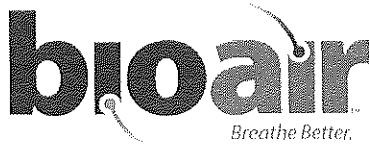


ENGINEERING SUBMITTAL ECOFILTER[®] ODOR CONTROL SYSTEMS



EcoFilter EF124, Mt. Holly, NJ

Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
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A. SPECIFICATION COMPLIANCE

A.1. GENERAL REMARKS

- BioAir has used 14 in w.c. for the blower pressure rating per the Technical Specifications Part IV, Section 2.3.3, B, 5., which allows for 4 in. w.c. for the bioscrubber media. BioAir's media is designed to operate at a pressure drop of less than 1 in w.c. The airflow will be balanced using the VFD in the control panel.
- The EcoFilter system does not utilize recirculation after startup. BioAir is supplying the recirculation system (hereafter referred to as "startup system" in this submittal) for equipment startup only. Startup system will be permanently installed, and will be bypassed after startup is complete.
- Owner/Engineer to provide BioAir with confirmation that the plant water quality meets the requirements of Section B.1.9 of this submittal.
- Owner/Engineer to confirm that the irrigation water supply flow/pressure meets the requirements of Section B.1.10. The irrigation water supply requirement to the inlet of the Water Panel is 25 gpm at 70 psi (dynamic pressure).
- Power supply to the Electrical Control Panel for is 480 V / 3-phase / 60 Hz, 30A.
- BioAir has provided NEMA starters for all permanently-installed motors (blower, booster pumps) where required. IEC starters are provided for temporarily-installed motors (recirculation pumps).

A.2. SPECIFICATION REVIEW

Part IV – Technical Specifications

Item No.	Part IV	Comply	Deviate/Clarify
SECTION 1 – DEFINITIONS AND ABBREVIATIONS			
1	1-27	Comply	
SECTION 2 – TECHNICAL OVERVIEW AND PURPOSE			
3	2.1-2.2	Comply	
4	2.3.1.A	Comply	Please reference Section C.1
5	2.3.1.B	Comply	
6	2.3.2.A	Comply	Please reference Section C.1 for outlet connection details
7	2.3.2.B	Comply	Please reference Section D.3
8	2.3.2.C	Comply	Please reference Section E.1
9	2.3.2.D	Comply	Please reference Section B.1 for design conditions
10	2.3.3.A	Comply	
11	2.3.3.B 1-2	Comply	Please reference Section C.1
12	2.3.3.B 3	Comply	EBRT is 20.85 seconds and meets specification. Please reference Section B.7 for performance guarantee
13	2.3.3.B 4	Comply	Please reference Section D.3
14	2.3.3.B 5	Comply	Please reference Section D.4 for blower information Please reference Section E.1 for VFD information
15	2.3.4	Comply	
16	2.3.5	Comply	Please reference Section K for performance testing



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Item No.	Part IV	Comply	Deviate/Clarify
			procedures.
SECTION 3 – SITE VISIT AND DOCUMENTS			
18	3.1-3.5	Comply	
SECTION 4 – SITE VISIT AND DOCUMENTS			
20	4.1.1.A	Comply	Please reference Section C.1
21	4.1.1.B	Comply	
22	4.1.1.C-D	Comply	Please reference Section B.8 for warranty information
23	4.1.1.E	Comply	O&M to be delivered 2 weeks before installation of equipment. Please reference Section J for training information Please reference Section I for startup information
24	4.1.1.F	Comply	Please reference Section K for performance testing procedures
25	4.1.1.G	Comply	Please reference Section G.1 for spare parts
26	4.1.1.H	Comply	Please reference section I for P&ID
27	4.1.2	Comply	Please reference Section B.1 for design conditions
28	4.1.3	Comply	
29	4.2	Comply	
30	4.3.1	Comply	Please reference Section C.1 and D.3 for nutrient feed system
31	4.3.2	Comply	Please reference Section K for performance testing procedures
32	4.3.3	Comply	Please reference Section B.1 for required water makeup. Design done with assumption of effluent water meeting qualifications laid out herein
33	4.3.4	Comply	Please reference Section E for electrical information Please reference Section D.3 for inlet water panel
34	4.4.1-3	Comply	
35	4.5.1.A	Comply	Please references Section C.1 for Biotrickling filter layout
36	4.5.1.B a	Comply	Please reference Section D.2 for reactor assembly
37	4.5.1.B b	Comply as noted	The EcoFilter biotrickling filter will not require a mist eliminator due to the up flow velocity being less than the terminal down flow velocity of the water droplets coming out of the spray nozzle. The limits any mist from spraying out of the top of the vessel
38	4.5.1.B c-d	Comply	Please reference Section D.2 for reactor assembly Spray nozzle has free passage of 0.26", and is inline with a 20 mesh strainer. Removal of nozzle for any reason is not anticipated, but nozzle can be accessed for removal without entering the vessel.
39	4.5.1.B e	Comply as noted	Please reference Section D.3 for Water Control Panel, and Section D.8 for irrigation water inlet. Given flow rate and pressure needed in irrigation system, 1.5" pipe size is sufficient per design
40	4.5.1.B f	Comply	Please reference Section C.1 for reactor inlet and outlet configuration
41	4.5.1.B g	Comply	Please reference Section D.2 for reactor assembly and pipe support locations
42	4.5.1.B h	Comply	
43	4.5.2 A-F	Comply	BioAir's standard vessel Color is CCP Base White W005 gel coat (RAL 9003) with UV resistant pigment. In the case the engineer wants to differ from our standard, please select a custom color from the following web site - http://www.ralcolor.com and provide the RAL number.
44	4.5.3.A	Comply	Professional Engineering calculations will be provided



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Item No.	Part IV	Comply	Deviate/Clarify
			showing integrity of tank and adherence to design criterion
45	4.5.4 A-C	Comply	Please reference Section B.7 for performance guarantee
46	4.5.5.A	Comply	
47	4.5.5.B	Comply	Please reference Section D.5 for startup system. System to be designed to be permanently installed, and bypassed once startup is complete.
48	4.5.5.C	Comply	Please reference Section P for Nozzle certificate of compliance.
49	4.5.5.D	Comply as noted	Please reference Section D.3 for nutrient feed system. BioAir assumes plant effluent water usage for irrigation system, and so no nutrient feed to irrigation system will be required. Electronic pulse flow monitor reports flow to PLC, and metering pump includes 4-function valve to act as anti-syphon.
50	4.5.5.E	Comply	Please reference Section D.3 for Water Control Panel specifications.
51	4.5.5.F	Comply	Item is for contractor
52	4.5.6.A-F	Comply	Please reference Section E.1 for electrical information
53	4.5.7.A-C	Comply	Please reference Section D.4 for blower specifications
54	4.5.8.D-E	Comply	Please reference Section G.1 for list of provided spare parts.
55	4.5.9	Comply	
56	4.5.10	Comply	
57	4.5.11-12	Comply	Item is for contractor
58	4.6.1	Comply	
59	4.6.2	Comply	



B. TECHNICAL SPECIFICATION

B.1. ODOR CONTROL SYSTEM DESIGN SERVICE CONDITIONS

The EcoFilter® biotrickling filter systems are designed per the following conditions:

Description	Value
B.1.1. Duty	Air supply and odorous compound concentrations are continuous and consistent, and falls within the concentration ranges as specified in Biotrickling Filter Schedule.
B.1.2. Location	Outdoors
B.1.3. Inlet Air Temperature	45 to 100 °F
B.1.4. Inlet Air Relative Humidity	40 – 100%
B.1.5. Total Airflows	As listed in Biotrickling Filter Schedule. Total Airflow = 2000 cfm
B.1.6. Average Air Relative Humidity	60 to 100%
B.1.7. Type of Contaminants	Hydrogen sulfide (H ₂ S), ammonia (NH ₃), reduced sulfur compounds (RSC) and other organic odors typical for Municipal Wastewater treatment applications.
B.1.8. H ₂ S Concentration in Inlet Air	300 ppmv avg., 800 ppmv max.
B.1.9. Irrigation Water Source (Plant)	If the irrigation water supply consists of treated effluent, then the water shall meet the following characteristics: • pH = between 6 and 8 • Min./Max. Temperature = 59 – 99°F • Total Chlorine < 3 ppm Cl⁻ • TSS < 10 ppm • Total Dissolved Solids < 2000 ppm • Hardness < 400 ppm CaCO₃ (at pH = 2) • COD < 100 ppm • BOD < 30 ppm • Total N = 3 – 20 ppm N • Total P = 1 – 5 ppm P
Englewood WD to confirm effluent water meets required characteristics	
Irrigation Water Source (Potable)	In the event that potable water is used for irrigation purposes, EcoGrow™ nutrients will be added to provide the required nutrients for optimum system performance. See Section B-3 for water use and nutrient requirements. Potable water supply to meet the following characteristics: • pH = between 6 and 8 • Min./Max. Temperature = 59 – 99°F • Total Chlorine < 3 ppm Cl⁻ • TSS < 10 ppm



Description	Value
	- Total Dissolved Solids < 2000 ppm - Hardness < 400 ppm CaCO₃ (at pH = 2)
B.1.10. Required Irrigation Water Supply to Water Panel.	25gpm @ 70 psi dynamic pressure

B.2. EQUIPMENT SPECIFICATION AND DESCRIPTION

The odor control equipment includes:

Description	Value	Reference
B.2.1.A) EcoFilter™ Biotrickling Filter System		
Model Number	EcoFilter EF84	See Section D.2
Number of Reactor Vessels	One (1)	See Section C.1
Material of Construction	Fiberglass	See Section D.2
Reactor Color	Base White (CCP W005)	See Section D.2
Shipping Weight	5,200 lbs	See Section C.1
Reactor Operating Weight	20,700 lbs	See Section C.1
Foundation Load Bearing Surface	6,083 in ²	See Section C.1
Reactor Design Pressure	+14" w.c.	
Pressure in Reactor	Positive	
Reactor Pressure Drop	Estimated 0.85" w.c.	
Number of Spray Nozzles	One (1)	
Nozzle Flow Rate	25 gpm	



B.2.1.B) Electrical Control Panel Quantity Enclosure Type Enclosure Dimensions Panel Mounting Number of Panel Stands Electrical Design Power Supply PLC	One (1) NEMA 4X, 304SS 24" W x 30" H x 8" D Mounted on panel stand (provided). NOTE: Panel to be mounted more than 3 ft from nearest odorous air source to comply with NEC Class 1, Division 2 One (1) Comply with NEMA, UL508 and local codes. Panel is NOT NEC Class 1, Division 2 rated. 480/3/60, 20A Allen-Bradley MicroLogix 1400	See Section E.1 See Section E.2 See Section E.2 See Sections C.1 and D.8.1 See Section E.1 See Section E.1 See Section E.2
B.2.1.C) Water Panel Quantity Enclosure Type Enclosure Dimensions Panel Mounting Number of Panel Stands Pipe Connection Flanges Required Water Supply	One (1) NEMA 4X, 304SS 48" W x 36" H x 12" D Mounted on panel stand, back to back with control panel, by others. Note: Panel to be mounted more than 3 ft from nearest odorous air source to comply with NEC Class 1, Division 2 None additional Ø1.5" Schedule 80, ANSI flange 25 gpm @ 70 psi dynamic	See Section D.3 See Section D.3 See Section D.3 See Section C.1
B.2.1.D) Blower BL-01 Quantity Supplier Color Model Number Capacity Blower Motor Size	One (1) Verantis Base White (CCP W005) CHMB-12, CW, BH, Arr. 10 2000 cfm at 14.0" w.c 10 HP	See Section D.4.
B.2.1.E) Recirculation System Number of Systems Pump Type Pump Motor Size NOTE: BIOAIR SUPPLIES THE RECIRCULATION SYSTEM FOR EQUIPMENT STARTUP, WILL BE	One (1) Grundfos CRI5-7 Centrifugal Pump TEFC, 304 SS 2 HP	See Section D.5



PERMANENTLY MOUNTED WITH ABILITY TO BYPASS AFTER STARTUP.		
B.2.1.G) Nutrient Dosing System		
Nutrient Dosing Pump	LMI-P03 included in Water Panel	See Section D.3
Nutrient Barrel	One (1) x 55 gal barrel	See Sections C.1 and D.7
Nutrients	One (1) x 50 lb EcoGrow™	
B.2.1.H) Instrumentation		
Differential Pressure Gage	One (1) Dwyer 2020	See Section F.2
Handheld pH Sensor	One (1) Oakton R-35634-30	See Section F.2
B.2.1.I) Interconnecting Ductwork between Blower and Reactor	One (1) Reactor Transition One (1) Blower Transition One (1) Flex Connector	See Sections D.6
B.2.1.J) Upstream Ductwork	Supplied by Contractor	
B.2.1.K) Other Equipment		
See Mechanical Bill of Material		See Section D.1

B.3. SYSTEM UTILITY AND NUTRIENT REQUIREMENTS

Electrical Requirements: 480/3/60, 30A
 Water Supply: 25 gpm at 70 psi dynamic pressure at pipe connection to water panel
 Total Daily Water Use: 22,835 gpd
 Nutrient Use (if required): EcoGrow liquid nutrient solution 2.13 gpd

B.4. BIOTRICKLING FILTER MEDIA

Each EcoFilter biotrickling filter comes with BioAir's proprietary, uniform, structured EcoBase® plastic synthetic media pre-installed in the reactor module(s) prior to delivery to the job site. The EcoBase media is fabricated from high porosity, chemically resistant plastic material that provides for long operating life and controlled steady state operation to assure consistent long term performance. The media layer(s) is self supporting, does not shrink or swell with varying moisture content, and is constructed to eliminate short circuiting of air.

The EcoBase media has a void space greater than 96% and a specific surface area of 750 m²/m³.

Figure 1 below shows a pressure drop curve for the EcoBase media.

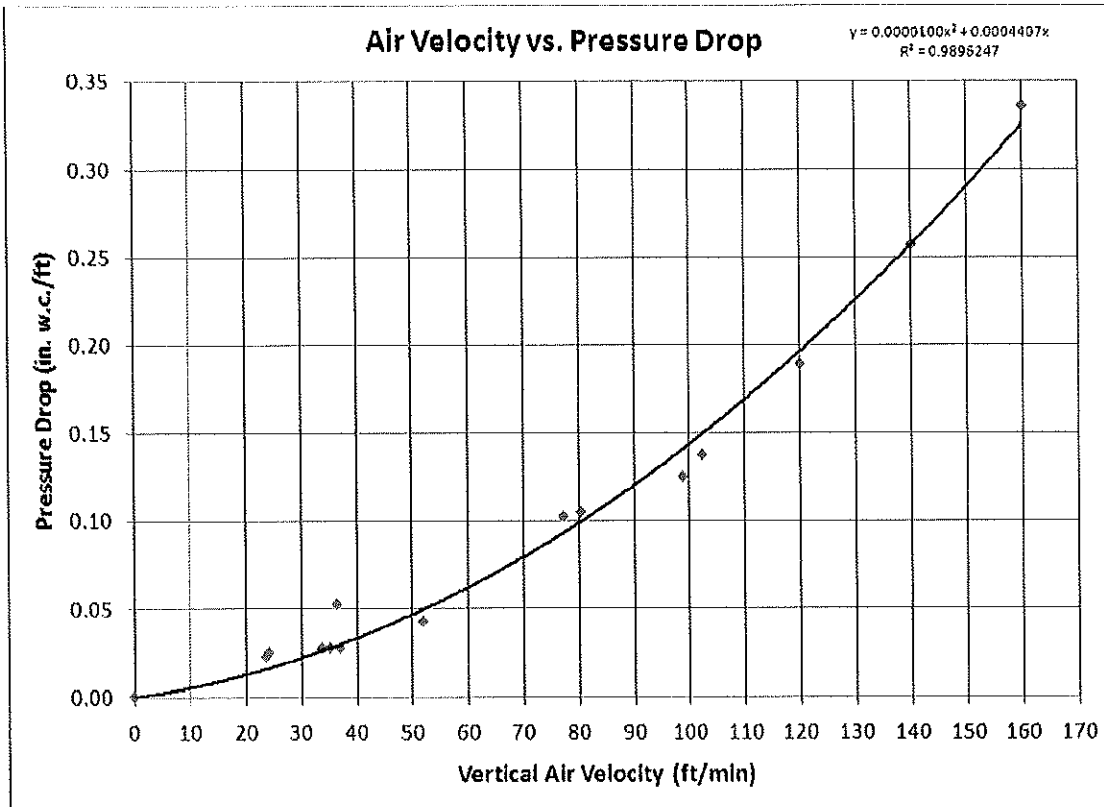


Figure 1 – Pressure drop information for EcoBase media



B.5. PROCESS DESCRIPTION

The odor control systems are biotrickling filters that are designed to remove hydrogen sulfide, organic reduced sulfur compounds and other odorous compounds from the foul air stream.

The biotrickling filter operates in a counter-current fashion. The foul air enters the reactor vessel at the bottom and flow upwards through each of the EcoBase media layer(s). The media is intermittently irrigated from the top of each vessel section using suitable plant reclaimed effluent or potable water. The water flows downward through each vessel section inside the reactor and is discharged from the section bottom through a drain. The hydrogen sulfide in the odorous air entering the reactor is oxidized by the autotrophic bacteria resident on the lower media layer(s). As the air passes through the upper media layer(s), the resident heterotrophic bacteria will oxidize the remaining organic odorous compounds. The airstream is then released to the atmosphere via the exhaust stack located on top of the reactor. The drain water is discharged from each vessel section bottom via a PVC drain line to a suitable location.

