATA AVAILABLE	
INFLUENT CONC. (ppb)	
EFFLUENT CONC. (ppb)	
PERCENT REMOVAL	
CONTAMINANT NUMBER #4	
CONTAMINANT NAME	
DATA AVAILABLE	
INFLUENT CONC. (ppb)	
EFFLUENT CONC. (ppb)	
PERCENT REMOVAL	
CONTAMINANT NUMBER #5	
CONTAMINANT NAME	
DATA AVAILABLE	
INFLUENT CONC. (ppb)	
EFFLUENT CONC. (ppb)	
PERCENT REMOVAL	
CONTAMINANT NUMBER #6	
CONTAMINANT NAME	
DATA AVAILABLE	
INFLUENT CONC. (ppb)	
EFFLUENT CONC. (ppb)	
PERCENT REMOVAL	
WATER FLOWRATE (GPM)	125
WATER TEMP. (DEG. F)	48
WATER TEMP. (DEG. C)	8.9

NATIONAL ENVIRONMENTAL SYSTEMS INC. AIR STRIPPING PROGRAM

PROJECT INFORMATION	
PROJECT NUMBER	01-071191-01
PROJECT NAME	Linemaster
FIRM NAME	Fuss & O'Neil
CONTACT NAME #1	Dave Day
CONTACT NAME #2	
TEL. NO.	203-646-2469

CONTAMINANT NUMBER	CONTAMINANT NAME	VC	A	ML
CONTAMINANT NUMBER #1	TCE	256	0.006	3.45
CONTAMINANT NUMBER #2				??
CONTAMINANT NUMBER #3				??
CONTAMINANT NUMBER #4				??
CONTAMINANT NUMBER #5				??
CONTAMINANT NUMBER #6				??

CONTAMINANT NUMBER	CONTAMINANT NAME	L	PL	HENRY LAW
CONTAMINANT NUMBER #1	TCE	4978	62.4	0.23568
CONTAMINANT NUMBER #2		??	??	
CONTAMINANT NUMBER #3		??	??	
CONTAMINANT NUMBER #4		??	??	
CONTAMINANT NUMBER #5		??	??	
CONTAMINANT NUMBER #6		??	??	

CONTAMINANT NUMBER	CONTAMINANT NAME	DL	A/W	R
CONTAMINANT NUMBER #1	TCE	2.52e-05	30/60	18.85
CONTAMINANT NUMBER #2				
CONTAMINANT NUMBER #3				
CONTAMINANT NUMBER #4				
CONTAMINANT NUMBER #5				
CONTAMINANT NUMBER #6				

NATIONAL ENVIRONMENTAL SYSTEMS INC. AIR STRIPPING PROGRAM

PROJECT INFORMATION	
PROJECT NUMBER	01-071191-01
PROJECT NAME	Linemaster
FIRM NAME	Fuss & O'Neil
CONTACT NAME #1	Dave Day
CONTACT NAME #2	
TEL. NO.	203-646-2469

TOWER INFORMATION	PACK SAFETY FACTOR	TOWER DIA.	CFM	AIR/WATER
	1.05	48.0000	1337	80

CONTAMINANT NUMBER	CONTAMINANT NAME	PH W/SF (FT)	PH NO/SF (FT)	AIR/WATER MIN/MAX
CONTAMINANT NUMBER #1	TCE	32.5749	31.0237	30/60
CONTAMINANT NUMBER #2				
CONTAMINANT NUMBER #3				
CONTAMINANT NUMBER #4				
CONTAMINANT NUMBER #5				
CONTAMINANT NUMBER #6				

CONTAMINANT NUMBER	CONTAMINANT NAME	% REMOVAL	HENRY LAW
CONTAMINANT NUMBER #1	TCE	99.9875%	0.23568
CONTAMINANT NUMBER #2			
CONTAMINANT NUMBER #3			
CONTAMINANT NUMBER #4			
CONTAMINANT NUMBER #5			
CONTAMINANT NUMBER #6			

NATIONAL ENVIRONMENTAL SYSTEMS INC. AIR STRIPPING PROGRAM

PROJECT INFORMATION	
PROJECT NUMBER	01-071191-01
PROJECT NAME	Linemaster
FIRM NAME	Fuss & O'Neil
CONTACT NAME #1	Dave Day
CONTACT NAME #2	
TEL. NO.	203-646-2469

CONTAMINANT NUMBER	CONTAMINANT NAME	HENRY LAW	HTU	NTU
CONTAMINANT NUMBER #1	TCE	0.236	3.29	9.43
CONTAMINANT NUMBER #2				
CONTAMINANT NUMBER #3				
CONTAMINANT NUMBER #4				
CONTAMINANT NUMBER #5				
CONTAMINANT NUMBER #6				

CONTAMINANT NUMBER	CONTAMINANT NAME	PH	PH/SF
CONTAMINANT NUMBER #1	TCE	31.02	32.57
CONTAMINANT NUMBER #2			
CONTAMINANT NUMBER #3			
CONTAMINANT NUMBER #4			
CONTAMINANT NUMBER #5			
CONTAMINANT NUMBER #6			

SITE PARAMETER	
WATER FLOWRATE (GPM)	125
WATER TEMP. (DEG. F)	48
WATER TEMP. (DEG. C)	8.9

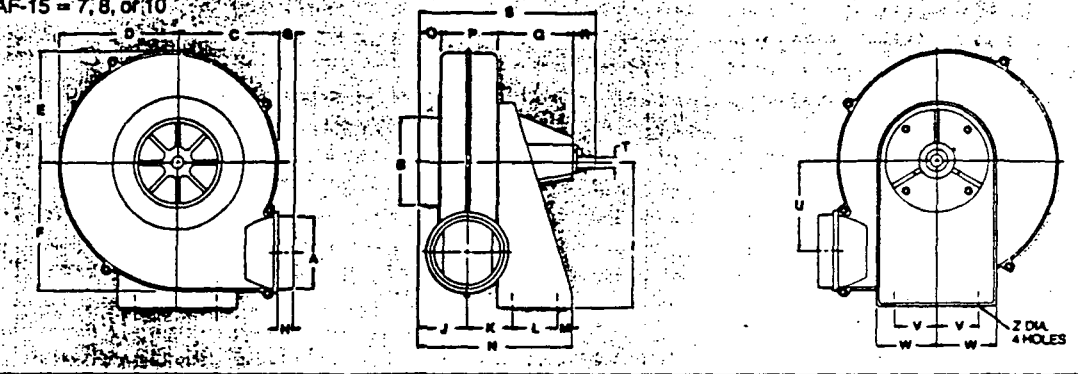
TOWER PARAMETER	
DRIVING CONTAMINANT	TCE
TOWER DIAMETER (IN)	48
PACK HIGHT CALC.(FT)	32.57
AIR FLOW CALC. (CFM)	1337
AIR TO WATER RATIO	80

DIMENSIONAL DATA

AF SIZE	A	B	C	D	E	F	G	N	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	Z
8	4	4	4 15/16	5 13/16	5 3/32	6 11/16	1 3/8	1	10	2 7/8	2 7/8	3 1/4	3/4	9 3/4	1 1/8	3 1/2	3 11/16	3	11 9/16	3/4	4 9/16	2 7/8	4	7/16
9	4	5	6	7 1/4	6 17/32	7 3/4	1 7/16	1	10	3 1/16	2 29/32	3 1/4	3/8	10 1/32	1 3/16	3 3/4	3 11/16	3	11 5/8	3/4	5 5/8	2 7/8	4	7/16
10	5	6	6 11/16	8 5/16	7 25/32	9	1 1/8	1	10	3 3/8	2 29/32	3 1/4	3/4	10 17/32	1 1/2	3 3/4	3 11/16	3	11 5/16	3/4	6 3/8	2 7/8	4	7/16
12	6	7	7 3/4	9 1/4	8 1/2	10 7/16	1 1/8	1	11 1/2	3 5/8	3 13/32	4 1/2	1 1/4	12 25/32	1 1/2	4 1/4	5 1/16	4	15 5/16	1	7 1/16	3 1/8	4 1/2	3/4
15	8	*	9 3/8	11	10	12	1 9/16	1	15	4 7/16	4 3/8	4 1/2	1 1/4	14 9/16	1 1/2	5 7/8	5 9/16	4	16 13/16	1 7/16	7 7/8	3 3/4	5	3/4

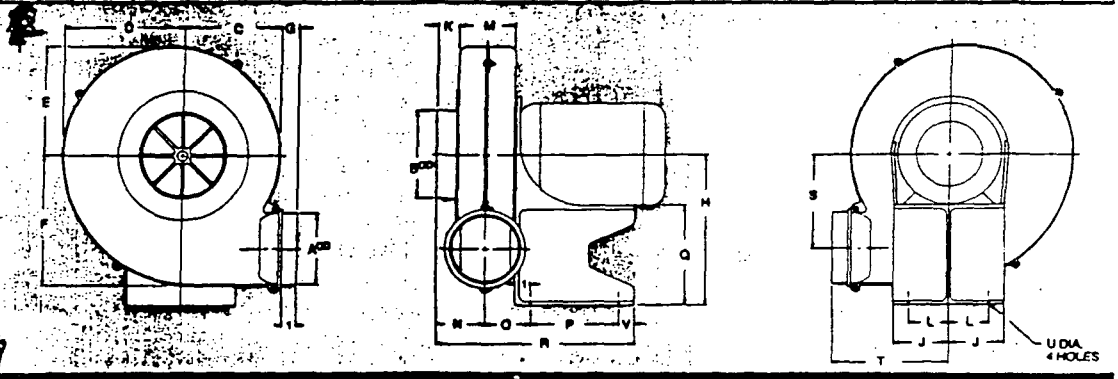
* "B" Dimension on AF-15 = 7, 8, or 10

ARRANGEMENT 2 CAST ALUMINUM BASE



AF SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V
8	4	4	4 15/16	5 13/16	5 3/32	6 11/16	1 3/8	8 1/2	3 3/4	1 1/8	2 3/4	3 1/2	2 7/8	2 7/8	5	5	11 3/4	4 9/16	6 5/16	7/16	1
9	4	5	6	7 1/4	6 17/32	7 3/4	1 7/16	10 1/2	3 3/4	1 3/16	2 3/4	3 3/4	3 1/16	3 1/16	6	7	13 1/8	5 5/8	7 9/16	7/16	1
10	5	6	6 11/16	8 5/16	7 25/32	9	1 1/8	10 1/2	3 3/4	1 1/2	2 3/4	3 3/4	3 3/8	3 1/16	6	7	13 7/16	6 3/8	7 13/16	7/16	1