Extensive process description and details are provided in the Operation and Maintenance Manual.

B.6. CONTROL NARRATIVE

In order to achieve optimum system performance, moisture and pH levels in the media must be properly controlled. This is achieved by regulating the total amount of water supplied to the biotrickling filter via the spray nozzle system(s).

The spray nozzle is designed to uniformly supply water across the top surface of the media. The uniformity of the spray pattern is dependent on the water flow rate, so it is critical for the flow rate to remain near the nozzle's design flow rate during irrigation (see Section B.2.1.A for nozzle design flow rates). Therefore, adjustments to the total amount of water supplied to the system, as required for process control, are accomplished by varying the percentage of time that irrigation takes place, NOT by adjusting the instantaneous water flow rate.

This is done by setting a *cycle time* and an *irrigation time*. The *cycle time* is defined as the amount of time between an irrigation event and the next repeated occurrence of that event. Each irrigation event takes place once per cycle. The *irrigation time* is the amount of time that one nozzle's automatic ball valve is open to allow irrigation water to flow to the nozzle. In the event that there is more than one valve operating on a single control system, separate *irrigation times* can be set for valve (and thus, for each nozzle and its corresponding vessel section). Depending on the inlet H₂S concentration, the vessel sections will be irrigated separately and in succession, starting with the lower section, or simultaneously.



When potable water, or effluent water with insufficient nutrients, is used for the irrigation water supply, nutrient addition is required. This is accomplished by activating the nutrient dosing pump during each biotrickling filter irrigation sequence. The PLC will also give the operator the ability to set a *nutrient dose time* for each biotrickling filter.

The above control sequences are the normal operating mode of the system, which will take place when switches controlling the automatic ball valve(s) controlling irrigation and nutrient pump(s) are in *AUTO* mode. The switches can also be placed in *OFF* and momentary *ON* position for convenience during maintenance, priming, or other necessary functions.

Extensive control narrative and related details are provided in the Operation and Maintenance Manual.

B.7. PERFORMANCE GUARANTEE

BioAir warrants that upon equipment startup and for one (1) year after equipment startup the process will perform as given below:

At average inlet H₂S concentrations

The system shall, on average, remove $\geq 99.5\%$ of the inlet air H₂S OR reduce the H₂S concentration to average ≤ 1.5 ppmv in the exhaust air.

At peak inlet H₂S concentrations

The system shall reduce the H₂S concentration to ≤ 8.0 ppmv in the exhaust air.

The Performance Guarantee is subject to the design conditions as outlined in Section B.1 and operation of the equipment in accordance with BioAir's Operation and Maintenance Manual and performance testing in accordance with the Performance Test Protocol given in Section K. If the equipment fails to meet the Performance Guarantee, BioAir's sole obligation shall be to make such repairs or replace such parts as may be required to achieve the Performance Guarantee.

B.8. EQUIPMENT WARRANTY

BioAir's sole warranty obligations are as follows:

- A. BioAir warrants the synthetic media against defects in material and workmanship for five (5) years from equipment delivery to job site. In the event it is determined that a defect exists in the synthetic media, BioAir's sole obligation shall be to repair or replace the defective media.
- B. All equipment supplied by BioAir, other than the synthetic media, is warranted by BioAir against defects in material and workmanship for twelve (12) months from equipment startup or eighteen (18) months from the date of delivery, whichever comes first. In the



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event it is determined that a defect exists in such equipment, BioAir's sole obligation shall be to repair or replace the defective equipment.

- C. BioAir warrants that upon equipment startup and for one (1) year after equipment startup the process will perform in accordance with the Performance Guarantee contained in paragraph B-7 above. The Performance Guarantee is subject to operation of the equipment in accordance with BioAir's operation and maintenance manual. If the equipment fails to meet the Performance Guarantee, BioAir's sole obligation shall be to make such repairs or replace such parts as may be required to achieve the Performance Guarantee.
- D. BioAir will not be liable under any warranty if the defect was caused by misuse, abuse, improper operation, improper maintenance, alteration, repair or modification, negligence in use, casualty, storage, handling or any other cause beyond the control of BioAir.
- E. EXCEPT AS SPECIFICALLY SET FORTH IN THE CONTRACT, BIOAIR MAKES NO WARRANTIES, EXPRESS OR IMPLIED, OF ANY KIND OR NATURE WHATSOEVER INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR USE.
- F. The warranties provided in this Paragraph B-8 with respect to the Equipment (including, but not limited to, reactor vessel, synthetic media and other equipment) sold by BioAir to Purchaser pursuant to this Project are exclusive and in lieu of all other warranties. There are no other warranties and BioAir expressly disclaims, and Purchaser hereby expressly waives, all other such warranties, expressed or implied, including without limitation, warranties of merchantability or fitness for a particular purpose.

B.9. SAFETY INFORMATION

ALL PERSONS INVOLVED WITH THE USE OF BIOAIR EQUIPMENT MUST BE PROPERLY TRAINED AND KNOWLEDGEABLE ON THE USE OF BIOAIR EQUIPMENT AND AWARE OF ALL HAZARDS BEFORE ENGAGING IN SUCH ACTIVITIES. THIS MANUAL AND ALL OTHER WARNINGS AND WRITTEN MATERIALS SUPPLIED BY BIOAIR, AS WELL AS ALL OTHER APPLICABLE SAFETY MANUALS, STANDARDS AND REGULATIONS, ("MATERIALS") SHOULD BE REVIEWED BY ALL PERSONS BEFORE PARTICIPATING IN THE USE OF BIOAIR EQUIPMENT. IT IS THE SOLE RESPONSIBILITY OF THE OWNER TO ASSURE THAT ALL PERSONS INVOLVED IN THE USE OF BIOAIR EQUIPMENT, OR WORKING ON OR NEAR THE BIOAIR EQUIPMENT, HAVE PROPER SAFETY TRAINING, ARE ADVISED OF THE PROPER MEANS AND METHODS OF PERFORMING THEIR WORK,



HAVE BEEN PROVIDED WITH THE MATERIALS AND ARE AWARE OF ALL THE HAZARDS AND RISKS THAT MUST BE ELIMINATED OR AVOIDED.

THE FOLLOWING ITEMS ARE INTENDED TO HIGHLIGHT SOME OF THE KEY SAFETY ITEMS WHEN ENGAGING IN THE OPERATION OF THE BIOAIR ODOR CONTROL EQUIPMENT. IT IS IMPORTANT THAT THE OWNER AND THE OWNER'S OPERATORS FAMILIARIZE THEMSELVES WITH THE CONTENT OF THIS OPERATION AND MAINTENANCE MANUAL PRIOR TO OPERATING THE BIOAIR EQUIPMENT.

KEY SAFETY ITEMS:

- POWER SUPPLY TO THE ELECTRICAL CONTROL PANEL SHOULD ALWAYS BE TURNED OFF USING THE MAIN SWITCH ON THE PANEL DOOR BEFORE OPENING ELECTRICAL PANEL DOOR.
- USE GLOVES AND SAFETY GLASSES WHEN WORKING ON THE WATER STRAINER. NOTE: THE STRAINER MAY CONTAIN BIOLOGICAL MATTER. AVOID CONTACT WITH SKIN, EYES, AND DO NOT TAKE INTERNALLY.
- ALWAYS TURN THE MAIN WATER SUPPLY TO THE WATER PANEL OFF BEFORE WORKING ON THE STRAINER ASSEMBLY.
- READ AND CAREFULLY FOLLOW THE INSTRUCTIONS AND WARNINGS CONTAINED IN THE ECOGROW NUTRIENTS MSDS (SEE SECTION H). ALWAYS WEAR GLOVES AND SAFETY GLASSES WHEN MIXING ECOGROW NUTRIENTS OR WORKING WITH ECOGROW IN DISSOLVED LIQUID OR IN POWDER FORM.
- WEAR GLOVES AND SAFETY GLASSES WHEN OPENING THE INSPECTION PORT ON THE TOP, OR AT THE BOTTOM, OF THE ECOFILTER REACTOR. FOLLOW PROPER CONFINED-SPACE ENTRY REGULATIONS. UNDER NO CIRCUMSTANCES SHOULD THE ECOFILTER INTERIOR BE ACCESSED WHILE SYSTEM IS RUNNING.
- ALWAYS WEAR GLOVES AND SAFETY GLASSES WHEN COLLECTING DRAIN WATER SAMPLES. NOTE THAT DRAIN WATER IS ACIDIC AND DIRECT CONTACT WITH SKIN OR EYES SHOULD BE AVOIDED AT ALL TIMES. DRAIN WATER SHOULD NOT BE SWALLOWED UNDER ANY CIRCUMSTANCES, AND IF SO, IMMEDIATELY CONSULT WITH A PHYSICIAN. BE SURE TO MENTION THAT THE DRAIN WATER CONTAINS SULFURIC ACID (PH = 1-2) AND BACTERIA.
- USE CAUTION WHEN ACCESSING BLOWER FOR REPAIR OR SERVICE. MAKE SURE THAT THE POWER TO THE BLOWER MOTOR IS DISCONNECTED AND LOCKED-OUT PRIOR TO WORKING ON THE BLOWER. FOLLOW THE MANUFACTURER'S INSTRUCTION AND WARNINGS WHEN WORKING ON THE BLOWER.



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B.10. BIOAIR SERVICE CENTER

BioAir Service Center Information:

BioAir Solutions, LLC

110 Kresson-Gibbsboro Road – Suite 303

Voorhees, NJ 08043

Phone: (856) 258-6969 EXT. 111



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C. MECHANICAL DRAWINGS

C.1. GENERAL ARRANGEMENT DRAWING

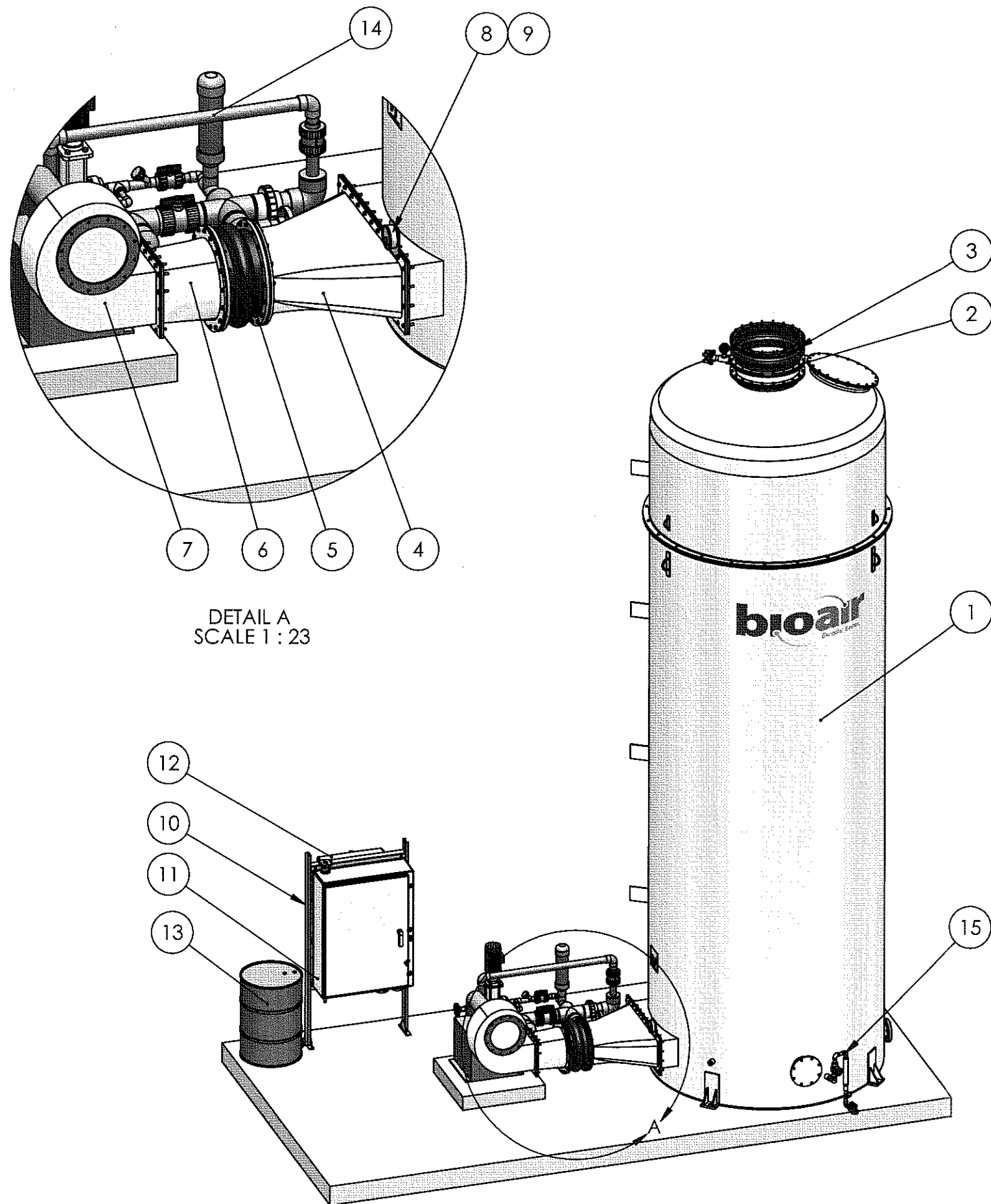
C.2. NAME PLATE DRAWING



Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

C.1. GENERAL ARRANGEMENT DRAWING

REV.	DATE	ECN#	REVISION RECORD	DRCK
0	10/01/2012			RK



ITEM	PART NUMBER	QTY	REMOTE QTY	DESCRIPTION	OPERATING WEIGHT (LB)
1	RA084000_P1217	1	-	EF84 REACTOR ASSEMBLY WITH Ø4" ANSI DRAIN	20700
2	NA241500	1	-	NOZZLE ASSEMBLY Ø1½ ANSI 150, PP	14
3	FC240000	1	-	EPDM FLEX CONNECTOR Ø24" PS15-69	15
4	TP163600	1	-	FRP INLET TRANSITION Ø16" PS15-69 X 36"x11"	22
5	FC160000	1	-	EPDM FLEX CONNECTOR Ø16", PS15-69	18
6	BT161200	1	-	FRP RECT BLOWER TRANSITION Ø16" PS15-69 x CHMB-12	9
7	BL012000_P1217	1	-	VERANTIS CMHB-12, ARRANGEMENT 10, CW BOTTOM HORIZONTAL, 10HP MOTOR	395
8	2020	1	-	DWYER DIFFERENTIAL PRESSURE GAUGE 0" - 20" W.C.	2
9	SW000100	1	-	DIFFERENTIAL PRESSURE GAUGE MOUNTING BRACKET	2
10	PS000100	1	-	STAINLESS STEEL PANEL STAND	50
11	WP151000_P1217	1	-	304 STAINLESS STEEL WATER PANEL Ø1 1/2" ANSI 150	160
12	CD1217	1	-	304 STAINLESS STEEL ELECTRICAL CONTROL PANEL	75
13	NB550100	1	-	NUTRIENT BARREL ASSEMBLY 55GAL	210
14	RS000750_P1217	1	-	STARTUP SYSTEM	125
15	MW000215	1	-	MAKE-UP WATER ASSEMBLY	10
16	AS101200	-	1	Ø1" AIR SAMPLING SYSTEM	5

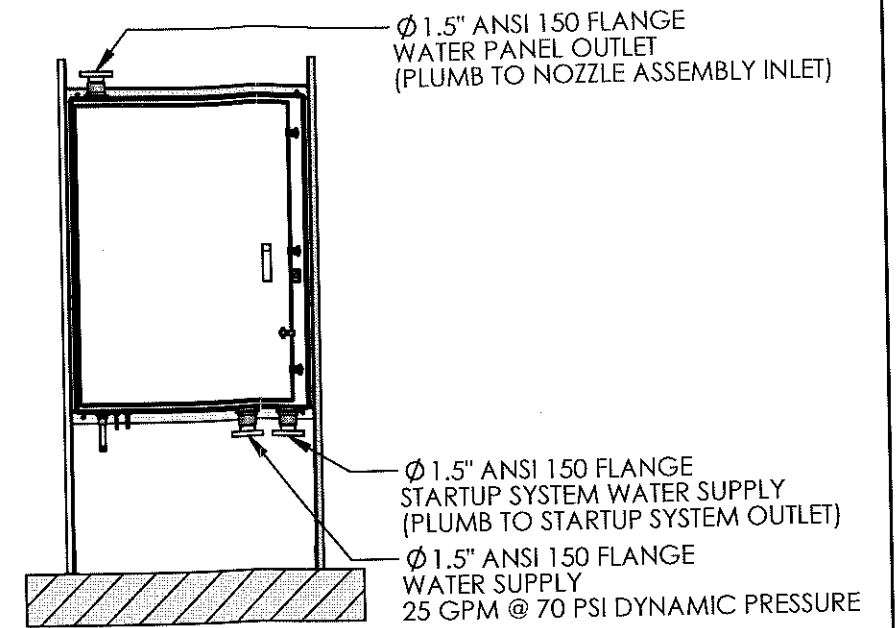
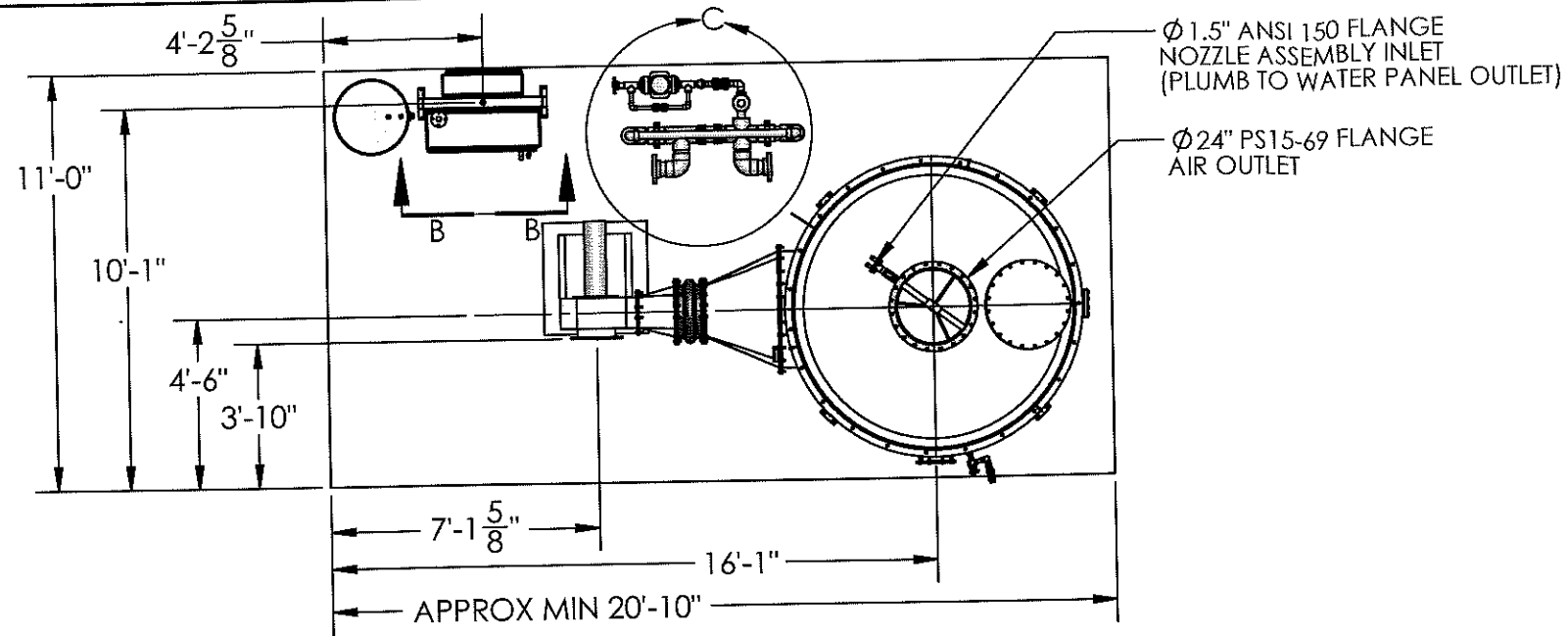
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MATERIAL	SEE TABLE	
FINISH		

DRAWN BY	DATE	ENG APPR.	DATE	QC APPR.	DATE
RK	10/01/2012				

PART NAME
GENERAL ARRANGEMENT ECOFILTER EF84

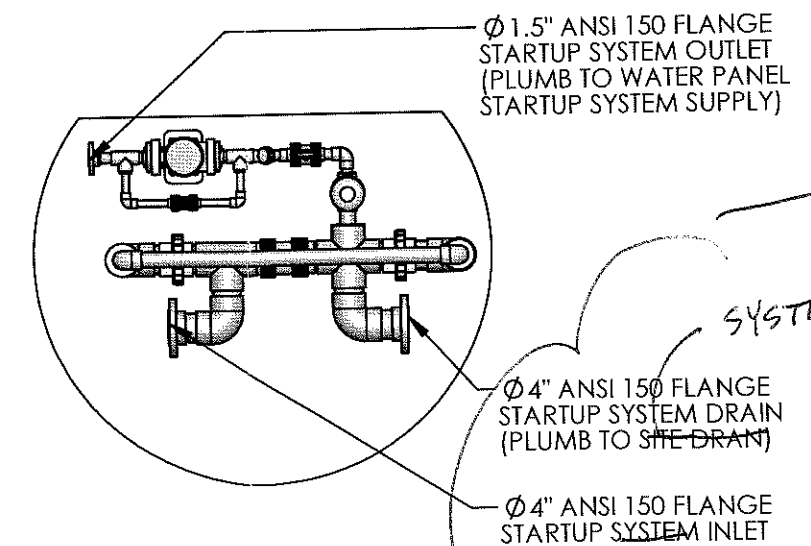
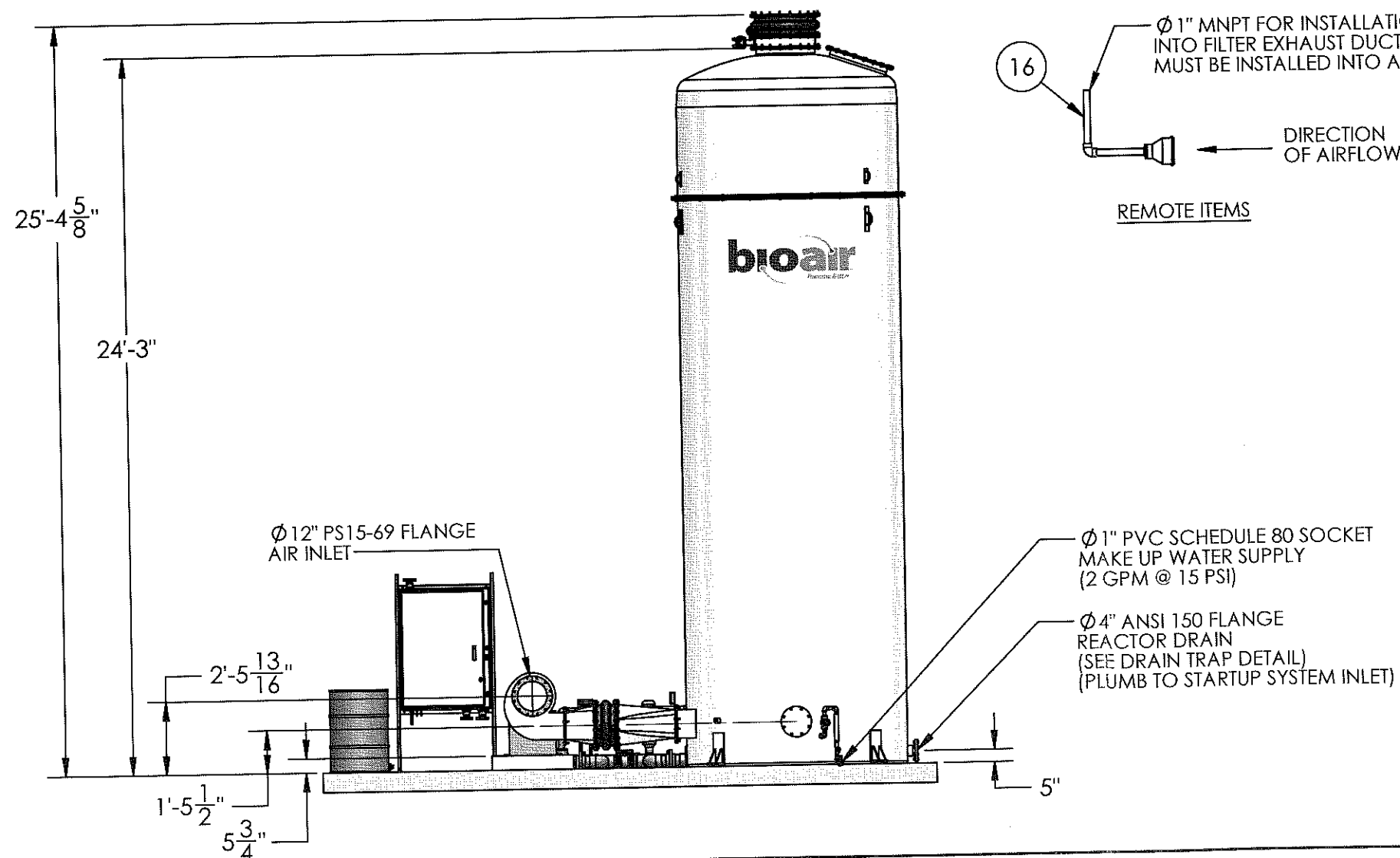
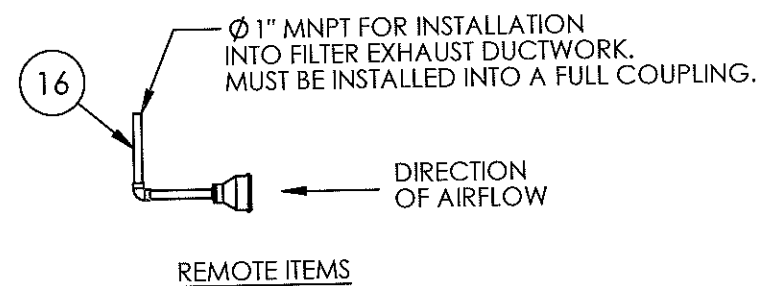
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: ±1° FRACTIONS: ±1/4 TWO PLACE DECIMAL: ±.060 THREE PLACE DECIMAL: ±.030	SIZE B	DWG. NO. EF84-GA_P1217	REV 0
	SCALE: 1 : 46	SHEET 1 OF 3	



SECTION B-B

SCALE 1 : 29

609-744-9050

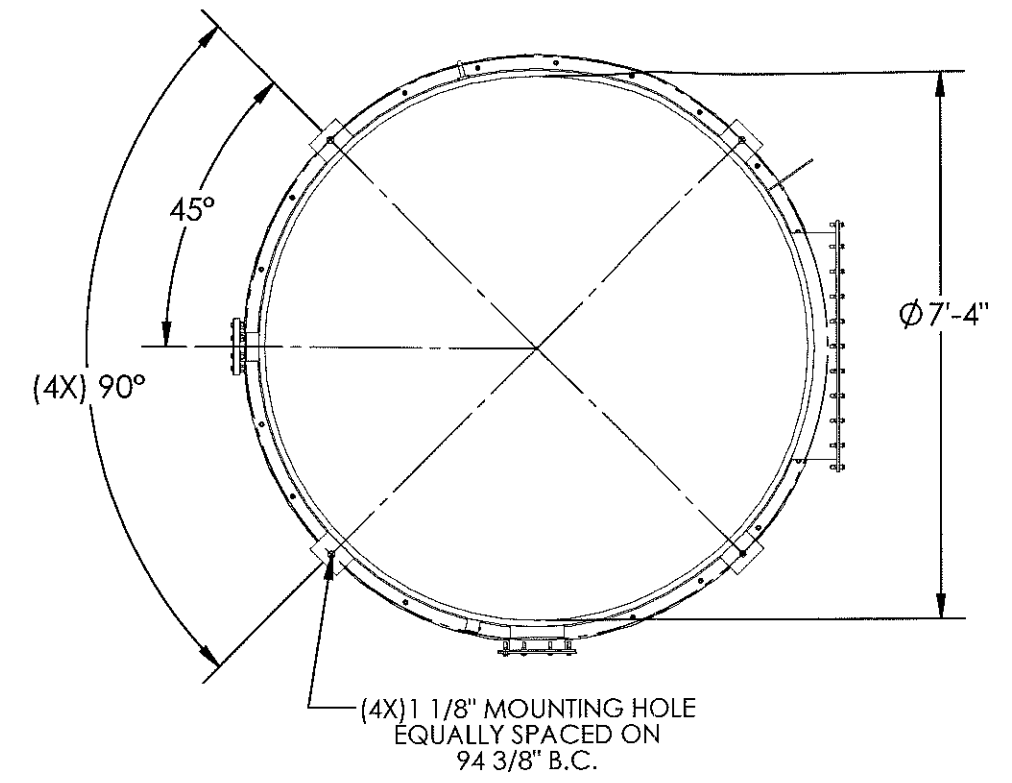
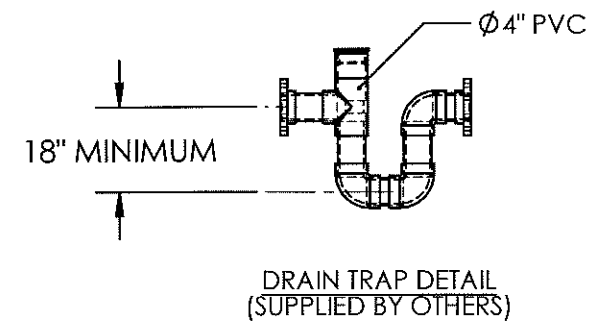


DETAIL C
SCALE 1 : 29

SYSTEM
DRAIN

SIZE	DWG. NO.	REV
B	EF84-GA_P1217	0
SCALE: 1 : 58		SHEET 2 OF 3

- NOTES:
1. FOUNDATION PAD MUST BE FABRICATED UNIFORM IN TEXTURE AND APPEARANCE AND MEET A SURFACE PLANE TOLERANCE OF 1/8" IN 10'
 2. REACTOR TO BE SET ON MINIMUM TWO (2) LAYERS 30LB FELT PAPER
 3. LOAD DISTRIBUTION AREA = 6083 in²
 4. SHIPPING WEIGHT = 5200 LBS, OPERATING WEIGHT = 20700 LBS



LOADING DIAGRAM
SCALE: 1 : 30

SIZE	DWG. NO.	REV
B	EF84-GA_P1217	0
SCALE: 1 : 58		SHEET 3 OF 3



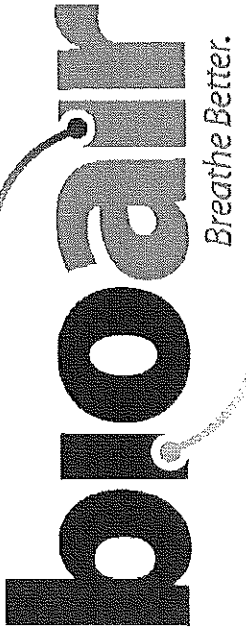
Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

C.2. NAME PLATE DRAWING

REV.	DATE	ECN#	REVISION RECORD	DR CK
A				TT

NOTES:

1. GRAVOGRAPH GRAVOPLY 2 PLY, WHITE SURFACE BLUE CORE.
2. JOB SPECIFIC TEXT TO BE PROVIDED WITH PURCHASE ORDER.
3. LOGO MAY BE ENGRAVED OR PRINTED, ALL TEXT TO BE ENGRAVED.

	
BioAir Solutions, LLC 110 Kresson-Gibbsboro Road Voorhees, NJ 08043	Phone: (856) 258-6969 Fax: (856) 258-6975 www.bioairsolutions.com
Unit Type:	EcoFilter EF84
Serial Number:	0912-0037
Project Number:	P1217
Location:	Englewood Water District Water Reclamation Facility Englewood, FL
U.S. Provisional Patent #61/106,467 Trespassing, tampering, and unauthorized inspection are prohibited.	
8"	

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MATERIAL	SEE NOTE #1
FINISH	
DRAWN BY	DATE
RK	08/30/2012
ENG APPR.	DATE
QC APPR.	DATE
PART NAME	
8" X 8" ABS NAME PLATE	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	SIZE DWG. NO.
TOLERANCES ARE:	A NP880002_P1215
ANGULAR: ±1°	
FRACTIONS: ±1/4	
TWO PLACE DECIMAL: ±.060	
THREE PLACE DECIMAL: ±.030	
SCALE: 1:2	SHEET 1 OF 1



Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

D. MECHANICAL EQUIPMENT

D.1. MECHANICAL BILL OF MATERIAL

D.2. ECOFILTER® REACTOR

D.3. WATER PANEL

D.4. BLOWER

D.5. STARTUP SYSTEM

D.6. INTERCONNECTING DUCTWORK

D.7. OTHER



Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

D.1. MECHANICAL BILL OF MATERIAL

P1217 - ENGLEWOOD WD - BILL OF MATERIALS - EF84				
ITEM	PART NUMBER	QTY	DESCRIPTION	REFERENCE
1	RA084000_P1217	1	EF84 REACTOR ASSEMBLY WITH Ø4" ANSI DRAIN	SECTION D.2
2	NA241500	1	NOZZLE ASSY Ø1-1/2" ANSI 150, PP	SECTION D.7
3	FC240000	1	EPDM FLEX CONNECTOR SINGLE ARCH Ø24" PS15-69	SECTION D.6
4	TP163600	1	FRP RECT TRANSITION Ø16" PS15-69 X 36"x11"	SECTION D.6
5	FC160000	1	FLEX CONNECTOR SINGLE ARCH Ø16" PS15-69	SECTION D.6
6	BT161200	1	FRP RECT TRANSITION Ø16" PS15-69 X CMHB-12	SECTION D.6
7	BL012000_P1217	1	VERANTIS CMHB-12, ARRANGEMENT 10, CW, BOTTOM HORIZONTAL, 10HP MOTOR	SECTION D.4
8	2020	1	DWYER DIFFERENTIAL PRESSURE GAGE 0" - 20" W.C.	SECTION F.2
9	SW0000100	1	DIFFERENTIAL PRESSURE GAUGE MOUNTING BRACKET	SECTION D.7
10	PS0000100	1	316 STAINLESS STEEL PANEL STAND	
11	WP151000_P1217	1	304 STAINLESS STEEL WATER PANEL Ø1 1/2" ANSI 150	SECTION D.3
12	CD1217	1	304 STAINLESS STEEL ELECTRICAL CONTROL PANEL	SECTION E
13	NB550100	1	NUTRIENT BARREL ASSEMBLY 55GAL	SECTION D.7
14	RS000750_P1217	1	STARTUP SYSTEM Ø2" ANSI 150	SECTION D.5
15	MW0000215	1	MAKEUP WATER INLET ASSEMBLY	SECTION D.5
16	AS101200	1	Ø1" AIR SAMPLING SYSTEM	SECTION D.7