ARRANGEMENT 4 CAST ALUMINUM BASE



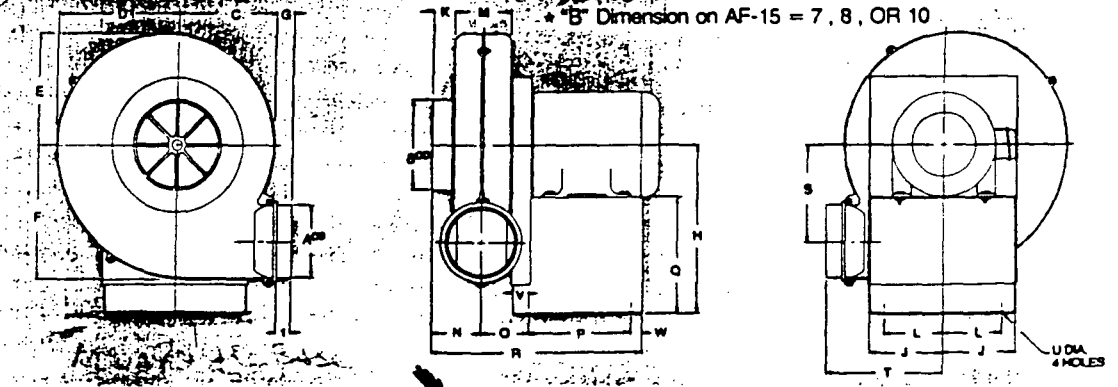
AF SIZE	A	B	C	D	E	F	G	N	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	FRAME SIZE
10	5	6	6 11/16	8 5/16	7 25/32	9	1 1/8	11 1/2	5	1 1/2	4	3 1/4	3 3/8	3 1/4	7	8	14 7/16	6 3/8	7 13/16	7/16	1 1/16	13/16	
12	6	7	7 3/4	9 1/4	8 1/2	10 7/16	1 1/8	11 1/2	5	1 1/2	4	4 1/4	3 3/8	3 9/16	7	8	15	7 5/16	8 7/8	7/16	1 1/16	13/16	
12	6	7	7 3/4	9 1/4	8 1/2	10 7/16	1 1/8	11 1/2	5	1 1/2	4	4 1/4	3 3/8	3 9/16	8	7	16 1/8	7 5/16	8 7/8	7/16	1 1/16	15/16	
15	8	*	9 3/8	11	10	12	1 9/16	15	6 5/16	1 1/2	4 7/8	5 7/8	4 7/16	5 1/8	8 3/4	11 1/2	20 1/2	7 7/8	10 15/16	9/16	1 7/8	2 3/16	
15	8	*	9 3/8	11	10	12	1 9/16	15	6 5/16	1 1/2	4 7/8	5 7/8	4 7/16	5 1/8	8 3/4	10 1/2	20 1/2	7 7/8	10 15/16	9/16	1 7/8	2 3/16	
15	8	*	9 3/8	11	10	12	1 9/16	15	6 5/16	1 1/2	4 7/8	5 7/8	4 7/16	5 1/8	8 3/4	9 3/4	20 1/2	7 7/8	10 15/16	9/16	1 7/8	2 3/16	

2/30V 60Hz single phase TEFC

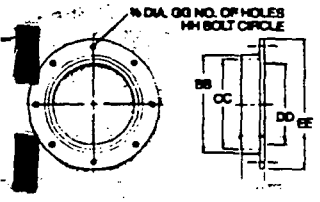
ARRANGEMENT 4 STEEL BASE

CANCO Blower No. 2

* "B" Dimension on AF-15 = 7 , 8 , OR 10

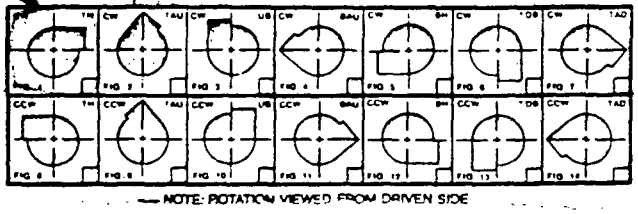


FLANGES



COLLAR O.D.	PART NO.	BB	CC	DD	EE	FF	GG	HH
4	414	4 11/16	4 1/32	3 9/16	7 3/4	1 1/4	4	6 1/8
5	415	5 5/8	5 1/32	4 9/16	7 7/8	1 1/4	4	6 3/4
6	416	6 11/16	6 1/32	5 1/2	9	1 5/16	4	8
7	417	7 1/2	7 1/32	6 1/4	9 7/8	1 5/16	8	8 7/8
8	418	9	8 1/32	7 1/2	13 1/2	1 1/2	8	11 3/4
10	419	10 3/16	10 1/32	—	16	1 5/8	8	14 1/4

DISCHARGE POSITIONS

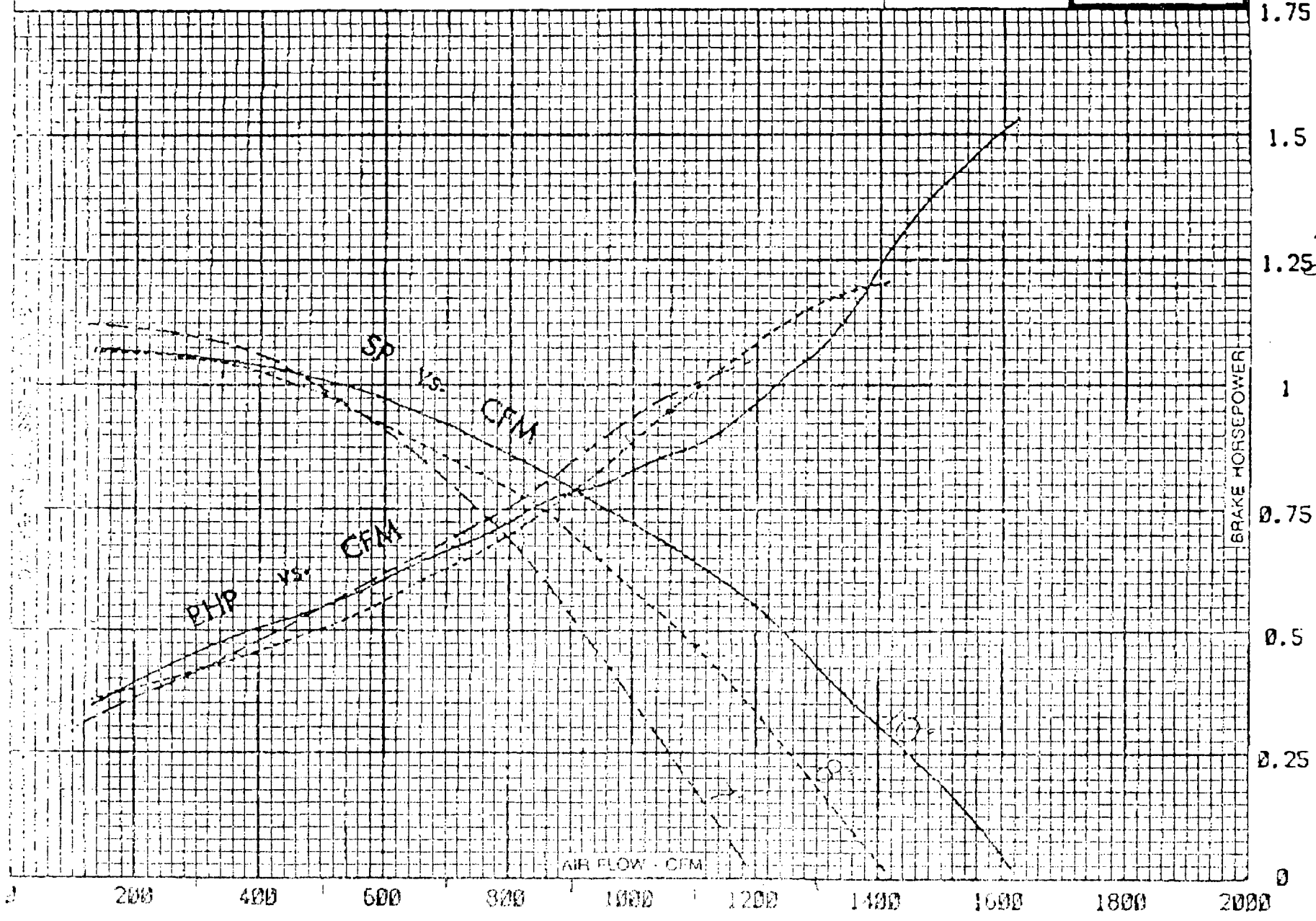


— NOTE: ROTATION VIEWED FROM DRIVEN SIDE

MODEL: AF-15-1105-7,8,&10 1750 RPM .075#/FT3 DENSITY

DATE: 10/24/83

TD-1737



513 @ 70 5550 → SALES

AMERICAN FAN COMPANY

2933 SYMMES ROAD, FAIRFIELD, OHIO 45014, PHONE: (513) 874-2400 TELEX: 21-4310

- SOLENOID VALVE
- TEMPERATURE SWITCH
  & BULB SENSOR

DMD1216A91\86088
Corres.

O'Keefe Controls Co.

Mailing Address
P. O. Box Q
Trumbull, CT 06611

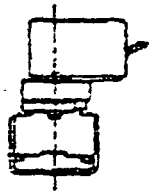
Phone 203 261-6711
Fax 203 261-8331

Main Office
4 Maple Drive
Monroe, CT 06468

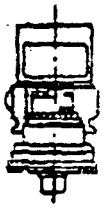
received 11/14/91 8:39 AM S&P

Specialists in Valves, Controls, Pneumatics & Fluid Measurement

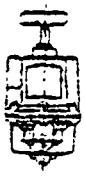
FAX TRANSMISSION DATA SHEET



ASCO
Solenoid Valves



ASCO
Pressure
Switches



Fairchild
Precision
Regulators

Dwyer
Pressure
Instruments

Date: 11/14/91 Fax No: 1-643-6313

Please deliver the following page(s) to:

Attention: Dave Day

Company name: Fes + O'Neill

City, State: _____

From:

Name: Bob O'Keefe

Total number of pages sent: 4 (Including this sheet)

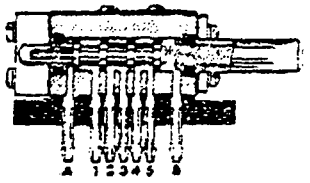
Reference: Valve + Temp Switch

Message: For Draining H2O. 11/15/91

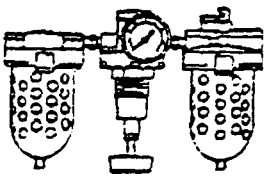
- Solenoid Valve Volts Hz
  Model 8210B56 120/60
  (0 differential for draw) } $292

- Temp Switch ↓ Bulb sensor
  5B110 / 8B10A1 } $200
  $100 / $100
  Adjustable −30 to +60 °F

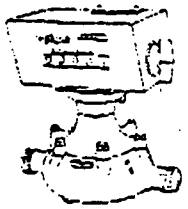
$500 for Valve & Temp Switch



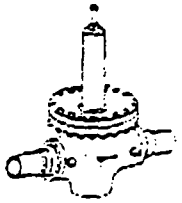
Dynamco
Air Logic



Wilkerson
Filters
Regulators



Neptune
Liquid
Meters



Kaye & MacDonald
Pressure
Reducing Valves

O'Keefe Controls Co.