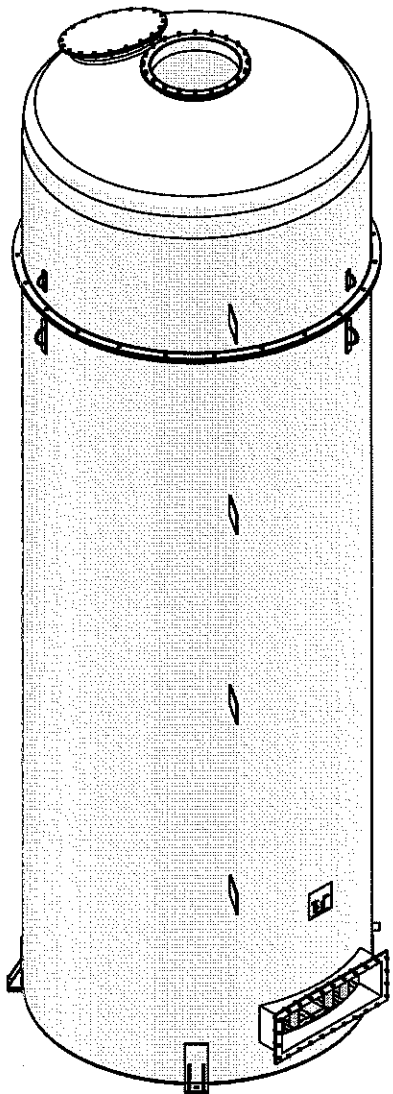
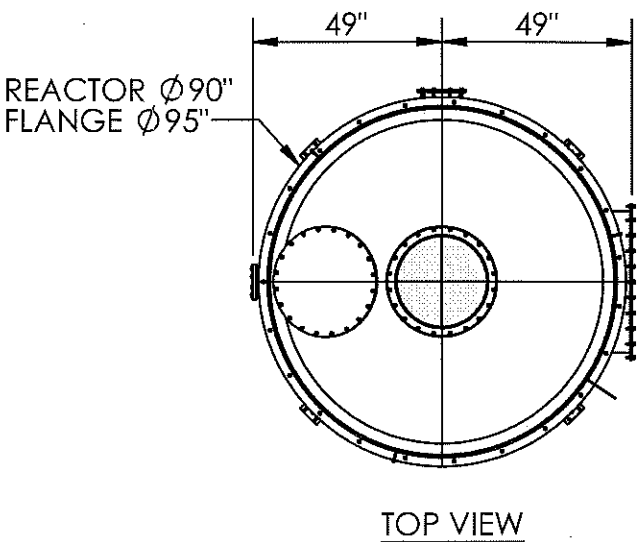
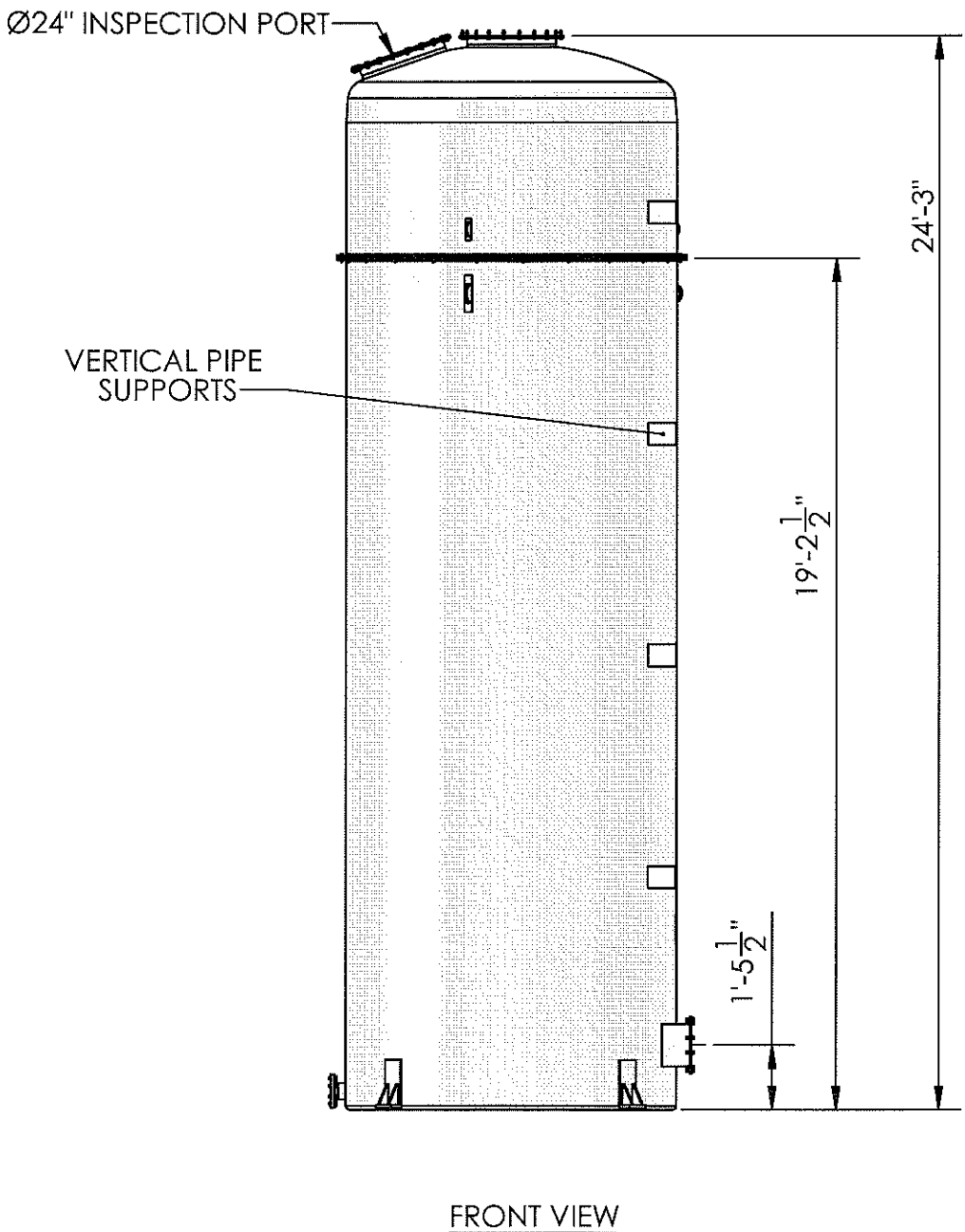


Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

D.2. ECOFILTER® REACTOR VESSEL

NOTES:

1. REACTOR MEETS DESIGN STRENGTH INTENT OF ASTM D3299
2. REACTOR RESIN: AOC VIPEL K022-ACA-00, PREMIUM VINYL ESTER
3. 100 MIL CORROSION BARRIER
4. EXTERIOR TOP COAT: CCP BASE WHITE W005 GEL COAT, ISOPHTHALIC RESIN BASE WITH UV RESISTANT PIGMENT
5. WIND SPEED: IN ACCORDANCE WITH ASCE 7, 130MPH, 3 SECOND GUSTS EXPOSURE C.
6. PRESSURE RATING: +14" W.C.
7. SHIPPING WEIGHT = 5200 LBS, OPERATING WEIGHT = 20700 LBS



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MATERIAL SEE TABLE					
FINISH CCP BASE WHITE W005 GEL COAT					
DRAWN BY KZ	DATE 08/15/2012	ENG APPR.	DATE	QC APPR.	DATE
PART NAME ECOFILTER EF84 FRP REACTOR ASSEMBLY					
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: ±1° FRACTIONS: ±1/4 TWO PLACE DECIMAL: ±.060 THREE PLACE DECIMAL: ±.030	SIZE B	DWG. NO. RA084000_P1217			REV A
	SCALE: 1 : 48			SHEET 1 OF 1	

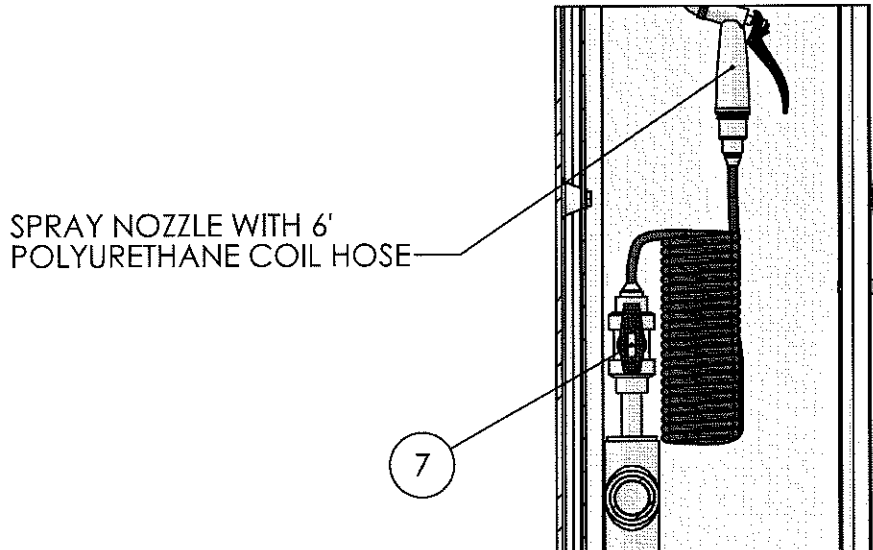
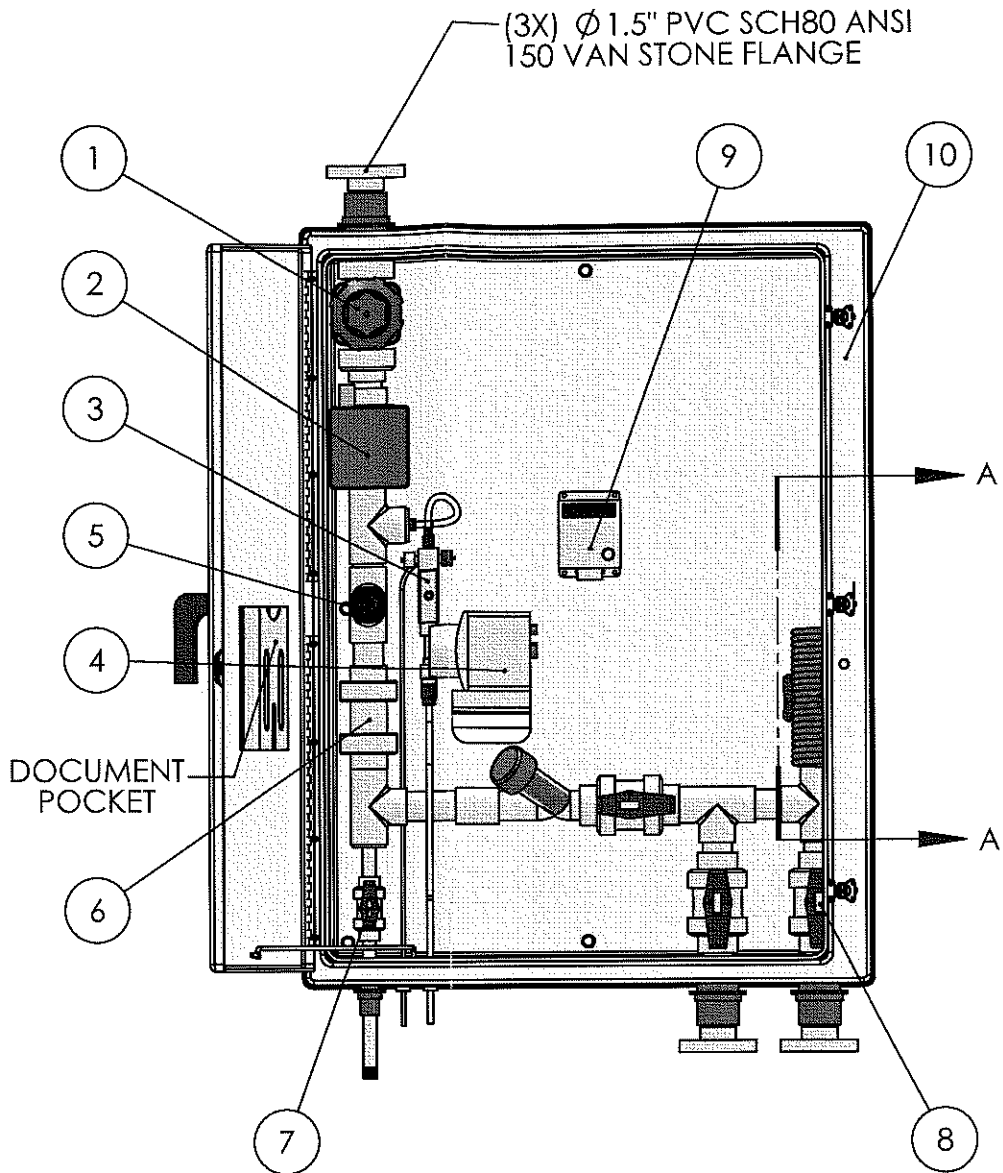


Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

D.3. WATER PANEL

ITEM	DESCRIPTION	QTY	VENDOR	PART NUMBER	DATA SHEET PAGE NUMBER
1	Ø1.5" DIAPHRAGM VALVE, SCH80 PVC, EPDM SEALS, SOCKET ENDS	1	GEORG FISCHER	161.514.616	1
2	Ø1.5" AUTOMATIC BALL VALVE, SCH80 PVC, EPDM SEALS, SOCKET ENDS	1	GEORG FISCHER	199.107.207	3
3	DIGIPULSE FLOW MONITOR	1	LMI	FM-PRO	5
4	SERIES P03 ELECTRONIC METERING PUMP 120VAC WITH 4 FUNCT VALVE & TUBING	1	LMI	P031-398-SI	8
5	PADDLEWHEEL WATER FLOW SENSOR PULSE OUTPUT 3-2536-P0	1	GEORG FISCHER	198.840.143	11
6	Ø1.5" PVC SCH80 CHECK VALVE TRUE UNION SOCKET ENDS	1	GEORG FISCHER	161.360.566	16
7	Ø1/2" BALL VALVE TYPE 546 PVC SCH80 EPDM SEALS SOCKET ENDS	1	GEORG FISCHER	161.546.342	18
8	Ø1.5" BALL VALVE TYPE 546, SCH80 PVC, EPDM SEALS, SOCKET ENDS	3	GEORG FISCHER	161.546.346	18
9	200W PANEL HEATER 115VAC	1	HOFFMAN	DAH2001A	20
10	48x36x12 304SS, NEMA 4X ENCLOSURE	1	SAGINAW	SCE-48EL3612SSLPPL	23

FOR SUBMITTAL ONLY



SECTION A-A
SCALE 1 : 8

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MATERIAL
SEE TABLE

FINISH

DRAWN BY: RK DATE: 10/24/2012 ENG APPR. DATE QC APPR. DATE

PART NAME
304 STAINLESS STEEL WATER PANEL Ø 1 1/2" ANSI 150

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
ANGULAR: ±1°
FRACTIONS: ±1/4
TWO PLACE DECIMAL: ±.060
THREE PLACE DECIMAL: ±.030

SIZE: **B** DWG. NO.: **WP151000_P1217** REV: **A**

SCALE: 1 : 12 SHEET 1 OF 1

bioair
Breathe Better.

Component Specification

Manufacturer	GEORG FISCHER
Part Number	161.514.616
Description	1½" BALL VALVE PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

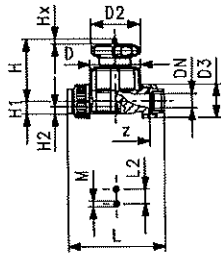
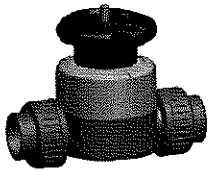
Manufacturer	
Part Number	
Description	

GF Piping Systems Datasheet

valid from
11/16/10

Diaphragm Valves New Generation

Type 514 Diaphragm Valve PVC With solvent cement sockets ASTM



Model:

- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Handwheel with built-in locking mechanism
- Designed for easy installation and removal
- Short overall length

Option:

- Contact customer service for customization
- Self adjusting multifunctional module with integrated limit switches
- PN16 available as a configuration

Size	DN [mm]	PSI	Cv-value [gal (US) /min]	EPDM Part No.	PTFE/EPDM Part No.	lbs
1/2	15	150	33.02	161 514 612	161 514 632	0.408
3/4	20	150	71.60	161 514 613	161 514 633	0.540
1	25	150	127.08	161 514 614	161 514 634	1.185
1 1/4	32	150	200.53	161 514 615	161 514 635	1.447
1 1/2	40	150	333.68	161 514 616	161 514 636	2.572
2	50	150	456.54	161 514 617	161 514 637	3.445

Size	D [inch]	D2 [inch]	D3 [inch]	L [inch]	L2 [inch]	H [inch]	H1 [inch]	H2 [inch]	M	z [inch]	Lift = Hx [inch]
1/2	2.56	2.56	1.69	5.55	0.98	2.87	0.55	0.47	M6	3.78	0.28
3/4	3.15	2.56	2.01	6.50	0.98	3.19	0.71	0.47	M6	4.49	0.39
1	3.46	3.43	2.28	7.05	0.98	4.21	0.87	0.47	M6	4.80	0.51
1 1/4	3.98	3.43	2.83	8.03	1.77	4.53	1.02	0.59	M8	5.51	0.59
1 1/2	4.61	5.31	3.27	9.06	1.77	5.83	1.26	0.59	M8	6.30	0.75
2	5.67	5.31	3.94	10.55	1.77	6.54	1.54	0.59	M8	7.48	0.98

The technical data are not binding and not expressly warranted characteristics of the goods. They are subject to change. Our General Conditions of Sale apply.