Solenoid Valve, Temp Switch & Bulb Sensor = $500.00

S-SERIES Temperature Switches

How to Select and Order

ASCO S-Series switches consist of two components, the switch unit and the transducer unit.

How to Select

1. Select the adjustable operating range based on desired actuation temperature.
2. Check that rated overrange temperature is sufficient.
3. Read across and select the desired S-Series switch unit with the proper enclosure.
4. Continue across and select a matching transducer unit compatible with the fluid.

How to Order

Factory assembled — Simply order the switch and transducer unit by catalog number joined by a slash (/), e.g., SA10D/GA10A1.

Field assembled — Simply order the switch and transducer unit separately by individual catalog number, e.g., one SA10D and one GA10A1.

Options — Add appropriate suffix for desired option (see pages 36-38).

Important Note: The third digit of each of the catalog numbers must be identical, e.g., SA[1]0D and GA[1]GA1.

Select S-Series temperature switch

SA, Switch Unit

Single-Stage Adjustable Deadband units allow independent adjustment of the set and reset points over the full operating range of the switch. The minimum difference between set and reset points is the deadband listed below; the maximum difference is the full range of the switch.

General Purpose

SB, SD or SE Switch Unit

SB Switch Unit: Single-Stage Fixed Deadband units have an adjustable set point and a non-adjustable reset point.

SD Switch Unit: Manual reset on decreasing temperature units operate automatically on increasing temperature and must be reset manually on decreasing temperature.
(To order, change second digit to letter "D", e.g., S[1]40D becomes S[D]40D).

SE Switch Unit: Manual reset on increasing temperature units operate automatically on decreasing temperature and must be reset on increasing temperature.
(To order, change second digit to letter "E", e.g., S[1]40D becomes S[E]40D.

Specifications				Adjustable Deadband				Fixed Deadband or Manual Reset			
Adjustable Operating Range (°F)	Rated Overrange Temperature (°F) Direct Mount	Rated Overrange Temperature (°F) Capillary Copper	Rated Overrange Temperature (°F) Capillary SS	Adjustable Deadband Minimum All Mid-Range (°F) ◊	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.	Fixed Deadband All Mid-Range (°F) ◊	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.
-20-20	250	350	200	8	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
-30-60	250	350	250	8	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
0-90	250	300	300	8	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
50-180	250	350	350	8	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
100-220	250	450	450	9	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
160-280	250	500	500	9	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
225-340	–	550	600	12	SA10D	SA11D	SA12D	6	SB10D	SB11D	SB12D
330-450	–	550	700	12	SA10D	SA11D	SA12D	6	SB10D	SB11D	SB12D
390-510	–	550	800	18	SA10D	SA11D	SA12D	7	SB10D	SB11D	SB12D
425-540	–	550	850	32	SA10D	SA11D	SA12D	20	SB10D	SB11D	SB12D

All switch units above are in stock for immediate delivery.

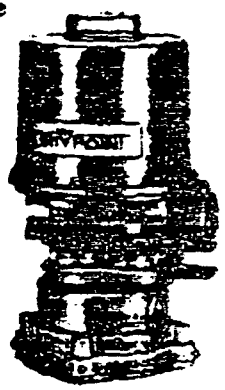
°C = (°F -32) x 5/9

◊ Values shown are nominal.

Select SA, SB, SC, SD or SE unit below

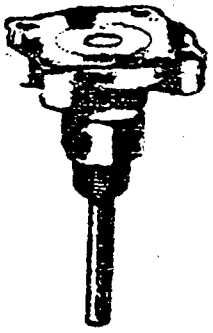
SC Switch Unit

Two-Stage Fixed Deadband units consist of two separate snap-action switches, each with an independently adjustable set point and non-adjustable reset point. The difference between the set and reset points of each switch is the deadband listed below; the minimum difference between the set points of the two switches is the separation.

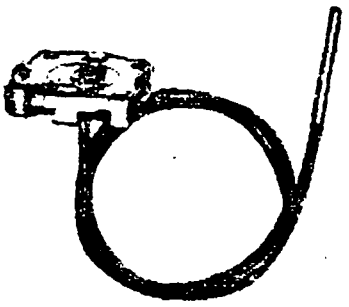


not available Explosion Proof

Select transducer unit below



Direct Mount 1/2" NPT



Capillary and Bulb

Transducer Unit

The temperature transducer works on the vapor principle where the internal pressure within the system is generated by the vapor pressure of a chemical within a sealed system. The temperature sensed by the bulb is related uniquely to an internal pressure within the system. The pressure acts on a diaphragm/piston to create the force output from the transducer into the switch unit.

Temperature transducers are available in two constructions. The direct mount (local) unit includes a 1/2" NPT connection for direct application to the process. The capillary and bulb-type construction allows for remote mounting from the process.

Two-Stage Fixed Deadband / Transducer Units

Fixed Deadband At Mid-Range (°F) ①	Separation: Maximum Full Scale / Minimum At Mid-Range (°F) ①	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.	Direct Mount: Copper Catalog No.	Direct Mount: 316 SS Catalog No.	6' Capillary and Bulb: Copper (Armored Capillary) Catalog No.	6' Capillary and Bulb: 316 SS (Plain Capillary) Catalog No.	12' Capillary and Bulb: Copper (Armored Capillary) Catalog No.	12' Capillary and Bulb: 316 SS (Plain Capillary) Catalog No.
4	8	SC10D	SC11D	SC12D	QA10A1	QA10A4	QA11A1	QA11A4	QA11A1D	QA11A4D
4	8	SC10D	SC11D	SC12D	QB10A1	QB10A4	QB11A1	QB11A4	QB11A1D	QB11A4D
4	8	SC10D	SC11D	SC12D	QD10A1	QD10A4	QD11A1	QD11A4	QD11A1D	QD11A4D
4	8	SC10D	SC11D	SC12D	QF10A1	QF10A4	QF11A1	QF11A4	QF11A1D	QF11A4D
4	8	SC10D	SC11D	SC12D	QJ10A1	QJ10A4	QJ11A1	QJ11A4	QJ11A1D	QJ11A4D
4	9	SC10D	SC11D	SC12D	QL10A1	QL10A4	QL11A1	QL11A4	QL11A1D	QL11A4D
8	12	SC10D	SC11D	SC12D	—	—	QN11A1	QN11A4	QN11A1D	QN11A4D
8	12	SC10D	SC11D	SC12D	—	—	QT11A1	QT11A4	QT11A1D	QT11A4D
10	18	SC10D	SC11D	SC12D	—	—	QU11A1	QU11A4	QU11A1D	QU11A4D
27	32	SC10D	SC11D	SC12D	—	—	—	QW11A4	—	QW11A4D

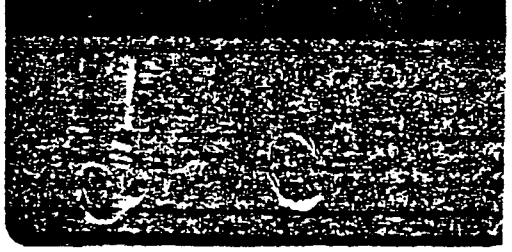
All switch units and transducer units above are in stock for immediate delivery.

2 WAY PILOT OPERATED
General Service Solenoid Valves

Red-Hat | Red-Hat II

8210 SERIES

Brass or Stainless Steel Bodies • ⅛" to 2½" N.P.T.



Specifications

Solenoid Enclosures: Valves listed in this series have either Red-Hat metal solenoid enclosures or Red-Hat II molded epoxy solenoids. Red-Hat II valves are identified by the change letter "G" in their catalog numbers, e.g., 8210G4, and are shown in red.

Standard Enclosures:
Red-Hat — Type 1 General Purpose
Red-Hat II — Types 1, 2, 3, 3S, 4 and 4X Combination General Purpose and Watertight.

Optional Enclosures:
Red-Hat — Types 3, 7 and 9 Combination Explosionproof and Raintight. To order, add prefix "EF" to catalog number. (Except Catalog Numbers 8210B57, 8210B58 and 8210B59)⑥
Red-Hat II — Types 3, 3S, 4, 4X, 6, 6P, 7 and 9 Combination Explosionproof and Watertight. To order, add prefix "EF" to catalog number.
Additional constructions are available. The Optional Electrical Features Section, page 11, contains descriptions and ordering information for: Open Frame Solenoids • Junction Box Enclosures • Panel Mount Constructions.

Electrical: Standard Voltages:
24, 120, 240, 480 volts, AC, 60 Hz
(or 110, 220 volts, AC, 50 Hz)
6, 12, 24, 120, 240 volts, DC
Other voltages are available when required.

Coil: Continuous duty molded Class F or H, as listed.

Nominal Ambient Temperature Ranges: Red-Hat and Red-Hat II Valves/AC Construction: 32°F to 125°F
Red-Hat Valves/DC Construction: 32°F to 77°F (104°F occasionally).
Red-Hat II Valves/DC Construction: 32°F to 104°F.
Refer to Engineering Section for details.

Valve Parts in Contact with Fluids:
Body — Brass or Stainless Steel, as listed
Seals and Discs — Buna "N" or Teflon*, as listed
Disc Holder — Nylon, as listed
Core Tube — 305 s.s.
Core and Plugnut — 430F s.s.
Springs — 302 s.s.
Shading Coil — Copper (brass body); Silver (stainless steel body)

Approvals: CSA certified.
UL listed as indicated. Refer to Engineering Section for details.

Ordering Information:
Important: We must have catalog number, voltage and Hertz, operating pressure and fluid handled. Use strainers with solenoid valves.

*DuPont Co. trademark

SPECIFICATIONS

Pipe Size (Ins.)	Orifice Size (Ins.)	Cv Flow Factor	Operating Pressure Differential (psi): Min.	Max. AC: Air-Inert Gas	Max. AC: Water	Max. AC: Light Oil @ 300 SSU	Max. DC: Air-Inert Gas	Max. DC: Water	Max. DC: Light Oil @ 300 SSU	Max. Fluid Temp. °F: AC	Max. Fluid Temp. °F: DC	Standard Solenoid Enclosures Red-Hat-Type 1 Red-Hat II-Types 1,2,3,3S,4 and 4X: Brass Body: Catalog Number	Brass Body: Constr. Ref. No. ⑩	Brass Body: UL Listing	S.S. Body: Catalog Number	S.S. Body: Constr. Ref. No. ⑩	S.S. Body: UL Listing	Watt Rating/Class of Coil Insulation ⑫: AC	Watt Rating/Class of Coil Insulation ⑫: DC
NORMALLY CLOSED (Closed when de-energized), Buna "N" or Teflon® Seating																			
⅛	⅛	1.5	⑨	150	125	—	40	40	—	180	150	8210G73 ⑨	1P	•	8210G36 ⑨	1P	•	6.1/F	11.6/F
¼	⅛	3	0	150	150	—	40	40	—	180	150	8210G93	5D	o	—	—	—	10.1/F	11.6/F
¼	¼	3	5	200	150	125	125	100	100	180	150	8210G1	6D	o	—	—	—	6.1/F	11.6/F
⅜	½	3	5	300	300	300	—	—	—	175	—	8210G6	5D	o	—	—	—	17.1/F	—
⅛	⅛	2.2	⑨	150	125	—	40	40	—	180	150	8210G15 ⑨	2P	•	8210G37 ⑨	2P	•	6.1/F	11.6/F
¼	⅛	4	0	150	150	—	40	40	—	150	150	8210G94	5D	o	—	—	—	10.1/F	11.6/F
¼	¼	4	0	150	150	125	40	40	—	175	150	—	—	—	8210G87	7D	•	17.1/F	11.6/F
½	¼	4	5	200	150	125	125	100	100	180	150	8210G2	6D	o	—	—	—	6.1/F	11.6/F
½	⅜	4	5	300	300	300	—	—	—	175	—	8210G7	5D	o	—	—	—	17.1/F	—
⅜	⅜	5	0	150	150	125	40	40	—	175	150	—	—	—	8210G88	7D	•	17.1/F	11.6/F
⅜	¼	5	5	125	125	125	100	90	75	180	150	8210G9	9D	o	—	—	—	6.1/F	11.6/F
⅜	⅜	5	0	150	150	—	40	40	—	180	150	8210G95	8D	o	—	—	—	10.1/F	11.6/F
½	½	6.5	5	250	150	100	125	125	125	180	150	8210G3	11D	o	—	—	—	6.1/F	11.6/F
¾	¾	6	0	350	300	200	200	180	160	200	77	8210B26 ⑨	10P	⑬	—	—	—	15.4/F	30.6/H
1	1	13	0	150	125	125	100	100	90	180	77	8210B54	31D	⑭	8210D89	15D	⑭	15.4/F	30.6/H
1	1	13	5	150	150	100	125	125	125	180	150	8210G4	12D	o	—	—	—	6.1/F	11.6/F
1	1	13.5	0	300	225	115	—	—	—	200	—	8210B27	14P	•	—	—	—	20/F	—
1¼	1¼	15	0	150	125	125	100	100	80	180	77	8210B55	32D	⑭	—	—	—	15.4/F	30.6/H
1¼	1¼	15	5	150	150	100	125	125	125	160	150	8210G8	16D	o	—	—	—	6.1/F	11.6/F
1½	1¼	22.5	0	150	125	125	100	100	80	180	77	8210B56	33D	⑭	—	—	—	15.4/F	30.6/H
1½	1¼	22.5	5	150	150	100	125	125	125	180	150	8210G22	16D	•	—	—	—	6.1/F	11.6/F
2	1¾	43	5	150	125	90	50	50	50	180	150	8210G100	20P	•	—	—	—	6.1/F	11.6/F
2½	1¾	45	5	150	125	90	50	50	50	180	150	8210G101	21P	•	—	—	—	6.1/F	11.6/F

CARBON FILTERS

Culligan® HI-FLO CULLAR® automatic water filters

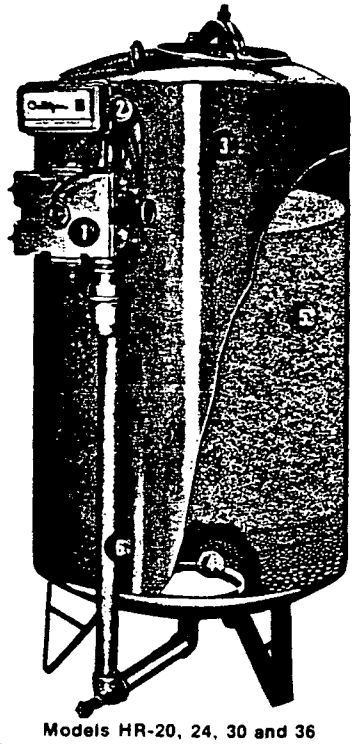
Activated Carbon Filters Absorb and Adsorb to Solve a Variety of Water Problems

1. AUTOMATIC CONTROL
Models HR-20 through 36 are equipped with the Culligan self-contained automatic control valve using exclusive design cartridge for instant servicing. A raw water bypass is incorporated to handle water demands during the backwash operation. Larger models HR-42 through 60 have a nest of hydraulically activated diaphragm valves to accomplish the cycles of backwash, rinse and service. There is no raw water bypass during backwash operations on these larger models.

2. WEATHERPROOF TIMER
Timer controls filter reconditioning process on a regular schedule at any time of any day. Push-button feature permits extra clean-up cycle without disrupting pre-set schedule. Standard features include an extra SPDT electrical contact for operating solenoid valves or pump starters during reconditioning cycle, and a gasketed case to make the timer weatherproof. Locking hasp helps make the unit tamperproof.

3. 5-YEAR TANK WARRANTY
Heavy duty tanks are designed for 100 psi working pressure and tested at 150% of design pressure. All tanks have a 4-6 mil (0.08-0.16 mm) baked-on phenolic epoxy interior and carry a 5-year extended warranty policy. Tank exteriors are painted with a grey rust-inhibiting primer.

4. DISTRIBUTOR SYSTEM
Graded gravel lower distribution assures uniform distribution of backwash, rinse, and service flows in smaller models HR-20 through 36. Header lateral design with fine slot non-corrosive plastic distributors disperse water laterally for even distribution in larger models HR-42 through 60.



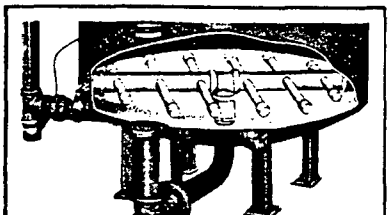
Models HR-20, 24, 30 and 36

For potable water application, filters with Cullar® Activated Carbon should be used only where the influent bacterial quality is known to be acceptable. If bacterial contamination is present an acceptable method of water disinfection is indicated.

5. FINEST MEDIA
Highly adsorptive Cullar D has a broad range of pore openings to handle the job of chlorine removal, plus taste and odor removal. Cullar G media is also available for maximum efficiency on detergent and oil removal. Other specialty grades of activated carbon can be used for specific applications. Consult Culligan for proper carbon media selection. See Specification Sheet for details.

6. COMPLETELY PACKAGED
All filters are furnished complete from inlet to outlet and factory pre-tested for tightness and proper operation. Installation requires only plumbing to filter and drain, loading the tanks and wiring to the timer. Smaller models are mounted on wood skids for easy handling during shipment. Models larger than 36 inches in diameter have valve nest removed at bolt-on flanges, and packaged separately for safer transit and easier job site handling.

OPERATING DATA		
Pressure	1.5 bar — 7 bar 20 psi — 100 psi	
Temperature	5°C — 50°C 40°F — 120°F	Standard
	up to 80°C up to 180°F	Available as option
Electrical Requirements	120 V 60 Hertz 220 V 50 Hertz	



Models HR-42, 48 and 60

SPACE REQUIREMENTS			
MODEL	WIDTH	DEPTH	HEIGHT
HR-20	53 cm 21 in.	89 cm 35 in.	170 cm 67 in.
HR-24	64 cm 25 in.	102 cm 40 in.	170 cm 67 in.
HR-30	79 cm 31 in.	114 cm 45 in.	195 cm 77 in.
HR-36	94 cm 37 in.	137 cm 54 in.	203 cm 80 in.
HR-42	109 cm 43 in.	147 cm 58 in.	211 cm 83 in.
HR-48	125 cm 49 in.	163 cm 64 in.	214 cm 84 in.
HR-60	155 cm 61 in.	198 cm 78 in.	234 cm 92 in.

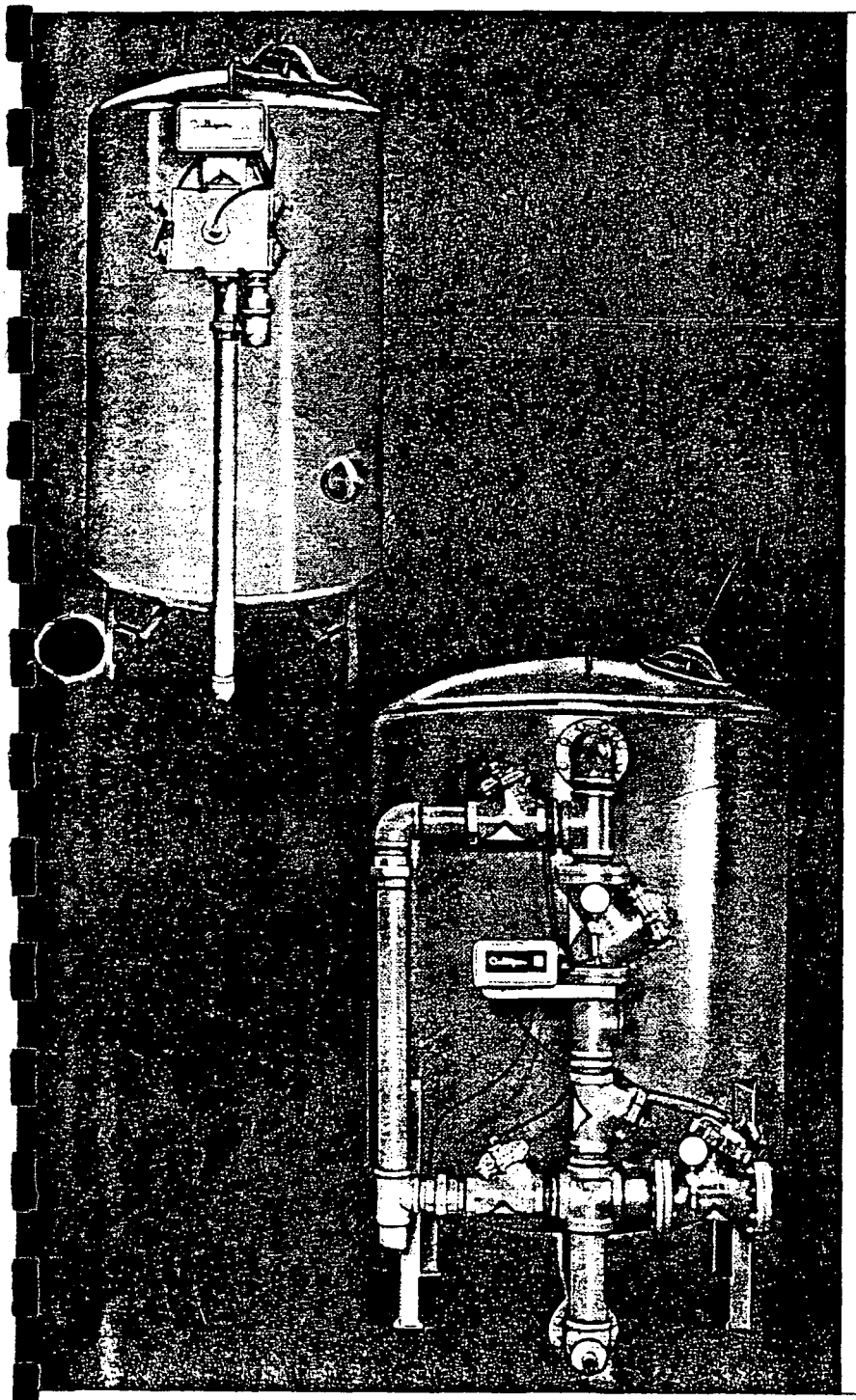
WARRANTED against failure due to faulty workmanship, materials and corrosion for a period of 1 year.