Georg Fischer Piping Systems Ltd, Postfach, CH-8201 Schaffhausen/Switzerland Phone +41 -(0)52-631 1111 e-mail: info.ps@georgfischer.com Internet: <http://www.piping.georgfischer.com>

Component Specification

Manufacturer	GEORG FISCHER
Part Number	199.107.207
Description	1.5" AUTOMATIC BALL VALVE PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

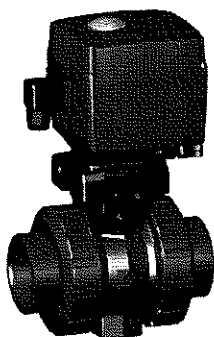
Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

GF Piping Systems Datasheet

valid from:
2/23/08

Ball Valves Electric



Type 107 Electrically Actuated Ball Valve PVC Solvent cement socket/Threaded NPT/Manual override standard

Model:

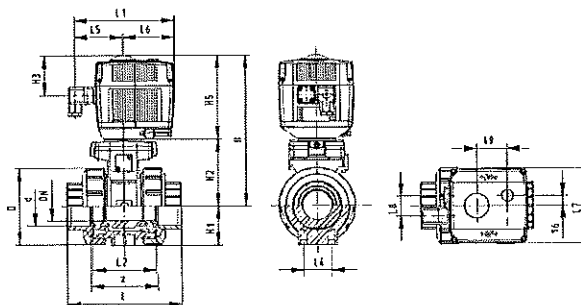
- Built on with electric actuator EA11
- For easy installation and removal
- Integrated stainless steel mounting inserts
- Voltage 100-230 V, 50-60 Hz
- Control range 90°<
- Control time 5 s/90°<

Option:

- Individual configuration of the valve (see form)

Size	DN [mm]	PN	Cv-value [gal (US) /min]	EPDM Part No.	FPM Part No.	lbs
3/8	10	150	5	199 107 202	199 107 212	4.630
1/2	15	150	13	199 107 203	199 107 213	4.630
3/4	20	150	25	199 107 204	199 107 214	4.850
1	25	150	49	199 107 205	199 107 215	5.071
1 1/4	32	150	70	199 107 206	199 107 216	5.732
1 1/2	40	150	112	199 107 207	199 107 217	6.614
2	50	150	217	199 107 208	199 107 218	8.377

Size	D [inch]	H [inch]	H1 [inch]	H2 [inch]	H3 [inch]	H5 [inch]	L [inch]	L1 [inch]	L2 [inch]	L4 [inch]	L5 [inch]	L6 [inch]	L7 [inch]	L8 [inch]	z [inch]
3/8	1.97	7.87	1.06	2.52	2.52	5.39	4.13	6.34	2.20	0.98	3.03	3.27	4.80	1.30	2.64
1/2	1.97	7.87	1.06	2.52	2.52	5.39	4.13	6.34	2.20	0.98	3.03	3.27	4.80	1.30	2.40
3/4	2.28	8.23	1.18	2.87	2.52	5.39	4.76	6.34	2.56	0.98	3.03	3.27	4.80	1.30	2.76
1	2.68	8.23	1.42	2.87	2.52	5.39	5.24	6.34	2.80	0.98	3.03	3.27	4.80	1.30	2.99
1 1/4	3.31	8.66	1.73	3.31	2.52	5.39	6.06	6.34	3.35	1.77	3.03	3.27	4.80	1.30	3.54
1 1/2	3.82	8.66	2.01	3.31	2.52	5.39	6.46	6.34	3.50	1.77	3.03	3.27	4.80	1.30	3.70
2	4.88	9.57	2.52	4.17	2.52	5.39	7.20	6.34	3.98	1.77	3.03	3.27	4.80	1.30	4.21



The technical data are not binding and not expressly warranted characteristics of the goods. They are subject to change. Our General Conditions of Sale apply.

Georg Fischer Rohrleitungssysteme AG, Postfach, CH-8201 Schaffhausen/Switzerland

Component Specification

Manufacturer	LMI
Part Number	FM-PRO
Description	DIGIPULSE FLOW MONITOR

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

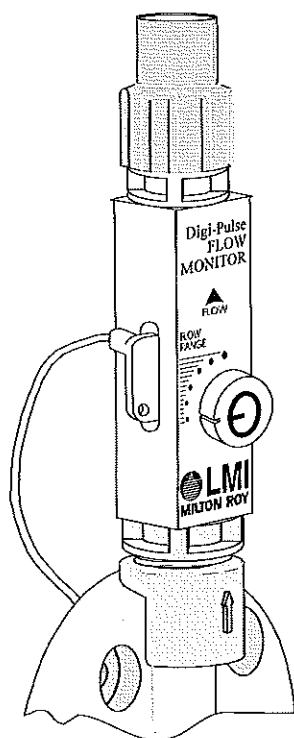
Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Information Sheet

Digi-Pulse™ Flow Monitor Series FM-PRO

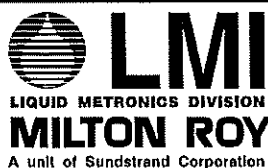


- Corrosion resistant UHMW PE
- Senses pulsating metering pump flow
- Adjustable, in-line
- Flow range: ml/stroke Max. LMI Pump Output
 0.05 - 5.0 7.9 GPH (30.0 l/h)
- Usable as Adjustable Flow Switch for non-pulsating flow
- Economical

Pulsating flow of your pump can be monitored and transmitted using the LMI Digi-Pulse™ Flow Monitor. Designed to electrically signal a low flow or no flow condition, you can be assured of your pumping performance; an advantage when working with pulsating or very low flows. A transmitter can be connected to a remote counting or recording device. The FM-PRO-9 transmitter is wired to be plugged directly into the receptacle, mounted in the Series A9 pump housing. The Digi-Pulse™ Flow Monitor is adjustable to any desired pulsating flow rate within its range.

SPECIFICATIONS		
Flow Range	ml/stroke	Max. LMI pump output
	0.05 - 5.0	7.9 GPH (30.0 l/h)
Max. Pulse (stroke) Rate	100 per minute	
Max. Pressure	150 psi (10 Bar)	
Transmitter	Reed Switch (No Flow = N.O. Switch Condition) Polarity Independent Minimum pulse width 15 msec	
Max. Load	100 mA AC or DC, 36V max.	
Cable Length	10 ft (3 m) (except FM-PRO-9) FM-PRO-9: Cable Length 20" (0.5 m)	
Body Material	UHMW PE (ultra high molecular weight polyethylene)	
Valve Fitting Material	Carbon Fiber Reinforced PVDF (where supplied)	
Seals & O-Rings	Polyprel® (TFE copolymer)	

CONFIGURATIONS	
Model No.	Connection
FM- PRO	Supplied without valve fitting (for use w/ 3FV's or 4FV's)
FM-PRO-9	Supplied without valve fitting (for use with w/ 3FV's or 4FV's and Series A9 pump)
FM -PRO1	Supplied w/ PVDF valve connection for 1/4" OD tubing
FM -PRO2	Supplied w/ PVDF valve connection for 3/8" OD tubing
FM -PRO3	Supplied w/ PVDF valve connection for 1/2" OD tubing (or 9 x 12 mm)
FM -PRO4	Supplied w/ 1/4" NPT male PVDF valve housing
FM -PRO5	Supplied w/ 1/4" OD fitting and Metric Tubing Adapter Kit for: 3 x 6 mm PE Tubing; or 4 x 6 mm PE Tubing
FM -PRO6	Supplied w/ 3/8" OD fitting and Metric Tubing Adapter Kit for: 6 x 8 mm PE Tubing; or 6 x 12 mm PE Tubing



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Instruction Sheet

Digi-Pulse™ Flow Monitor Series FM-PRO

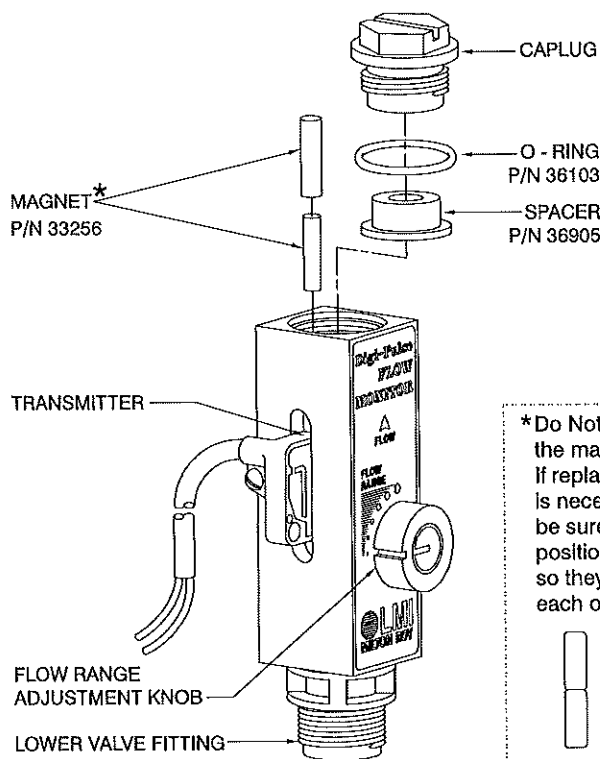
1. With your pump turned off, screw the lower valve fitting of the Digi-Pulse™ Flow Monitor to the discharge side of the pump head.
2. Remove the red Caplug from the top of the Digi-Pulse™. **Be sure to save the O-ring seal and spacer.** Attach your 3FV or 4FV to the top of the Digi-Pulse™.
3. Connect the Digi-Pulse™ cable to your counter, computer, or other recording device (polarity is not critical). If cable extension is desired, consult factory. Plug the FM-PRO-9 cable directly into the receptacle in the Series A9 pump housing.
4. Loosen the locknut of the flow-range knob of the flow monitor and set the knob to the largest dot. Start the pump and adjust it (calibrate, if necessary) for proper output to satisfy your system requirements.
5. With the pump running, gradually turn the adjustment knob of the flow monitor counter-clockwise ↺ until the sensor just begins to trigger your electronic device. This will be the most sensitive setting of the Digi-Pulse™, given your pump setting and fluid properties. Every stroke of the pump will output enough volume of solution to cause the Digi-Pulse™ flow monitor to register a pulse. If the flow drops below the initial pump setting, the Digi-Pulse™ will no longer register strokes to your electronics, indicating some type of pump failure or low-level condition.
6. Tighten the adjustment locknut without altering the adjustment position.

Note:

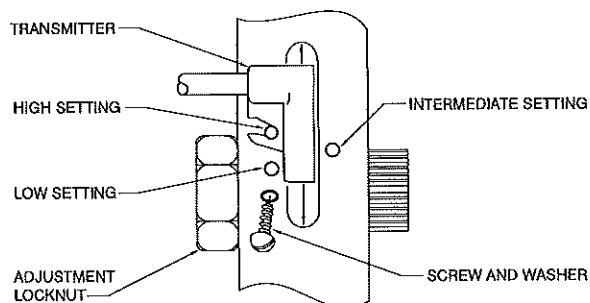
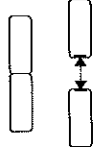
After the initial pump and Digi-Pulse™ setup is complete, any adjustment of the stroke length of the pump (output per stroke) will require a readjustment of the Digi-Pulse™ flow monitor (repeat steps 4 - 6 above).

To change the flow range setting:

A set screw holds the transmitter body in a notch on the side of the flow monitor. Remove the screw and washer and slide or turn the transmitter 180° to an alternate position and tighten the screw and washer in the hole to secure the transmitter. The Digi-Pulse™ Flow Monitor comes factory set at the "LOW" setting which should accommodate most applications. However, the "INTERMEDIATE" or "HIGH" settings may be appropriate for a particular application if the sensor does not trigger in the "LOW" setting.



*Do Not remove the magnets. If replacement is necessary, be sure to position them so they repel each other.



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Digi-Pulse is a trademark of Liquid Metronics, Inc. 6
Polyprel is a registered trademark of Liquid Metronics, Inc.

1865.A 7/97

Component Specification

Manufacturer	LMI
Part Number	P031-398-SI
Description	SERIES P ELECTRONIC METERING PUMP 120VAC WITH 4 FUNCTION VALVE AND TUBING

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Data Sheet

Configuration Data

Model **P14** **1** - **358SI**

Series P

Electronic Metering Pumps

Manual Control

Speed (stroking frequency) fixed and stroke length manually adjustable.

P02 --- 0.20 GPH (0.79 l/h) --- 150 psi (10.3 Bar)
 P03 --- 0.42 GPH (1.6 l/h) --- 110 psi (7.6 Bar)
 P04 --- 0.58 GPH (2.2 l/h) --- 250 psi (17.3 Bar)
 P05 --- 1.00 GPH (3.8 l/h) --- 110 psi (7.6 Bar)
 P06 --- 2.00 GPH (7.6 l/h) --- 50 psi (3.5 Bar)
 P08 --- 3.20 GPH (12.1 l/h) --- 22 psi (1.5 Bar)

Dual Manual Control

Speed (stroking frequency) and stroke length manually adjustable.

P12 --- 0.20 GPH (0.79 l/h) --- 150 psi (10.3 Bar)
 P13 --- 0.42 GPH (1.6 l/h) --- 110 psi (7.6 Bar)
 P14 --- 0.58 GPH (2.2 l/h) --- 250 psi (17.3 Bar)
 P15 --- 1.00 GPH (3.8 l/h) --- 110 psi (7.6 Bar)
 P16 --- 2.00 GPH (7.6 l/h) --- 50 psi (3.5 Bar)
 P18 --- 3.20 GPH (12.1 l/h) --- 22 psi (1.5 Bar)

Instrument Responsive / Manual

Manual adjustment features of Series P1 plus switch conversion to external control for automatic systems.

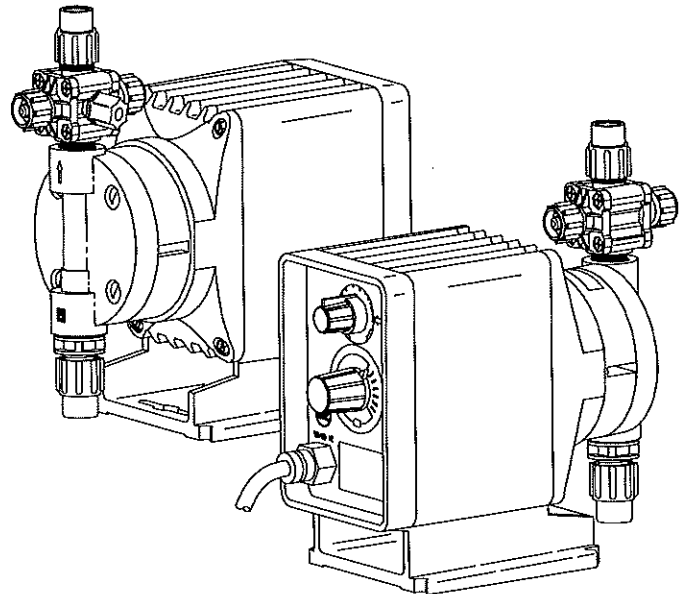
P74 --- 0.58 GPH (2.2 l/h) --- 250 psi (17.3 Bar)
 P75 --- 1.00 GPH (3.8 l/h) --- 110 psi (7.6 Bar)
 P76 --- 2.00 GPH (7.6 l/h) --- 50 psi (3.5 Bar)
 P78 --- 3.20 GPH (12.1 l/h) --- 22 psi (1.5 Bar)

Voltage Code

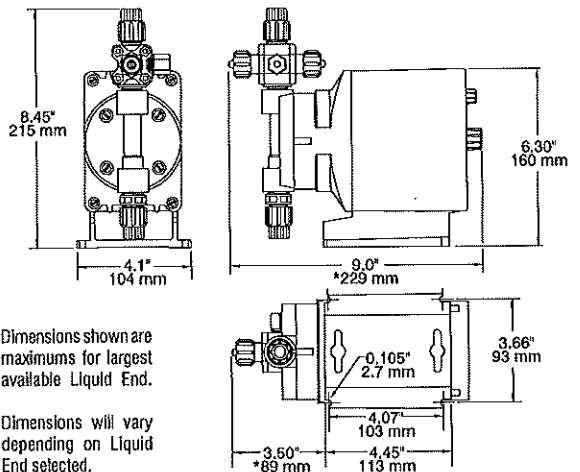
1 ----- 120 VAC US Plug
 2 ----- 240 VAC US Plug
 3 ----- 220-240 VAC DIN Plug
 5 ----- 240-250 VAC, UK Plug
 6 ----- 240-250 VAC, Aust./NZ Plug
 7 ----- 220 VAC, Swiss Plug

Liquid End

See next page for complete liquid end specifications and selection.



Dimensions



Specifications

Series	Strokes Per Minute (Adjustable) Min Max	Stroke Length (Adjustable) Recommended Minimum	Average Input Power @ Max Speed	Shipping Weight
P02, P03	fixed - 60	30%	22 watts	7.6 lbs (3.5 kg)
P04, P05				
P06, P08	fixed - 100	20%		
P12, P13	.6 60	30%		
P14, P74				
P15, P75	1 100	20%		
P16, P76				
P18, P78				



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Configuration Data & Materials of Construction

Drive Assembly	Liquid End No.	Size Code	Materials of Construction				Accessory	Tubing & Connections	
			Head & Fittings	Balls	Liquifram™	Check Valve		Discharge	Suction
P02□- P04□- P12□- P14□- P74□-	458SI†	0.5	PVC / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .250" O.D.	
	450SI†	0.5	Acrylic / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .250" O.D.	
	450FI†	0.5	Acrylic / PVC	PTFE	Fluorofilm™	PVDF / Polyprel®	4FV	PE .250" O.D.	
	358SI†	0.5	PVC / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .250" O.D.	
	353SI†	0.5	PVDF / PVDF	Ceramic	Fluorofilm™	PVDF / PTFE	4FV	PE .250" O.D.	
	352SI†	0.5	PVDF / PVDF	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .250" O.D.	
	156HV	0.5	Acrylic / PP	316 S.S.	Fluorofilm™	Hypalon®		PE .5" O.D. Vinyl .938" O.D.	
P03□- P05□- P13□- P15□- P75□-	155HV	0.5	Polypropylene	316 S.S.	Fluorofilm™	PTFE		PE .5" O.D. Vinyl .938" O.D.	
	257	0.5	316 S.S.	316 S.S.	Fluorofilm™	316 S.S.		Pipe 1/4" NPT M	
	498SI†	0.9	PVC / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	490SI†	0.9	Acrylic / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	490FI†	0.9	Acrylic / PVC	PTFE	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	398SI†	0.9	PVC / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	393SI†	0.9	PVDF / PVDF	Ceramic	Fluorofilm™	PVDF / PTFE	4FV	PE .375" O.D.	
P06□- P08□- P16□- P18□- P76□- P78□-	392SI†	0.9	PVDF / PVDF	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	86HV	0.9	Acrylic / PP	316 S.S.	Fluorofilm™	Hypalon®		PE .5" O.D. Vinyl .938" O.D.	
	85HV	0.9	Polypropylene	316 S.S.	Fluorofilm™	PTFE		PE .5" O.D. Vinyl .938" O.D.	
	297	0.9	316 S.S.	316 S.S.	Fluorofilm™	316 S.S.		Pipe 1/4" NPT M	
	468SI†	1.8	PVC / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	460SI†	1.8	Acrylic / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	460FI†	1.8	Acrylic / PVC	PTFE	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
P12□- P14□- P74□-	368SI†	1.8	PVC / PVC	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	363SI†	1.8	PVDF / PVDF	Ceramic	Fluorofilm™	PVDF / PTFE	4FV	PE .375" O.D.	
	362SI†	1.8	PVDF / PVDF	Ceramic	Fluorofilm™	PVDF / Polyprel®	4FV	PE .375" O.D.	
	76HV	1.8	Acrylic / PP	316 S.S.	Fluorofilm™	Hypalon®		PE .5" O.D. Vinyl .938" O.D.	
	75HV	1.8	Polypropylene	316 S.S.	Fluorofilm™	PTFE		PE .5" O.D. Vinyl .938" O.D.	
	277	1.8	316 S.S.	316 S.S.	Fluorofilm™	316 S.S.		Pipe 1/4" NPT M	

□ See front page for voltage code specifications.

3FV Indicates that the pump is equipped with an LMI Three Function Valve (pressure relief, priming aid, line drain).

Fluorofilm™ is a copolymer of PTFE and PFA.
Polyprel® is an elastomeric PTFE copolymer.

† To specify 1/4" NPT male, change 'I' to 'P'. To specify black, UV resistant tubing, change 'I' to 'U'. To specify Bleed 4FV, change 'S' to 'B'. To specify 3FV, change 'S' to 'I'.

4FV Indicates that the pump is equipped with an LMI Four Function Valve. This diaphragm type, anti-syphon/pressure relief valve is installed on the pump head. It provides anti-syphon protection and aids in priming, even under pressure.

Polyprel is a registered trademark of Liquid Metronics Incorporated. Fluorofilm and Liquifram are trademarks of Liquid Metronics Incorporated. Hypalon is a registered trademark of E. I. du Pont de Nemours & Co., Inc.

Output Information

Series	Gallons per Hour		Liters per Hour		mL/cc per Minute		mL/cc per Stroke		Maximum Injection Pressure
	Min	Max	Min	Max	Min	Max	Min	Max	
P02	0.063	0.21	0.237	0.79	3.94	13	0.07	0.22	150 psi (10.3 Bar)
P03	0.125	0.42	0.473	1.6	7.89	26	0.13	0.44	110 psi (7.6 Bar)
P04	0.117	0.58	0.442	2.2	7.36	37	0.07	0.37	250 psi (17.3 Bar)
P05	0.200	1.0	0.757	3.8	12.62	63	0.13	0.63	110 psi (7.6 Bar)
P06	0.400	2.0	1.510	7.6	25.23	126	0.25	1.26	50 psi (3.5 Bar)
P08	0.640	3.2	2.422	12.1	40.37	202	0.40	2.02	22 psi (1.5 Bar)
P12	0.001	0.21	0.002	0.79	0.04	13	0.07	0.22	150 psi (10.3 Bar)
P13	0.001	0.42	0.005	1.6	0.08	27	0.13	0.44	110 psi (7.6 Bar)
P14, P74	0.001	0.58	0.004	2.2	0.07	37	0.07	0.37	250 psi (17.3 Bar)
P15, P75	0.002	1.0	0.008	3.8	0.13	63	0.13	0.63	110 psi (7.6 Bar)
P16, P76	0.004	2.0	0.015	7.6	0.25	126	0.25	1.26	110 psi (7.6 Bar)
P18, P78	0.006	3.2	0.024	12.1	0.40	202	0.40	2.02	22 psi (1.5 Bar)

Component Specification

Manufacturer	GEORG FISCHER
Part Number	198.840.143
Description	PADDLE WHEEL WATER FLOW SENSOR PULSE OUTPUT 3-2536-P0

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

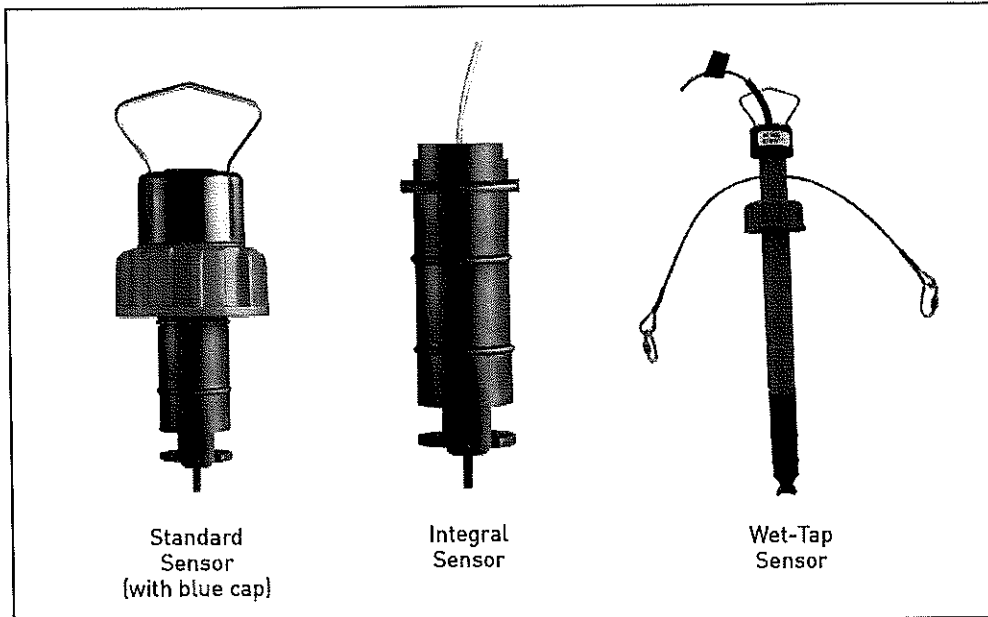
Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Signet 2536 Rotor-X Paddlewheel Flow Sensors

+GF+



Features

- Flow rate range 0.1 to 6 m/s (0.3 to 20ft/s)
- Wide Turndown Ratio of 66:1
- Open-collector output
- Simple , economical design
- Highly repeatable output
- Installs into pipe sizes DN 15 to DN 900 (0.5 to 36 in.)
- High resolution and noise immunity

Description

Simple to install with time-honored reliable performance, Signet 2536 Rotor-X Paddlewheel Flow Sensors are highly repeatable, rugged sensors that offer exceptional value with little or no maintenance. The Model 2536 has a process-ready open collector signal and has a wide dynamic flow range of 0.1 to 6 m/s (0.3 to 20 ft/s). The sensor measures liquid flow rates in full pipes and can be used in low pressure systems.

The Signet 2536 sensors are offered in a variety of materials for a wide range

of pipe sizes and insertion configurations. The many material choices including PP, PVDF, and Tefzel® make this model highly versatile and chemically compatible to many liquid process solutions. Sensors can be installed in DN 15 to DN 900 (0.5 to 36 in.) pipes using Signet's comprehensive line of custom fittings. These custom fittings, which include tees, saddles, and weldolets, seat the sensor to the proper insertion depth into the process flow. The sensors are also offered in configurations for wet-tap installation requirements.

- 7.6m (25 ft.) of cable for standard and Wet-tap sensors
- Chemically resistant materials
- Easy to replace rotor

Applications

- Pure Water Production
- Filtration Systems
- Chemical Production
- Liquid Delivery Systems
- Pump Protection
- Scrubbers/Gas stacks
- Gravity Feed Lines
- Not suitable for gases

CE

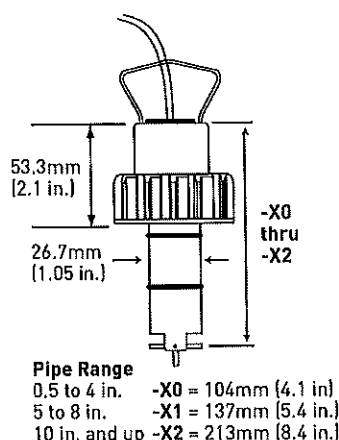
System Overview (For overview of Wet-Tap System see page 20.)

Panel Mount Signet Flow Instrument (sold separately) 8550 5075 8900 5500 5600 	Pipe, Tank, Wall Mount Signet Flow Instrument (sold separately) 8550 	Integral Mount Signet Flow Instrument (sold separately) 8550 
	Signet Universal Adapter Kit (3-8050) (sold separately) 	Signet Integral Adapter Kit (3-8051) (sold separately) 
Signet Model 2536 Standard or Wet-Tap (not shown) Flow Sensor 	Signet Model 2536 Standard or Wet-Tap (not shown) Flow Sensor 	Signet Model 2536 Integral Flow Sensor 
Signet Fittings* (sold separately) 		

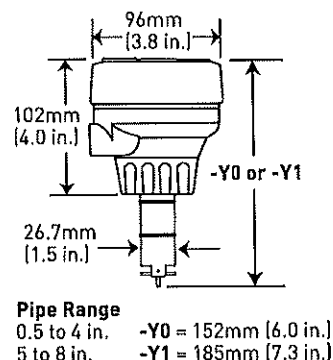
*See Fittings section for more information.

Dimensions

2536 Standard Mount Sensor

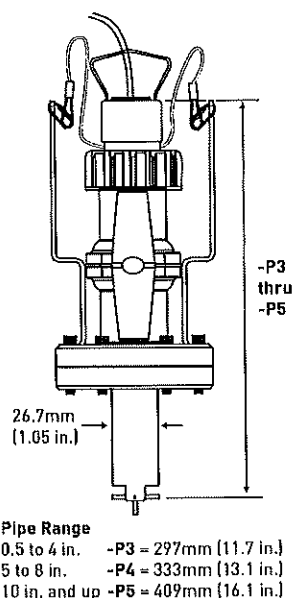


2536 Integral Mount Sensor shown with Transmitter (sold separately)



2536 Wet-Tap Mount Sensor with 3519 Wet-Tap Valve

See 3519 product page for more information.



Specifications

General

Flow Rate Range:
 0.1 to 6 m/s (0.3 to 20 ft./s.)
 Pipe Size Range:
 DN 15 to DN 900 (0.5 to 36 in.)
 Linearity: $\pm 1\%$ of full range
 Repeatability: $\pm 0.5\%$ of full range
 Min. Reynolds Number Required: 4500

Wetted Materials

Sensor Body:
 Glass-filled Polypropylene (black) or PVDF (natural)
 O-rings:
 FPM-Viton® (std)
 optional EPDM or FFPM-Kalrez®
 Rotor Pin:
 Titanium, Hastelloy-C or PVDF; optional ceramic, Tantalum or stainless steel
 Rotor:
 Black PVDF or Natural PVDF; optional Tefzel® with or w/o Fluoroloy B® sleeve

Electrical

Frequency: 49Hz per m/s nominal (15 Hz per ft/s nominal)
 Supply voltage: 3.3 to 24 VDC regulated
 Supply current: <1.5 mA @ 3.3 to 6 VDC
 <20 mA @ 6 to 24 VDC

Output Type:

Open collector transistor, sinking

Output Current: 10 mA max.

Cable Type:

2-conductor twisted pair with shield [22 AWG]

Cable Length:

7.6 m (25 ft.) standard/305 m (1,000 ft.) maximum

Max. Pressure/Temperature Rating

Standard and Integral Sensor

- PP: 12.5 bar @ 20°C, 1.7 bar @ 85°C (180 psi @ 68°F, 25 psi @ 185°F)
- PVDF: 14 bar @ 20°C, 1.7 bar @ 85°C (200 psi @ 68°F, 25 psi @ 185°F)

Operating Temperature:

- PP: -18°C to 85°C (0°F to 185°F)
- PVDF: -18°C to 85°C (0°F to 185°F)

Wet-Tap sensor

PP: 7 bar @ 20°C, 1.4 bar @ 66°C (100 psi @ 68°F, 20 psi @ 150°F)

Operating temperature:

-18°C to 66°C (0°F to 150°F)

Max. wet-tap sensor removal rating:

1.7 bar @ 22°C (25psi @ 72°F)

See Temperature and Pressure graphs for more information.

Shipping Weight:

3-2536-X0	0.454 kg	1 lb.
3-2536-X1	0.476 kg	1.04 lbs.
3-2536-X2	0.680 kg	1.50 lbs.
3-2536-X3	0.794 kg	1.75 lbs.
3-2536-X4	0.850 kg	1.87 lbs.
3-2536-X5	1 kg	2.20 lbs.
3-8512-X0	0.35 kg	0.77 lb.
3-8512-X1	0.37 kg	0.81 lbs.

Standards and Approvals

- CE
- Manufactured under ISO 9001:2000 for Quality and ISO 14001:2004 for Environmental Management

Application Tips:

- Use PVDF Rotor Pin for use in Deionized Water.
- Use the Conduit Adapter Kit to protect the cable-to-sensor connection when used in outdoor environments. See Accessories section for more information.
- Use a sleeved rotor in abrasive liquids to reduce wear.
- Sensor plug is used to plug installation fitting after extraction of sensor from pipe.
- For liquids containing particles, use only the Signet Magmeter.
- For systems with components of more than one material, the maximum temperature/pressure specification must always be referenced to the component with the lowest rating.

Please refer to Wiring, Installation, Accessories and Fittings sections for more information.

Ordering Information

→ Model 2536 Standard Mount Paddlewheel

When choosing this style of sensor, the instrument can be mounted nearby on a pipe or wall or in a remote location up to 305 m/1000 ft (standard cable length is 7.6m/25 ft) by connecting the sensor through a standard junction box. Use Signet fittings for proper seating of the sensor into the process flow.

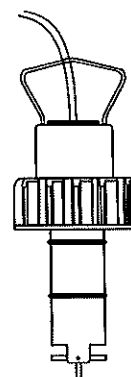
Sensor Part Number			
3-2536 ↓ ↓ ↓	Flow Sensor for use with remote mount instrument		
	Body/Rotor/Pin material-Choose one*		
	P	Polypropylene/Black PVDF/Titanium	
	T	Natural PVDF/Natural PVDF/Natural PVDF ¹	
	V	Natural PVDF/Natural PVDF/Hastelloy C ¹	
	↓ ↓ ↓	Pipe size - Choose one	
		0	0.5 to 4 in.
		1	5 to 8 in.
		2	10 to 36 in.
	3-2536	- P	0

¹ PVDF available 0.5 in. to 4 in. only



Mfr. Part No.*	Code	Mfr. Part No.*	Code
3-2536-P0	198 840 143	3-2536-T0	198 840 149
3-2536-P1	198 840 144	3-2536-V0	198 840 146
3-2536-P2	198 840 145	3-2536-V1	198 840 147

Model 2536 Standard Paddlewheel Flow Sensor



*Model 2536 Ordering Notes:

- 1) Most common part number combinations shown. For all combinations, refer to the Part Number Index.
- 2) Other rotor and pin materials are available and can be easily replaced in the field. See accessories for parts listing.

Model 2536 Integral Mount Paddlewheel

When choosing this style of sensor, the instrument is mounted directly onto the sensor for a local display. See Guidelines below for instructions.