Culligan®

Worldwide Service Capability

For the right answer to your water treatment problems, turn to the people who offer the efficient, economical systems approach. Our products and services, marketed by Culligan dealers, licensees and subsidiaries, are available through 1,350 offices in more than 90 countries. Just call and say, "Hey Culligan Man!"®

Culligan®



HI-FLO™ CULLAR®

automatic water filters

an activated carbon filter
for effective removal of
chlorine by adsorption

Also for removal of:

- other tastes and odors
- color
- tannins
- phenols
- pesticides
- detergents
- trace oil

Culligan®

WATER TREATMENT WORLDWIDE™

Design Data

CULLAR. FILTERS

MODEL	FLOW RATES: TASTE, ODOR, & ORGANIC REMOVAL[1] FLOW GPM	TASTE, ODOR, & ORGANIC REMOVAL[1] DROP PSI	DECHLORINATION[2] FLOW GPM	DECHLORINATION[2] DROP PSI	BACK WASH GPM	TANK[3] SIZE (IN)	PIPE SIZE: SERVICE (IN)	PIPE SIZE: DRAIN (IN)	MEDIA VOL. STD. FT³	DIMENSIONS[6]: WIDTH IN.	DIMENSIONS[6]: DEPTH IN.	DIMENSIONS[6]: HEIGHT IN.	WEIGHT: SHIP LB.	WEIGHT: OPERAT. LB.	MODEL
PV-12R	5	1.0	8	7	8	12x37	1½	¾	1.4	14	12	53	141	285	PV-12R
PV-16R	7	1.0	14	4	15	16x48	1½	1	2.8	17	20	65	305	520	PV-16R
HR-20	12	2.0	22	5	20	20x54	1½	1	6.0	21	36	69	670	1,275	HR-20
HR-24	15	2.0	31	8	30	24x54	1½	1	8.0	25	40	69	835	1,625	HR-24
HR-30	25	3.0	49	10	50	30x60	2	2½	14.0	31	46	77	1,330	2,525	HR-30
HR-36	35	4.0	71	10	70	36x60	2	2½	20.0	37	54	84	1,810	3,575	HR-36
HR-42	50	4.0	100	14	90	42x60	2½	2½	24.0	43	51	86	3,200	5,120	HR-42
HR-48	65	4.0	125	16	130	48x60	2½	3	30.0	49	60	92	4,520	7,120	HR-48
HR-54	80	6.0	150	18	160	54x60	2½	3	40.0	55	71	94	5,640	9,025	HR-54
HR-60	100	4.0	200	13	210	60x60	3	3	48.0	61	98	98	6,900	11,160	HR-60

DEPTH FILTERS

MODEL	FLOW RATES: CONTINUOUS[4] FLOW GPM	CONTINUOUS[4] DROP PSI	PEAK[5] FLOW GPM	PEAK[5] DROP PSI	BACKWASH STD. GPM	BACKWASH QUAD. GPM	TANK[3] SIZE (IN)	PIPE SIZE (IN): INLET & OUTLET	PIPE SIZE (IN): DRAIN	MEDIA VOL. STD. FT³	DIMENSIONS: WIDTH IN.	DIMENSIONS: DEPTH IN.	DIMENSIONS: HEIGHT IN.	WEIGHT: SHIP LB.	WEIGHT: OPERAT. LB.	MODEL
PV-12D	8	2	12	4	10	—	12x37	1½	¾	1.5	14	18	53	222	365	PV-12D
PV-16D	14	3	21	7	20	—	16x37	1½	1	2.8	17	20	53	410	615	PV-16D
HD-20	22	3	45	10	30	50	20x54	1½	1	6.0	21	36	69	975	1,600	HD-20
HD-24	31	3	65	16	50	80	24x54	1½	2½	8.0	25	40	69	1,315	2,150	HD-24
HD-30	49	5	100	16	70	120	30x60	2	2½	13.0	31	46	77	2,015	3,275	HD-30
HD-36	71	5	140	16	90	160	36x60	2½	2½	19.0	37	54	84	2,970	4,750	HD-36
HD-42	95-142	5-10	190	17	136	226	42x60	3	3	25.0	43	51	86	4,980	6,850	HD-42
HD-48	125-187	6-10	250	16	188	324	48x60	3	3	34.0	49	62	92	6,300	8,850	HD-48
HD-54	160-240	5-8	320	13	210	398	54x60	4	3	42.0	55	72	94	8,000	11,290	HD-54
HD-60	200-300	4-9	400	14	270	430	60x60	4	3	52.0	61	77	98	9,770	13,990	HD-60
HD-72	290-425	4-9	560	14	400	—	72x60	6	4	75.0	73	88	94	14,150	20,100	HD-72
HD-84	390-575	4-9	770	14	540	—	84x60	6	4	106.0	85	94	97	19,240	27,300	

(1) Taste, odor, and organic removal based on 5 gpm per square foot of filter area.
(2) Dechlorination flow rate can be set up to 10 gpm per square foot of filter area.
(3) Dimensions are diameter by straight side sheet.
(4) Normal Service Range based on 10 gpm per square foot of filter bed area.
(5) Peak Flow based on 20 gpm per square foot of filter bed area, not recommended for extended periods of time.
(6) Does not include operating and maintenance spaces, ASME code tanks are slightly taller.

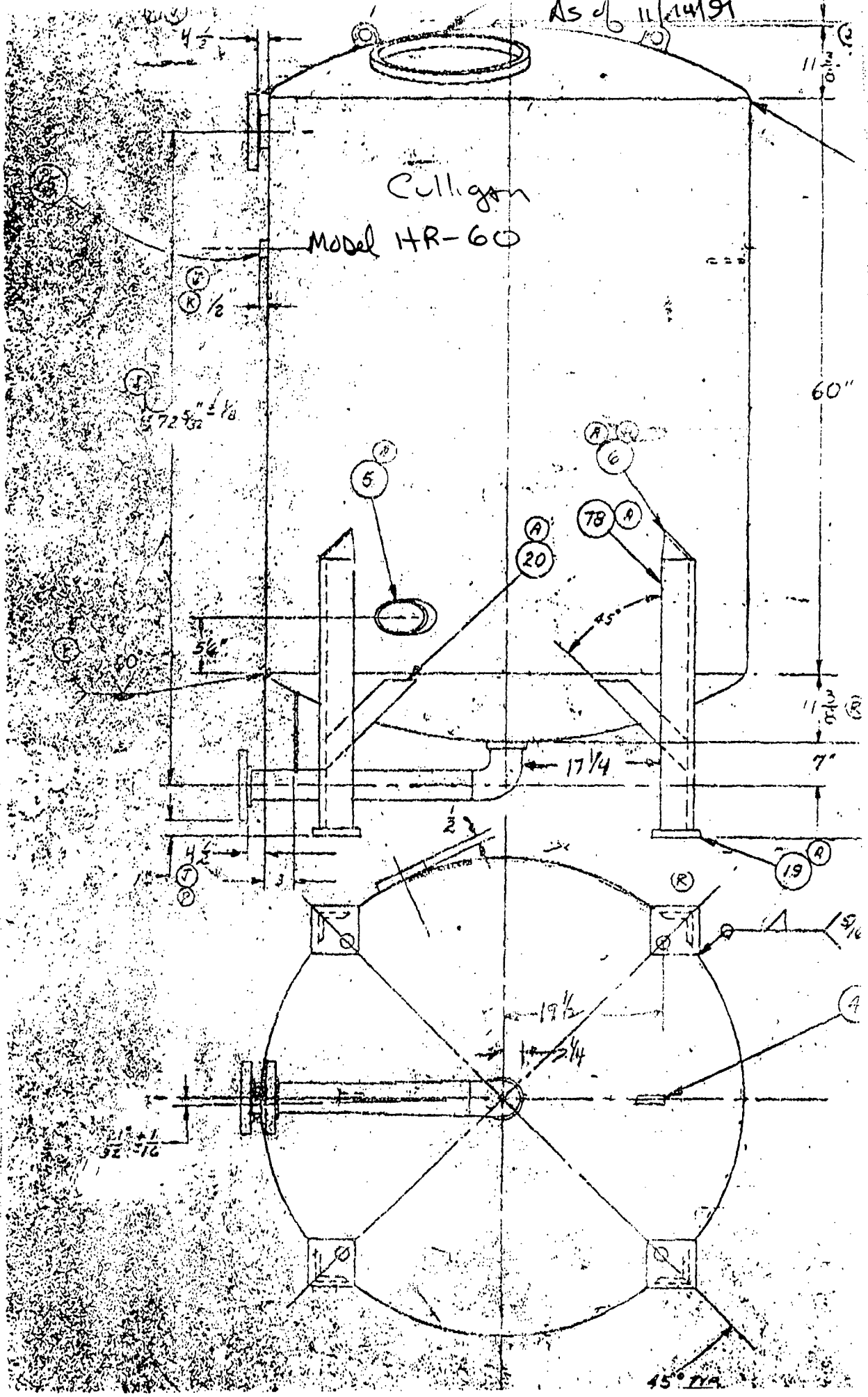
NOTE: CONSULT FACTORY FOR WATER RECLAMATION APPLICATIONS.

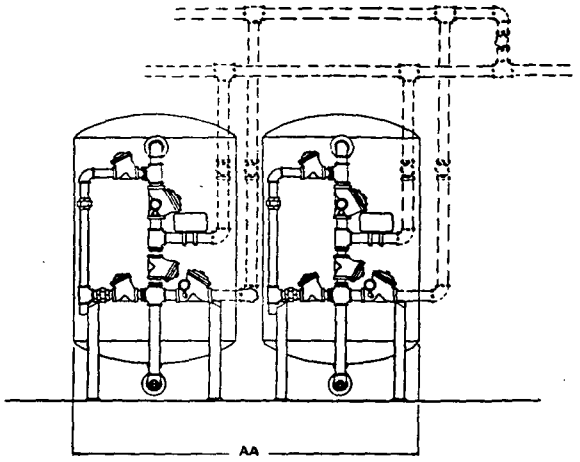
Multi-Tech™ Systems

Design Data

MODEL	DAILY CAPACITY[1]	SERVICE FLOW RATE PER TANK[2]: NORMAL	SERVICE FLOW RATE PER TANK[2]: MAXIMUM	BACKWASH FLOW RATE[3]	TANK DIAMETER	PIPE SIZE[4]	MODEL
MT-20	0.065 MGD	15 gpm	22 gpm	30 gpm	20 in.	1½ in.	MT-20
MT-24	0.095 MGD	22 gpm	30 gpm	50 gpm	24 in.	1½ in.	MT-24
MT-30	0.150 MGD	35 gpm	50 gpm	70 gpm	30 in.	2 in.	MT-30
MT-36	0.215 MGD	50 gpm	70 gpm	100 gpm	36 in.	2 in.	MT-36
MT-42	0.280 MGD	65 gpm	95 gpm	130 gpm	42 in.	2½ in.	MT-42
MT-48	0.367 MGD	85 gpm	125 gpm	170 gpm	48 in.	3 in.	MT-48
MT-54	0.475 MGD	110 gpm	160 gpm	220 gpm	54 in.	3 in.	MT-54
MT-60	0.580 MGD	135 gpm	190 gpm	270 gpm	60 in.	4 in.	MT-60
MT-72	0.842 MGD	195 gpm	280 gpm	400 gpm	72 in.	4 in.	MT-72
MT-84	1.15 MGD	265 gpm	380 gpm	530 gpm	84 in.	6 in.	MT-84
MT-96	1.52 MGD	350 gpm	500 gpm	700 gpm	96 in.	6 in.	MT-96
MT-120	2.37 MGD	550 gpm	780 gpm	1100 gpm	120 in.	6 in. (8 in.)	MT-120

(1) Daily Capacity based on 24 hour operation of 3 train system operating at normal service flow rate of 7 gpm/ft² per train.
(2) Service flow rates based on 7 gpm/ft² per train. When one train of the 3 train system is in backwash, the remaining 2 trains will operate at 10.5 gpm/ft².
(3) The backwash flow rate of both the clarifier and filter are approximately 14 gpm/ft². The clarifier eductor draws 2-3 cfm/ft² air during the scour cycle for additional mineral bed expansion.
(4) Pipe size selection is based on a maximum velocity of 5 fps at the Normal Service flow rate.
(5) Total water usage per train is 225 gallons per sq ft of filter tank area. This includes 140 gallons of influent water for clarifier backwash and system rinse plus 85 gallons of filtered water for depth filter backwash.


As of 11/14/91
Culligan
Model HR-60
60"
17 1/4
7"
19 1/2
45° TYP.



DUPLEX INSTALLATION

NOTES:

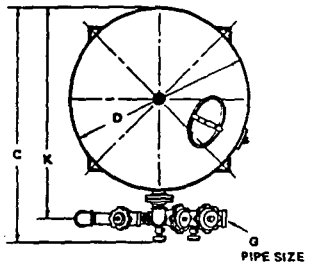
(1) PIPE AND FITTINGS SHOWN DOTTED TO BE FURNISHED BY OTHERS.

(2) AN ELECTRICAL OUTLET SHOULD BE PROVIDED WITHIN FIVE FEET OF THE EQUIPMENT LOCATION.

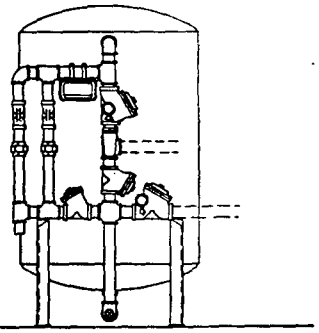
(3) INSIDE DIAMETER - ALLOW A MINIMUM OF 1-INCH FOR OUTSIDE CLEARANCE.

* OVERALL HEIGHT BASED ON STANDARD NON-CODE CONSTRUCTION. SPECIALLY CONSTRUCTED TANKS DESIGNED FOR HIGHER WORKING PRESSURES AND A.S.M.E. CODE CONSTRUCTED TANKS ARE SLIGHTLY TALLER. CONSULT FACTORY IF HEIGHT IS CRITICAL. ALLOW 24-INCHES ABOVE FILTER FOR FILLING.

ALL DIMENSIONS ARE ± 1 INCH AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

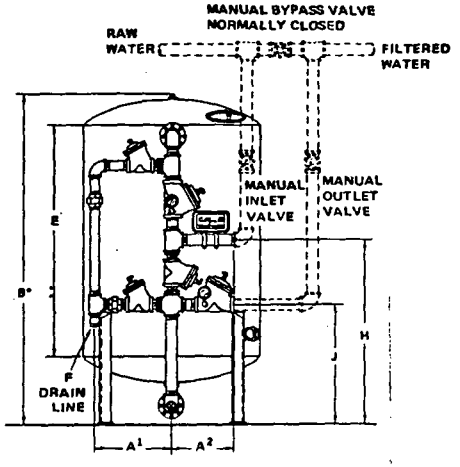


TOP VIEW



HI-FLO$_{T.M.}$ DEPTH FILTER SHOWING QUADRA-KLEEN$_{T.M.}$ BACKWASH SYSTEM
Consult factory for details

	DIMENSIONS												DRAIN FLOW		
	MODEL	A1	A1	AA	B*	C	D(3)	E	F	G	H	J	K	STANDARD	WITH QUADRA-KLEEN™	OPERATING WEIGHT
DEPTH	HD-42	17in. 43 cm	16 in. 41 cm	90 in. 229 cm	86 in. 218 cm	51 in. 130 cm	42 in. 107 cm	60 in. 152 cm	3 in.	3 in.	38 in. 97 cm	22 in. 56 cm	47 in. 119 cm	138 gpm 515 lpm	226 gpm 855 lpm	6,850 lb. 3 100 kg
DEPTH	HD-48	16 in. 41cm	16 in. 41 cm	102 in. 259 cm	92 in. 234 cm	62 in. 157 cm	48 in. 122 cm	60 in. 152 cm	3 in.	3 in.	45 in. 114 cm	30 in. 76 cm	58 in. 147 cm	188 gpm 712 lpm	324 gpm 1 226 lpm	8,850 lb. 4 020 kg
DEPTH	HD-60	20 in. 51 cm	22 in. 56 cm	126 in. 320 cm	98 in. 241 cm	77 in. 196 cm	60 in. 152 cm	60 in. 152 cm	3 in.	4 in.	44 in. 112 cm	23 in. 58 cm	71 in. 180 cm	270 gpm 1 022 lpm	480 gpm 1 817 lpm	13,990 lb. 6 350 kg
DEPTH	HD-72	43 in. 109 cm	41 in. 104 cm	175 in. 445 cm	94 in. 239 cm	88 in. 224 cm	72 in. 183 cm	60 in. 152 cm	4 in.	6 in.	76 in. 193 cm	26 in. 66 cm	82 in. 208 cm	400 gpm 1 510 lpm		20,000 lb. 9 130 kg
DEPTH	HD-84	49 in. 124 cm	41 in. 104 cm	200 in. 508 cm	97 in. 246 cm	94 in. 239 cm	84 in. 214 cm	60 in. 152 cm	6 in.	6 in.	75 in. 191 cm	27 in. 69 cm	87 in. 221 cm	540 gpm 2 050 lpm		27,300 lb. 12 400 kg
CULLAR®	HR-42	15 in. 38 cm	17 in. 43 cm	90 in. 229 cm	86 in. 218 cm	51 in. 130 cm	42 in. 107 cm	60in. 152 cm	2⅛ in.	2⅛ in.	41 in. 104 cm	25 in. 64 cm	47 in. 119 cm	90 gpm 341 lpm		5,120 lb. 2 325 kg
CULLAR®	HR-48	15 in. 38 cm	18 in. 46 cm	102 in. 259 cm	92 in. 234 cm	60 in. 152 cm	48 in. 122 cm	60 in. 152 cm	3 in.	2⅛ in.	47 in. 119 cm	31 in. 79 cm	56 in. 142 cm	130 gpm 492 lpm		7,120 lb. 3 230 kg
CULLAR®	HR-60	18 in. 46 cm	20 in. 51 cm	126 in. 320 cm	98 in. 241 cm	77 in. 196 cm	60 in. 152 cm	60 in. 152 cm	3 in.	3 in.	50 in. 127 cm	27 in. 60 cm	70 in. 178 cm	210 gpm 795 lpm		11,160 lb. 5 070 kg



FRONT VIEW

42 - 84 INCH
HI-FLO$_{T.M.}$ FILTERS
DEPTH AND CULLAR®
TECHNICAL DATA SHEET

Culligan

No. 8182-03 Printed in USA Rev. 10/82

- LIGHTING
- HEATING

Hose down blower heater

2 to 40 kW

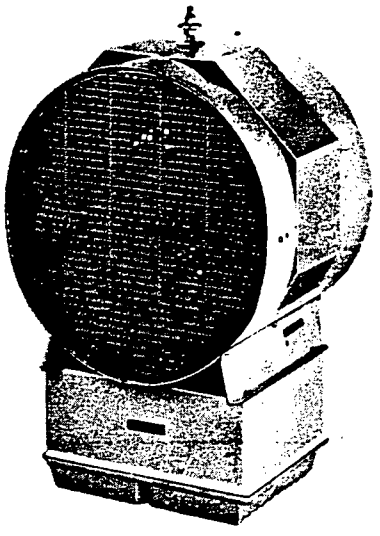
120 to 575V

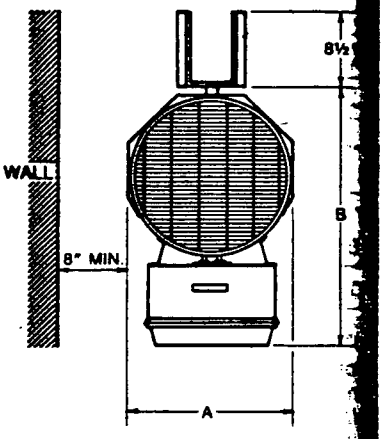
U.L. Listed

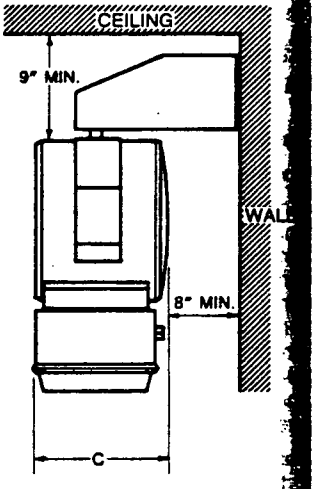
Built-in Controls
Corrosion Resistant
Washable, Watertight

Factory Pre-wired
Swivel Mounting Bracket

Type HDH







kW	Volts	Phase	Dimensions (inches) A	B	C
2.5-5.0	120-277	1	13¾	22½	12
5.0 7.5 5.0-7.5	480 208-480 208-575	1 1 3	13¾	24½	14
10.0-20.0	All	1,3	17	27	14
25.0-39.0	480,575	3	21⅛	30¼	16

Applications

☐ Ideal for comfort heating or freeze protection in "clean areas" or non-hazardous dusty/dirty environments which periodically require cleaning — can be hosed down. Locations include:
☐ Coal handling areas (non-hazardous)
☐ Food processing plants
☐ Foundries
☐ Car washes
☐ Cement plants
☐ Steel mills
☐ Canneries or dairies
☐ Waste water treatment plants.