Sensor Part Number			
3-8512	Flow Sensor for integral mounting on the 8150 or 8550 instrument using the 3-8051 adapter (instrument and adapter sold separately)		
	Body/Rotor/Pin material-Choose one*		
	P	Polypropylene/Black PVDF/Titanium	
	T	Natural PVDF/Natural PVDF/Natural PVDF ¹	
	V	Natural PVDF/Natural PVDF/Hastelloy C ¹	
	↓	Pipe size - Choose one	
		0	0.5 to 4 in.
		1	5 to 8 in.
		↓	
	3-8512	- V	0

¹ PVDF available 0.5 in. to 4 in. only

Mfr. Part No.	Code	Mfr. Part No.	Code
3-8512-P0	198 864 513	3-8512-T0	198 864 518
3-8512-P1	198 864 514	3-8512-V0	198 864 516

Model 2536 Integral Mount Paddlewheel Flow Sensor

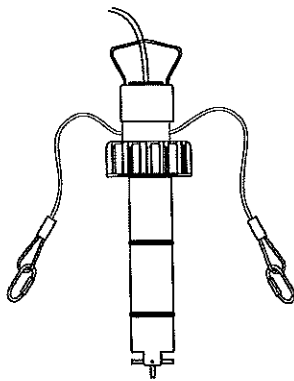


Guidelines: Combining a 2536 integral mount flow sensor with an integrally mounted instrument

Once an integral mount sensor is chosen, it can be mounted directly to an instrument by following these guidelines:

- a) Order the integral adapter kit 3-8051 (sold separately) to connect the sensor to an instrument.
- b) Order an instrument (sold separately). The following instrument part numbers are compatible: 3-8550-1, 3-8550-2, 3-8550-3.
- c) Assembling the sensor with the integral adapter and instrument is quick and simple. These parts can also be ordered as an assembled part. See "Integral Mount" data sheet for more information.

Model 2536 Wet-Tap sensor
with the 3519 Wet-tap valve



*Model 2536 Ordering Notes:

- 1) Most common part number combinations shown. For all combinations, refer to the Part Number Index.
- 2) Other rotor and pin materials are available and can be easily replaced in the field. See accessories for parts listing.

Ordering Information (continued)

Model 2536 Wet-Tap Mount Paddlewheel Flow Sensor

When choosing this style of sensor, the instrument can be mounted nearby on a pipe or wall or in a remote location up to 1000 ft (305 m) by connecting the sensor through a standard junction box. Standard cable length is 7.6m (25 ft). This style of sensor uses the 3519 Wet-Tap valve only (see individual product page for more information).

Sensor Part Number - Choose one			
3-2536	Flow Sensor for wet-tap mounting with the 3519 Wet-Tap Valve (sold separately)		
↓	Body/Rotor/Pin material*		
	P	Polypropylene/Black PVDF/Titanium	
	↓	Pipe size - Choose one	
		3	0.5 to 4 in.
		4	5 to 8 in.
		5	10 to 36 in.
↓			
3-2536	- P	3	Example Part Number

Mfr. Part No.*	Code
3-2536-P3	159 000 758
3-2536-P4	159 000 759
3-2536-P5	159 000 760

Guideline: Combining a 2536 Wet-Tap Sensor with a 3519 Wet-Tap Valve

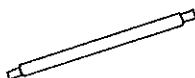
- a) Once a sensor is chosen, it can be mounted in a 3519 Wet-Tap Valve (sold separately)
- b) Assembling a sensor with a 3519 Wet-Tap valve is quick and simple. These parts can also be ordered as complete assemblies. See 3519 product page.

Accessories and Replacement Parts

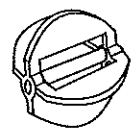
Rotor



Rotor Pin



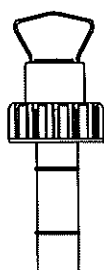
Sleeved Rotor (pin not included)



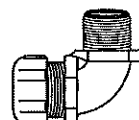
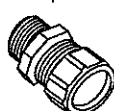
Sensor Cap



Sensor Plug



Conduit
Adapter Kit



Mfr. Part No.	Code	Description
Rotors		
3-2536.320-1	198 820 052	Rotor, PVDF Black
3-2536.320-2	159 000 272	Rotor, PVDF Natural
3-2536.320-3	159 000 273	Rotor, Tefzel®
3-2536.321	198 820 054	Rotor and Pin (matched set), PVDF Natural
3-2536.322-1	198 820 056	Sleeved Rotor, PVDF Black
3-2536.322-2	198 820 057	Sleeved Rotor, PVDF Natural
3-2536.322-3	198 820 058	Sleeved Rotor, Tefzel®
Rotor Pins		
M1546-1	198 801 182	Pin, Titanium
M1546-2	198 801 183	Pin, Hastelloy-C
M1546-3	198 820 014	Pin, Tantalum
M1546-4	198 820 015	Pin, Stainless Steel
P51545	198 820 016	Pin, Ceramic
O-Rings		
1220-0021	198 801 186	O-Ring, FPM-Viton®
1224-0021	198 820 006	O-Ring, EPR
1224-0205	159 000 869	O-Ring, EPDM (Europe Only)
1228-0021	198 820 007	O-Ring, FFPM-Kalrez®
Miscellaneous		
P31536	198 840 201	Sensor Plug, Polypro
P31536-2	159 000 649	Sensor Plug, PVDF
P31542-3	159 000 464	Sensor Cap, Blue
P31934	159 000 466	Conduit Cap
P51589	159 000 476	Conduit Adapter Kit
5523-0222	159 000 392	Cable (per foot), 2 cond. w/shield, 22 AWG
3-8050	159 000 184	Universal Mount Kit
3-8051	159 000 187	Transmitter Integral Adapter

Component Specification

Manufacturer	GEORG FISCHER
Part Number	161.360.566
Description	1 1/2" CHECK VALVE PVC SCHED 80 TRUE UNION SOCKET ENDS

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
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Manufacturer	
Part Number	
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Manufacturer	
Part Number	
Description	

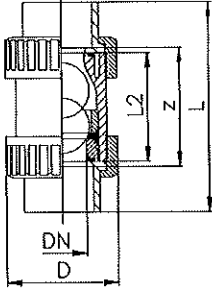
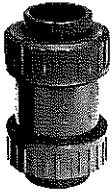
Manufacturer	
Part Number	
Description	

GF Piping Systems Datasheet

valid from:
9/20/07

Ball check valves

Type 360 True Union Ball Check Valve PVC With solvent cement sockets ASTM



Model:

- For easy installation and removal
- Ball is sealing at a minimum water column 2m
- Vibration free even at high flow velocity

Size	DN [mm]	PN	Cv-value [gal (US) /min]	EPDM Part No.	FPM Part No.	lbs/each	z [inch]	D [inch]	L [inch]	L2 [inch]
3/8	10	240	12	161 360 561	161 360 571	0.271	2.91	1.77	4.41	2.48
1/2	15	240	11	161 360 562	161 360 572	0.271	2.64	1.77	4.41	2.48
3/4	20	240	23	161 360 563	161 360 573	0.452	3.15	2.09	5.16	2.95
1	25	240	27	161 360 564	161 360 574	0.701	3.35	2.52	5.59	3.11
1 1/4	32	240	50	161 360 565	161 360 575	1.155	4.02	3.07	6.54	3.50
1 1/2	40	240	63	161 360 566	161 360 576	1.854	3.94	3.62	6.69	3.74
2	50	240	97	161 360 567	161 360 577	3.296	4.88	4.57	7.91	4.53

The technical data are not binding and not expressly warranted characteristics of the goods. They are subject to change. Our General Conditions of Sale apply.

Georg Fischer Rohrleitungssysteme AG, Postfach, CH-8201 Schaffhausen/Switzerland

Component Specification

Manufacturer	GEORG FISCHER
Part Number	161.546.342
Description	1/2" BALL VALVE TYPE 546 PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	GEORG FISCHER
Part Number	161.546.346
Description	1 1/2" BALL VALVE TYPE 546 PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
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Manufacturer	
Part Number	
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Manufacturer	
Part Number	
Description	

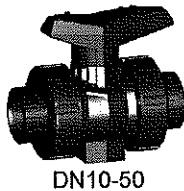
Manufacturer	
Part Number	
Description	

GF Piping Systems Datasheet

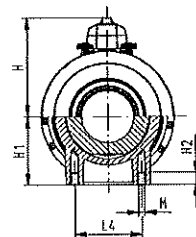
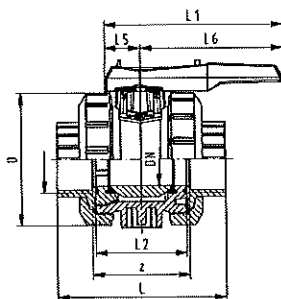
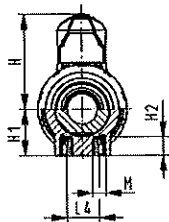
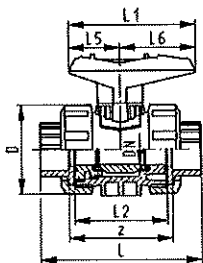
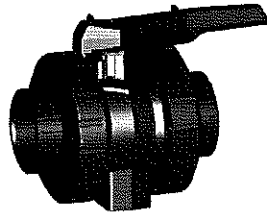
valid from:
7/9/08

Ball valves

Ball Valve Type 546 PVC With Mounting Inserts With solvent cement sockets inch ASTM Inclusive 2 threaded valve ends NPT



DN10-50



Model:

- Designed for easy installation and removal
- z-dimension, valve end and valve nut are **not compatible** with Type 370 and Type 346
- Ball seals PTFE
- Integrated stainless steel mounting inserts
- Threaded valve ends are only enclosed for 3/8" to 2"

Option:

- Contact customer service for customization
- Multifunctional module with integrated limit switches
- Pneumatic or electric actuators from GF

Size	DN [inch]	PN	Cv-value [gal (US) /min]	EPDM Part No.	FPM Part No.	lbs
1/8	0.39	240	5	161 546 341	161 546 351	0.406
1/4	0.59	240	13	161 546 342	161 546 352	0.428
3/8	0.79	240	25	161 546 343	161 546 353	0.648
1/2	0.98	240	49	161 546 344	161 546 354	0.946
3/4	1.26	240	70	161 546 345	161 546 355	1.631
1	1.57	240	112	161 546 346	161 546 356	2.205
1 1/4	1.97	240	217	161 546 347	161 546 357	3.935
2	2.56	240	350	161 546 348	161 546 358	10.803
2 1/2	3.15	240	490	161 546 349	161 546 359	16.314
3	3.94	240	770	161 546 350	161 546 360	25.353

Size	D [inch]	H [inch]	H1 [inch]	H2 [inch]	L [inch]	L1 [inch]	L2 [inch]	L4 [inch]	L5 [inch]	L6 [inch]	M	z [inch]
1/8	1.97	2.24	1.06	0.47	4.13	3.03	2.20	0.98	1.26	1.77	6	2.64
1/4	1.97	2.24	1.06	0.47	4.13	3.03	2.20	0.98	1.26	1.77	6	2.40
3/8	2.28	2.64	1.18	0.47	4.76	3.82	2.56	0.98	1.54	2.28	6	2.76
1/2	2.68	2.87	1.42	0.47	5.24	3.82	2.80	0.98	1.54	2.28	6	2.99
3/4	3.31	3.54	1.73	0.59	6.06	5.04	3.35	1.77	2.13	2.91	8	3.54
1	3.82	3.82	2.01	0.59	6.46	5.04	3.50	1.77	2.13	2.91	8	3.70
1 1/4	4.88	4.57	2.52	0.59	7.20	5.98	3.98	1.77	2.60	3.43	8	4.21
2	6.54	5.87	3.35	0.59	9.17	10.63	5.35	2.76	2.52	8.11	8	5.67
2 1/2	7.87	6.34	4.13	0.59	10.00	10.63	5.55	2.76	2.52	8.11	8	5.94
3	9.37	7.01	4.84	0.87	11.85	12.60	6.46	4.72	2.52	10.08	12	6.85



Component Specification

Manufacturer	HOFFMAN
Part Number	DAH2001A
Description	200W PANEL HEATER 115V

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

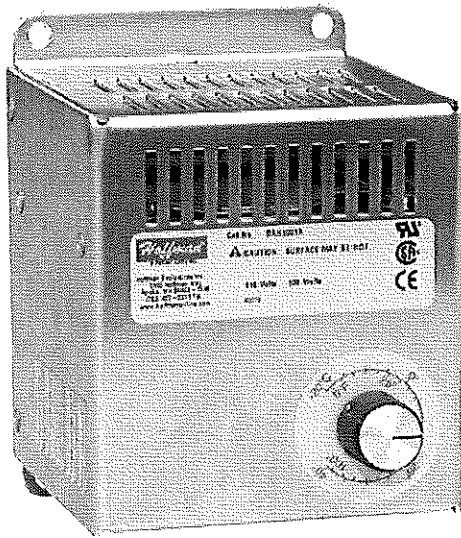
Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
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Manufacturer	
Part Number	
Description	

Electric Heaters

Bulletin
D85



Application

Designed to protect sensitive mechanical, electrical, and electronic equipment from the harmful effects of condensation, corrosion, and low temperatures. Thermostatically-controlled fan-driven heater units maintain a stable temperature within enclosures so critical components can perform more reliably over a longer period of time.

Construction

- Attractive and durable aluminum housing
- Thermostat, standard on all units, is adjustable from 0°F to 100°F (-18°C to 38°C)
- Fan draws cool air from the bottom of the enclosure and passes this air across the thermostat and heating elements before being released into enclosure cavity
- Heated air is discharged through the top of the heater unit
- Four 10-32 self-tapping screws are included with each heater
- Ball bearing fan runs continuously for even temperature distribution
- Terminal strip with clamp connector that accepts both solid and stranded wire

Finish

Brushed aluminum

Industry Standards

UL Component Recognized, UL File No. E61997
CSA Certified, CSA File No. 42186
CE

Standard Sizes Electric Heaters

Catalog Number	Watts	Voltage	Hz	Amps	Weight (lb.)	Weight (kg)
DAH1001A	100	115	50/60	0.98	4.00	181
DAH1002A	100	230	50/60	0.49	4.00	181
DAH2001A	200	115	50/60	1.89	4.00	181
DAH2002A	200	230	50/60	0.95	4.00	181
DAH4001B	400	115	50/60	3.72	6.00	2.72
DAH4002B	400	230	50/60	1.86	6.00	2.72
DAH8001B	800	115	50/60	7.37	6.00	2.72
DAH8002B	800	230	50/60	3.69	6.00	2.72

CAUTION

These electric heaters are not designed for use in dusty, dirty, corrosive, or hazardous locations. Portions of the heater can get hot. Adequate protection must be taken to protect people from potential burns, and to protect other components from this heat. Hoffman recommends this heater only be installed in a totally-enclosed metal enclosure.

DO NOT INSTALL HEATERS ON WOOD PANELS.

Installation

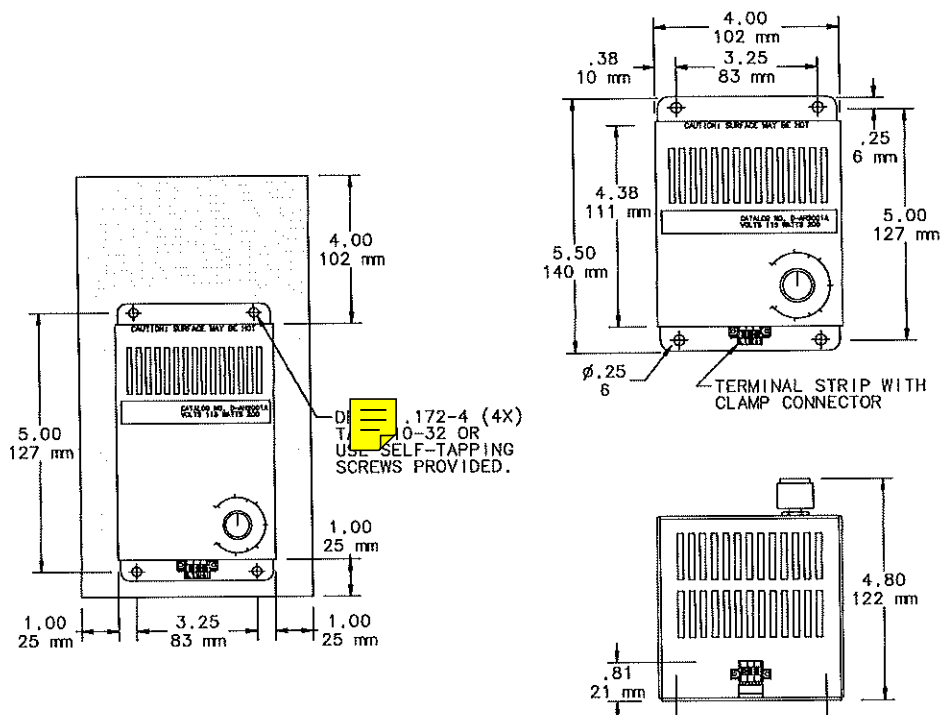
Hoffman electric heaters should be centered as low as possible on an interior enclosure panel. This permits the unit to heat the cool air located at the bottom of the enclosure. For maximum efficiency and longevity, the heater should be mounted in a vertical position with the terminal block to the bottom and the air outlet openings at the top in a sealed enclosure free from dust or debris. However, the unit will also effectively distribute heat if turned 90 degrees. Although enclosure panels are preferable, heaters may be installed on any flat sheet metal surface.

DO NOT INSTALL HEATERS ON WOOD PANELS.