Features

Monel Fintube® elements — attached to junction box with leak-proof threaded fittings for maximum corrosion resistance.

Anodized Aluminum case — Stainless or epoxy painted steel available on special order.

NEMA 4X molded fiberglass junction box — houses built in controls which include two power contactors (primary & backup), motor contactor and fused transformer for 120V control circuit. Branch circuit protection and temperature control must be provided separately and remotely mounted.

Stainless steel swivel wall mounting bracket — included with heater.

Built-in overtemperature protection — provided by epoxy sealed automatic and manual (back up) reset thermal cutouts.

Epoxy sealed thermal fan delay — allows fan motor to continue to operate after heating thermostat has been satisfied to maximize transfer of generated heat to space being heated and extend operating life of heating elements.

Totally enclosed fan motor — Permanently lubricated ball bearings for long life. Resistant to moisture and corrosion (⅓ hp, 460V, 3 phase).

All hardware stainless steel.

Aluminum fan. Finished same as outlet grille.

Adjustable louvered outlet grille — to direct air flow up or down. Painted with one coat zinc chromate primer and two coats of corrosion resistant paint for added moisture and corrosion protection.

Heavy gauge rear wire grille — protects against accidental contact with the rapidly rotating fan. Finished same as outlet grille.

Recommended temperature control — Chromalox WCRT-100 thermostat. (See Controls section).

Options

Case
Heavy gauge anodized aluminum or epoxy painted steel.

Pilot light
Indicates when power is on.

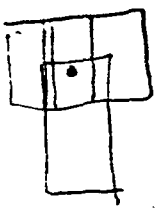
Three-position switch
Internal heat-cool switch (heater on, heater off, fan only) permits air flow with or without energizing the heating elements. The switch is accessible from outside the NEMA 4X enclosure.

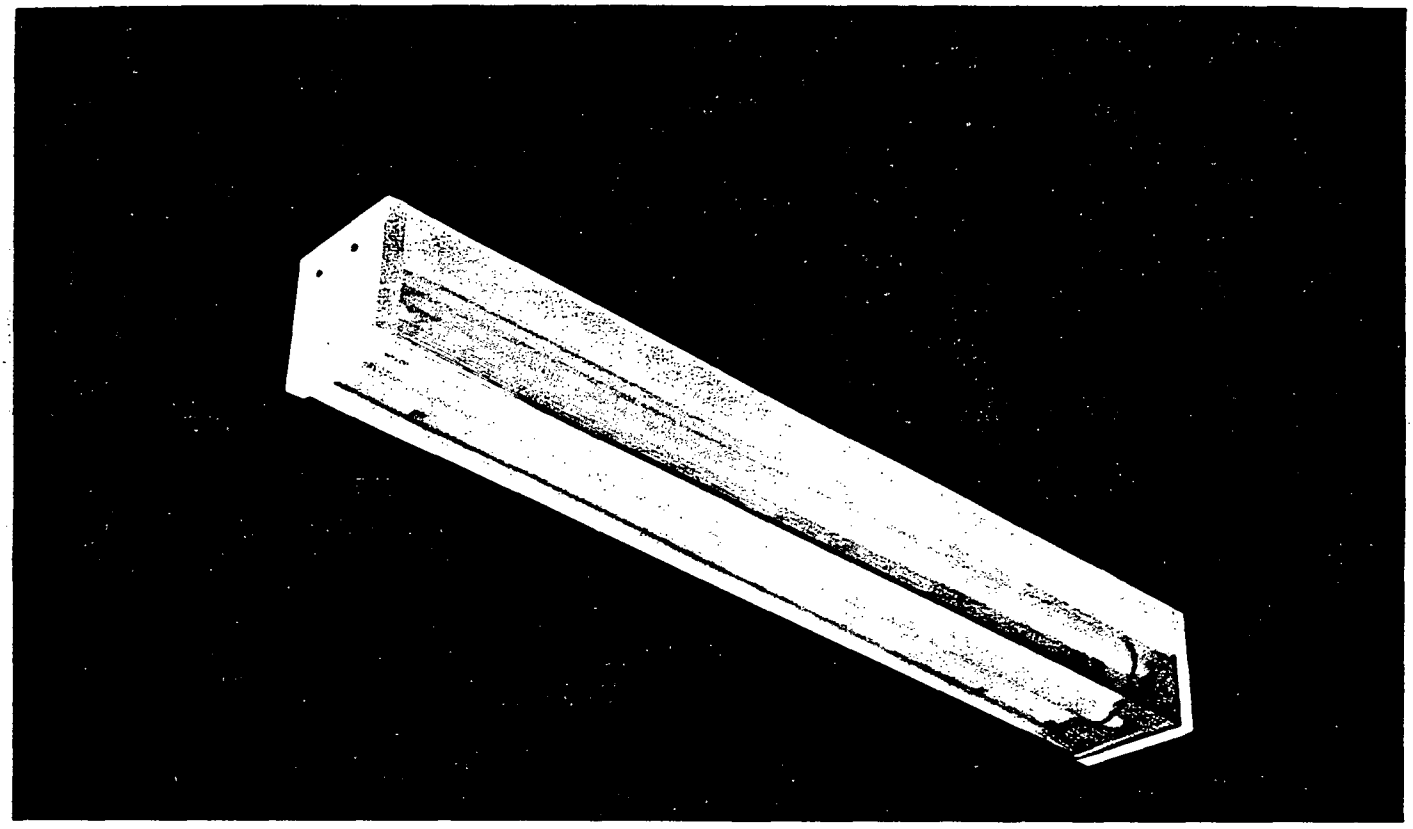
Thermostat
Internal thermostat with a temperature range of 40°-100°F has an adjustable control knob outside the NEMA 4X enclosure.

Additional ratings available — contact your local Chromalox representative

Hose down blower heater

Heater kW	Volts	Phase	Amps	Motor Volts	Motor Phase	Output BTU/Hr.	Air Temp. Rise °F	Air Velocity Ft./Min.	Air Volume CFM	Horizontal Air Throw Ft.	Catalog Number	Stock Status	PCN	Wt. Lbs.
2.0	120	1	16.7	115	1	6824	21	430	405	12.5	HDH-200	NS	211123	56
2.0	208	1	9.6	208	1	6824	21	430	405	12.5	HDH-200	$	211131	56
2.0	240	1	8.3	240	1	6824	21	430	405	12.5	HDH-200	NS	211140	56
2.0	277	1	7.2	277	1	6824	21	430	405	12.5	HDH-200	NS	211158	56
3.0	120	1	25.0	115	1	10,236	31	430	405	12.5	HDH-300	NS	211166	56
3.0	208	1	14.4	208	1	10,236	31	430	405	12.5	HDH-300	NS	211174	56
3.0	240	1	12.5	240	1	10,236	31	430	405	12.5	HDH-300	$	211182	56
3.0	277	1	10.8	277	1	10,236	31	430	405	12.5	HDH-300	NS	211190	56
5.0	208	1	24.0	208	1	17,060	40	430	405	12.5	HDH-500	NS	211203	68
5.0	240	1	20.8	240	1	17,060	40	430	405	12.5	HDH-500	$	211211	68
5.0	277	1	18.1	277	1	17,060	40	430	405	12.5	HDH-500	NS	211220	68
5.0	480	1	10.4	480	1	17,060	40	430	405	12.5	HDH-500	NS	211238	68
5.0	208	3	13.9	208	1	17,060	40	430	405	12.5	HDH-500	NS	211246	68
5.0	240	3	12.0	240	1	17,060	40	430	405	12.5	HDH-500	NS	211254	68
5.0	480	3	6.0	480	1	17,060	40	430	405	12.5	HDH-500	$	211262	68
5.0	575	3	5.0	115	1	17,060	40	430	405	12.5	HDH-500	NS	211270	68
7.5	208	1	36.1	208	1	25,590	37	640	590	13	HDH-750	NS	211289	68
7.5	240	1	31.3	240	1	25,590	37	640	590	13	HDH-750	NS	211297	68
7.5	277	1	27.1	277	1	25,590	37	640	590	13	HDH-750	NS	211300	68
7.5	480	1	15.6	480	1	25,590	37	640	590	13	HDH-750	NS	211318	68
7.5	208	3	20.8	208	1	25,590	37	640	590	13	HDH-750	$	211326	68
7.5	240	3	18.1	240	1	25,590	37	640	590	13	HDH-750	NS	211334	68
7.5	480	3	9.0	480	1	25,590	37	640	590	13	HDH-750	$	211342	68
7.5	575	3	7.5	115	1	25,590	37	640	590	13	HDH-750	NS	211350	68
10.0	240	1	41.7	240	1	34,120	28	800	1180	40	HDH-1000	NS	211369	78
10.0	277	1	36.1	277	1	34,120	28	800	1180	40	HDH-1000	NS	211377	78
10.0	480	1	20.8	480	1	34,120	28	800	1180	40	HDH-1000	NS	211385	78
10.0	208	3	27.8	208	1	34,120	28	800	1180	40	HDH-1000	NS	211393	78
10.0	240	3	24.1	240	1	34,120	28	800	1180	40	HDH-1000	$	211406	78
10.0	480	3	12.0	480	1	34,120	28	800	1180	40	HDH-1000	$	211414	78
10.0	575	3	10.1	115	1	34,120	28	800	1180	40	HDH-1000	NS	211422	78
12.5	277	1	45.1	277	1	42,650	36	800	1180	40	HDH-1250	NS	211430	78
12.5	480	1	26.0	480	1	42,650	36	800	1180	40	HDH-1250	NS	211449	78
12.5	208	3	34.7	208	1	42,650	36	800	1180	40	HDH-1250	NS	211457	78
12.5	240	3	30.1	240	1	42,650	36	800	1180	40	HDH-1250	NS	211465	78
12.5	480	3	15.1	480	1	42,650	36	800	1180	40	HDH-1250	NS	211473	78
12.5	575	3	12.6	115	1	42,650	36	800	1180	40	HDH-1250	NS	211481	78
15.0	480	1	31.3	480	1	51,180	32	900	1330	45	HDH-1500	NS	211496	78
15.0	208	3	41.7	208	1	51,180	32	900	1330	45	HDH-1500	$	211502	78
15.0	240	3	36.1	240	1	51,180	32	900	1330	45	HDH-1500	NS	211510	78
15.0	480	3	18.1	480	1	51,180	32	900	1330	45	HDH-1500	$	211529	78
15.0	575	3	15.1	115	1	51,180	32	900	1330	45	HDH-1500	NS	211537	78
19.5	240	3	47.0	240	1	66,534	42	900	1330	45	HDH-2000	NS	211545	78
20.0	480	1	41.7	480	1	68,240	42	900	1330	45	HDH-2000	NS	211553	78
20.0	480	3	24.1	480	1	68,240	42	900	1330	45	HDH-2000	$	211561	78
20.0	575	3	20.1	115	1	68,240	42	900	1330	45	HDH-2000	NS	211570	78
25.0	480	3	30.1	480	3	85,300	42	740	1800	48	HDH-2500	$	211019	90
25.0	575	3	25.1	575	3	85,300	42	740	1800	48	HDH-2500	NS	211588	90
30.0	480	3	36.1	480	3	102,360	50	740	1800	48	HDH-3000	$	211027	90
30.0	575	3	30.2	575	3	102,360	50	740	1800	48	HDH-3000	NS	211596	90
35.0	480	3	42.1	480	3	119,420	57	740	1800	48	HDH-3500	NS	211609	90
35.0	575	3	35.2	575	3	119,420	57	740	1800	48	HDH-3500	NS	211617	90
39.0	480	3	47.0	480	3	133,068	65	740	1800	48	HDH-4000	$	211035	90
39.0	575	3	39.2	575	3	133,068	65	740	1800	48	HDH-4000	NS	211625	90





Specifications

DESCRIPTION:

The M5000 series is an all-aluminum weather resistant fluorescent luminaire designed primarily for outdoor use under protected areas. This fixture is completely enclosed by a clear DR-acrylic diffuser and fully gasketed to withstand moisture and dirt. Most sizes and combinations use a low temperature ballast for reliable service under cold conditions. Suggested applications include, the illumination of parking garages, and use under canopies, soffits, and facades. Indoor use is possible in cold storage areas or high humidity areas.

CONSTRUCTION:

Housing, end plates, and reflectors are completely die formed of .040" thick quality aluminum. All other components and hardware are aluminum or stainless steel which will not rust. Available nominal sizes include, but are not limited to, 4ft., and 8ft. The end plates which close off the fixture are gasketed with urethane. Along both sides of the housing lies continuous urethane gasketing to create a tight seal against the plastic diffuser. A gasketed joiner band is provided for the middle of all 8ft. units for added support of the diffuser. The same joiner band is available for end-to-end mounting in continuous rows.

ELECTRICAL:

Units are available wired for one or two lamps either in a rapid start, slimline, or high output circuit. Tandem wiring of two units to operate from a single ballast is available. All electrical components are U.L. approved. One lamp rapid start ballasts are class "P", L.P.F., unless specified H.P.F. Two lamp rapid start, all slimline, and all high output ballasts are class "P", H.P.F., CBM-ETL where available. Units are wired for 110-125 volt, 60 HZ. AC, or as specified. All rapid start and two lamp slimline ballasts are rated for +50°F operation, unless units are specified with optional available 0°F. low temperature ballasts. One lamp slimline ballasts are rated for 0°F operation. High output ballasts are rated for −20°F operation, unless specified differently. Sufficient knockouts are provided on the back for electrical feeds. Although no knockout is provided in the end plate, surface conduit entry can be made into the end of the fixture by going through the end plate and using a chase nipple into the 7/8" hole in the socket plate. Fixtures bear I.B.E.W.-A.F.L. and U.L. labels.

DIFFUSER:

The clear, one-piece plastic diffuser provided is extruded from a .110" thick DR-acrylic mixture for maximum strength and long-lasting coloration. The outside is smooth for dirt resistance and ease of cleaning. Large linear prisms line the total inside surfaces for maximum light dispersal, freedom from glare, and lamp obscurity. The diffuser has a snug fit against the continuous gasketing. It is held in place by the end plates and on 8ft. units by an additional center joiner band.

MOUNTING:

Units are designed for surface mounting either individually or in continuous rows. Individual units are supplied with two end plates. Tandems are supplied with two end plates and one gasketed joiner band. For longer continuous rows, the proper number of ends and joiners will be supplied if specified.

FINISH:

Aluminum parts are put through a multi-cleansing process afterwhich a high quality white enamel is sprayed on and baked at 350°F. Will provide a reflectivity of 88%.

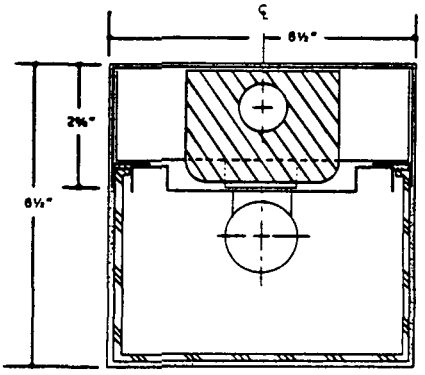
MERCURY

25 BRIGHTON AVENUE, PASSAIC, NEW JERSEY 07055 □ 201-779-5400 □ 212-695-6100

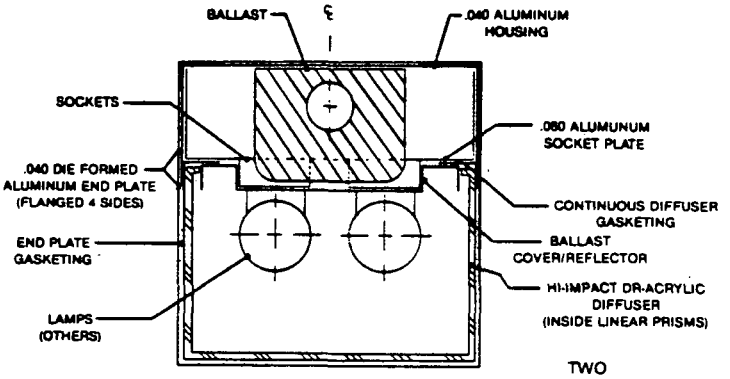
Dimensional Data

M5000 Series

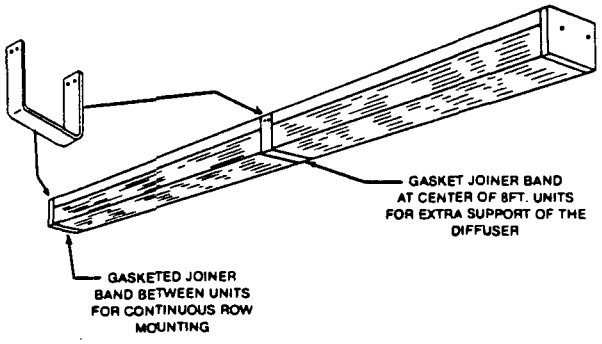
CROSS SECTION



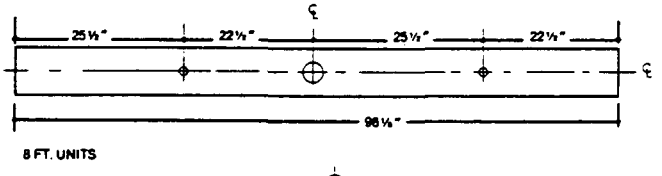
ONE LAMP



TWO LAMP



BACK PLANS



8 FT. UNITS

⊕ = 2⅛" K.O.

⊕ = ⅞" K.O.

NOTE: CONSULT SALES DEPARTMENT FOR 4FT. INFORMATION

Ordering Data

TYPE	NOMINAL SIZE (FT.)	CATALOG NO.	DESCRIPTION	STARTING TEMP.	LENGTH (IN.)
RAPID START (430 MA.)	4	M5000-140-RS	1-40W F40 LPF	+50°F	48⅛"
		M5000-240-RS	2-40W F40 HPF	+50°F	
		M5000-140-RS-0°DEG	1-40W F40 HPF	0°F	
		M5000-240-RS-0°DEG	2-40W F40 HPF	0°F	
SLIMLINE (430 MA.)	4	M5000-148	1-39W F48 HPF	0°F	48⅛"
		M5000-248	2-39W F48 HPF	+50°F	
	8	M5000-196	1-75W F96 HPF	0°F	96⅛"
		M5000-296	2-75W F96 HPF	+50°F	
		M5000-296-0°DEG	2-75W F96 HPF	0°F	
	16	M5000-196/16T	2-75W F96 HPF	+50°F	192⅛"[1]
HIGH OUTPUT (800 MA.)	4	M5000-148-HO	1-60W F48/HO HPF	−20°F	48⅛"
		M5000-248-HO	2-60W F48/HO HPF	−20°F	
	8	M5000-196-HO	1-110W F96/HO HPF	−20°F	96⅛"
		M5000-296-HO	2-110W F96/HO HPF	−20°F	
	16	M5000-196/16T-HO	2-110W F96/HO HPF	−20°F	192⅛"[1]

TYPE	CATALOG NO.	DESCRIPTION
ACCESSORIES AND ADDERS	-HPF	HIGH POWER FACTOR
	-277V	277V HPF
	-ESB	ENERGY SAVING BALLAST[2]
	-EM. PK.	EMERGENCY PACK
	-JB-5000	GASKETED JOINER BAND[3]

NOTES:

1 - Two 8ft. housings, one two lamp ballast, one joiner band.
2 - ESB, where available.
3 - For continuous row mounting, specify row information to obtain proper number of joiner bands and end plates.

DIMENSIONS SUBJECT TO CHANGE. CONSULT FACTORY FOR VERIFICATION.

DISCHARGE PERMIT APPLICATION
(SEPARATE DOCUMENT)

DLB1219A91\86088

Target Sheet

US EPA New England
Superfund Document Management System

File Break: 3.4 – Interim Deliverables

The maps associated with this record are oversized and may be reviewed, by appointment only, at the EPA Region I Records Center in Boston, Massachusetts.

For assistance please contact the EPA New England Office of
Site Remediation and Restoration Records and Information Center
Telephone: (617) 918-1440
Email: R1.Records-OSRR@epa.gov