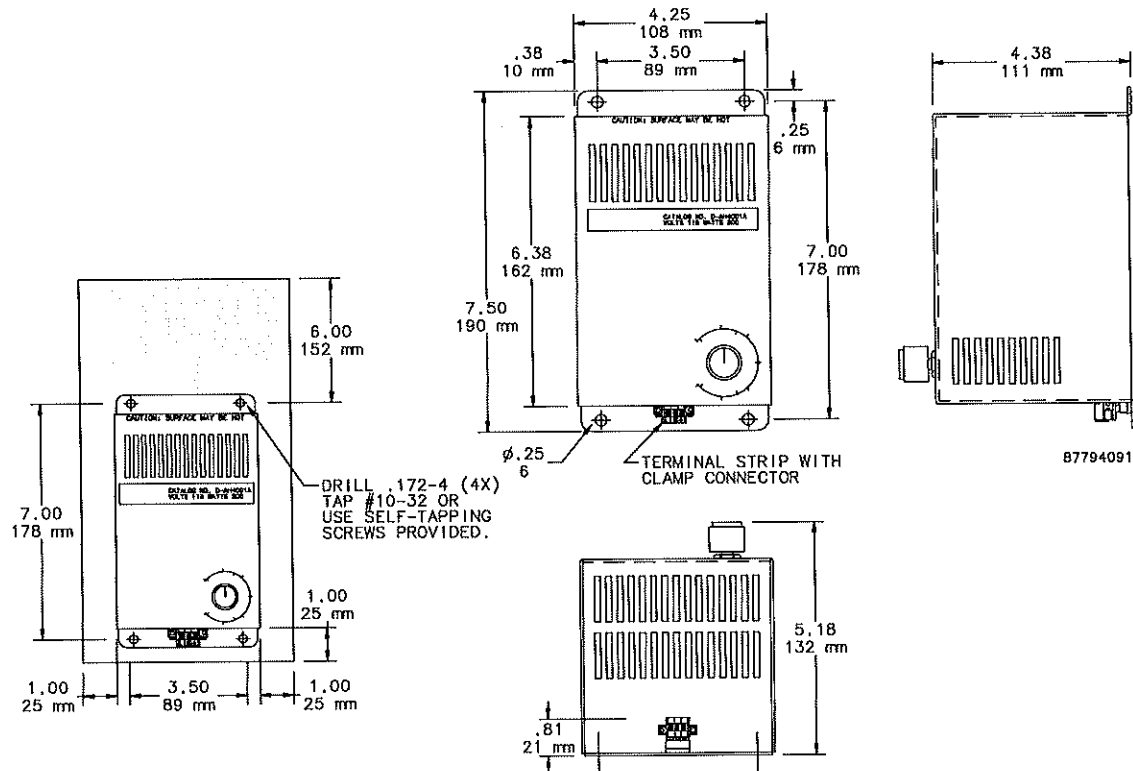
Heat sensitive components should not be placed near the heater discharge area since this air can be quite warm. The clearance range defines the space that must be kept free of these components for proper and safe operation of the heater.

Electric Heaters

Dimensions and Clearance Range Drawing for DAH1001A, -2A and DAH2001A, -2A



Dimensions and Clearance Range Drawing for DAH4001B, -2B and DAH8001B, -2B



Component Specification

Manufacturer	SAGINAW
Part Number	SCE-48EL3612SSLPPL
Description	304SS ENCLOSURE 48 X 36 X 12 NEMA 4X

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
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Manufacturer	
Part Number	
Description	



Your Enclosure Source®

Saginaw Control & Engineering
95 Midland Road
Saginaw, MI 48638-5770
Phone: (800)234-6871
Fax: (989)799-4524
<http://www.saginawcontrol.com>

Part Information - SCE-48EL3612SSLP

■ SCE-48EL3612SSLP

Application -

Designed to house electrical and electronic controls, instruments and components in areas which may be regularly hosed down or are in very wet conditions. Provides protection from dust, dirt, oil, and water. For outdoor application a drip shield is recommended. For installation information, consult our Installation Manual at www.saginawcontrol.com.

Construction -

- 0.063 and 0.075 in. stainless steel Type 304.
- Seams continuously welded and ground smooth.
- Flange trough collar around all sides of door opening.
- Oil-resistant gasket.
- Collar studs provided for mounting optional panels.
- Stainless steel concealed hinge.
- Removable and interchangeable doors.
- Black quarter turn latches on three sides of doors.
- Latches are opened or closed with a screwdriver (optional tamper-resistant inserts are available).
- Mounting holes in back of enclosure.
- Mounting hardware, sealing washer and hole plug included.
- Removable print pocket.
- Ground studs on door and body.

Options -

Optional mounting feet available.
Door hardware available.

Finish -

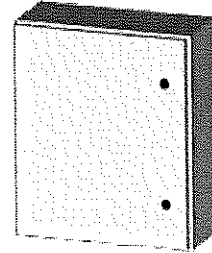
#4 brushed finish on all exterior surfaces.
Optional panels are powder coated white.

Industry Standards - (IS5)

NEMA Type 4, 4X, 12 and Type 13
UL Listed Type 4, 4X and 12
CSA Type 4, 4X and 12
IEC 60529 IP 66

Product Specifications -

Part Number: SCE-48EL3612SSLP
Description: S.S. EL Enclosure
Height: 48.00"
Width: 36.00"
Depth: 12.00"
Price Code: S5
List Price: \$2,334.67
Catalog Page: 200
Est. Ship Weight: 131.00 lbs



Download CAD Package
Add to Bill of Material

Optional Accessories -

SCE-48P36 - Subpanel, Bent
SCE-DF48EL36LP - Panel, Dead Front (Wall Mount)

Similar Part Numbers -

SCE-36EL2410SSLP - S.S. EL Enclosure
SCE-36EL2408SSLP - S.S. EL Enclosure
SCE-36EL3012SSLP - S.S. EL Enclosure
SCE-36EL3010SSLP - S.S. EL Enclosure
SCE-36EL3008SSLP - S.S. EL Enclosure
SCE-36EL3612SSLP - S.S. EL Enclosure
SCE-36EL3608SSLP - S.S. EL Enclosure
SCE-42EL2410SSLP - S.S. EL Enclosure
SCE-42EL3010SSLP - S.S. EL Enclosure
SCE-42EL3616SSLP - S.S. EL Enclosure
SCE-42EL3612SSLP - S.S. EL Enclosure
SCE-48EL3616SSLP - S.S. EL Enclosure
SCE-60EL3612SSLP - S.S. EL Enclosure
SCE-60EL3624SSLP - S.S. EL Enclosure
SCE-60EL3616SSLP - S.S. EL Enclosure

Saginaw Control and Engineering
95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871
Fax: (989)799-4524
SCE@SaginawControl.com



Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

D.4. BLOWER



Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October, 2012

BLOWER SPECIFICATION

Blower Type: Verantis CMHB-12 FRP, Arrangement 10, CW Rotation, Bottom Horizontal.

Capacity: 2000 cfm at 14" w.c., 2804 RPM, 0.075 lbs per cu. Ft

Motor Size and Type: 10 HP, 1750 RPM, 3PH, 60HZ, 230/460/60, TEFC, Suitable for use in Class 1 Division 2 Group D hazardous Environment

FEATURES

- Premium Vinyl Ester Housing with Antimony (Flame Retardant)
- Clockwise Rotation and Bottom Horizontal Discharge
- C-Veil With Gel Coat Interior Finish
- Grey (Standard) Exterior Color
- UV-Protected Standard Without C-Veil Exterior Finish
- Bolted and Gasketed Access Door
- 3/4-in. Drain Coupling
- Premium Vinyl Ester Resin Impeller
- Class III, 100% Width, Backward Curved, Non-Overloading Centrifugal Impeller Design
- 316 Stainless Steel Shaft with Neoprene seal
- Heavy Duty, Grease Lubricated, Sealed, Self-Aligning Bearings (Rated L₁₀ = 100,000 Hours)
- Carbon Steel Base with Type A Urethane Coating
- AMCA Arrangement 10 (Belt Drive)
- All FRP Encapsulated Hardware is 316 Stainless Steel
- All Hardware is 316 Stainless Steel

Data for Model CMHB 12

Reference Number: 31356

Standard Conditions	
Volume Flow Rate (CFM)	2000
Static Pressure (In. WC)	14.00
Temperature (°F)	68.00
Density (lb/ft3)	0.0750
Elevation (ft)	0.00
Power (BHP)	7.28
Static Efficiency (%)	62.67
Outlet Velocity (FPM)	2684.56
Tip Speed (FPM)	13808.12
Class	3
Max RPM	2944

Operating Conditions	
Volume Flow Rate (CFM)	2000
Static Pressure (In. WC)	14.00
Temperature (°F)	68.00
Density (lb/ft3)	0.0750
Elevation (ft)	0.00
Power (BHP)	7.28
RPM	2804
Static Efficiency (%)	62.67

Sound Power Levels								
Octave Band	1	2	3	4	5	6	7	8
OB Center Freq.	63	125	250	500	1000	2000	4000	8000
AMCA Lw	96	88	85	81	80	77	77	76
LwA Octave Band	71	73	77	78	80	78	78	75
Weighted LwA: 88 dBA								

Estimated Sound Pressure at 3.0 ft	
Open Inlet and Open Outlet	85.0 dBA
Open Inlet and Ducted Outlet	82.0 dBA
Ducted Inlet and Ducted Outlet	65.0 dBA

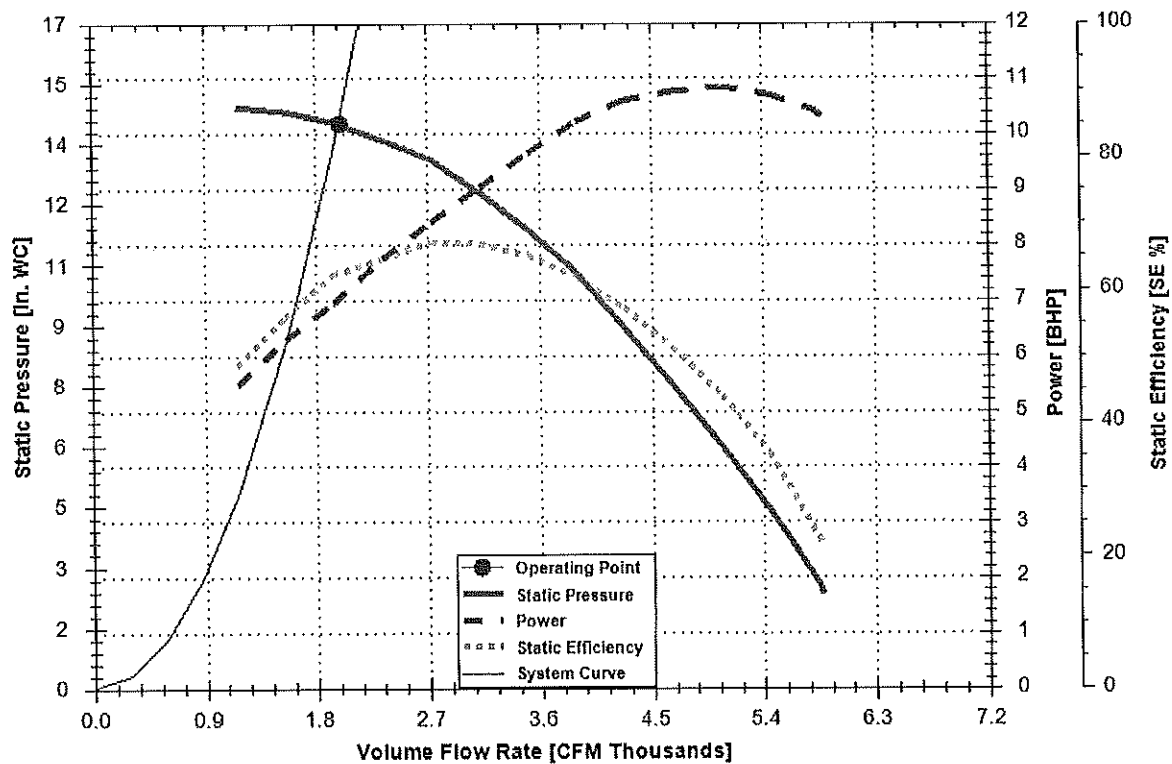
The table represents sound power levels of the selected Verantis fan. Sound power is neither environment dependent nor distance dependent. Sound power belongs strictly to the sound source. Sound pressure is the perceived sound level at a certain distance from the fan within a certain environment.

The sound power levels shown in the table are estimates based on Verantis test data. Verantis sound tests are conducted in accordance with AMCA Standards 300 (Reverberant Room Method for Sound testing of Fans) and 301 (Generalized Sound Format).

By: Jay Janning
 jay.janning@verantis.com

BioAir
 31356
 27-September-2012

Fan Curve for CMHB 12 at 2804 RPM and 0.075 lb/ft³



Volume Flow Rate: 2000 CFM

Static Pressure: 14.00 In. WC

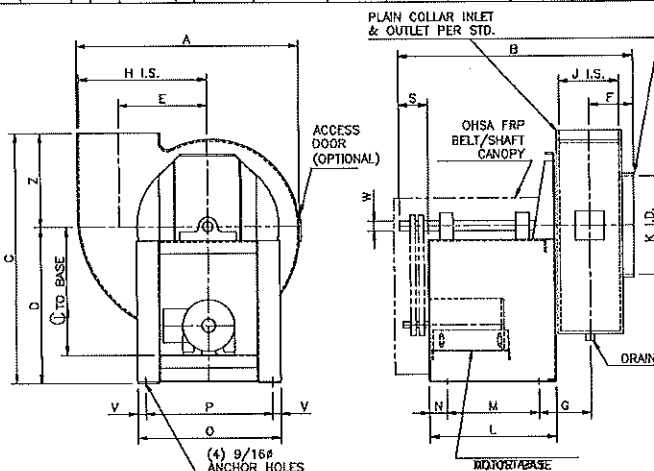
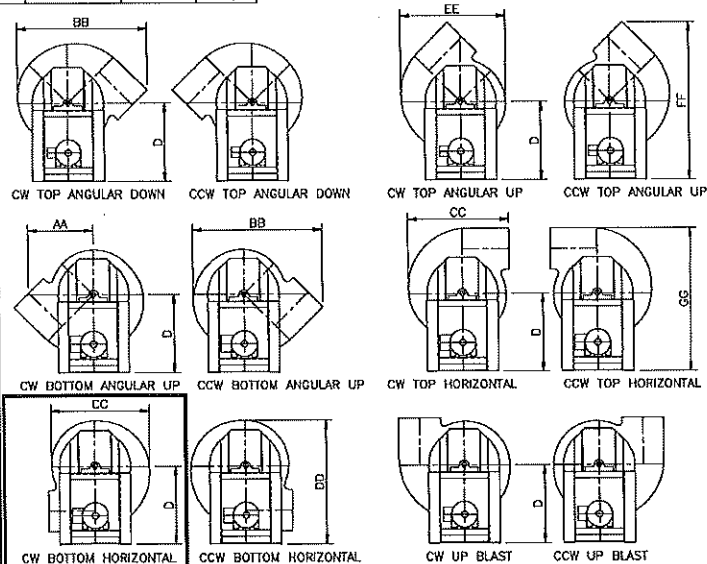
By: Jay Janning
jay.janning@verantis.com

7251 Engle Road, Suite 300 • Middleburg Heights, OH 44130 • Telephone 440-243-0700
Fax 440-234-3486 • Toll Free 800-554-8673 • www.Verantis.com
Successor in Interest to Cellicote APC

BioAir
31356
27-September-2012

FAN SIZE	INLET AREA	OUTLET AREA	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	S	V	W	Z	AA	BB	CC	DD	EE	FF	GG	DRAIN SIZE
4	.087	.095	18	26	28	18	7 13/32	4	1 15/16	5 1/2	2 1/2	4	17	13	2	20	18 1/2	3 3/4	1 3/16	10	12 5/16	22 1/2	18 3/4	25 5/8	17 1/8	32 3/8	28 1/4	3/4	
6	.186	.188	18	28	28	18	7 13/32	5	3	5 1/2	4 7/8	6	17	13	2	20	18 1/2	3	1 3/16	10	12 5/16	22 1/2	18 3/4	25 5/8	17 1/8	32 3/8	28 1/4	3/4	
8	.349	.333	23 3/8	29 13/16	29	18	9 1/2	6	3 13/16	7 3/8	6 1/2	8	17	13	2	20	18 1/2	3 3/4	1 3/16	11	14 1/2	28 1/8	22 3/8	28 3/16	22 3/8	35 1/4	31 3/8	3/4	
10	.545	.519	26	35 3/8	36	24	10 1/32	6 3/4	4 5/8	9 1/8	8 1/8	10	20	15	2 1/2	23	21 1/2	4 3/4	1 7/16	12	15 5/16	30 7/8	24 3/4	35	24 1/2	43	38 3/4	3/4	
12	.785	.745	30 11/16	36 15/16	37	24	12 9/32	7 1/2	5 7/16	11	9 3/4	12	20	15	2 1/2	23	21 1/2	4 3/4	1 7/16	13	17 7/8	35 11/16	28 1/4	36 9/16	28 5/16	45 7/8	41 15/16	3/4	
14	1.07	1.01	35 5/8	43	42	28	14 5/16	8 3/4	6 1/4	12 13/16	11 3/8	14	23	18	2 1/2	26	24	5	1 7/16	14	20	41 1/4	31 1/2	42 5/8	32 3/4	52 11/16	48 7/8	3/4	
16	1.40	1.32	40 11/16	44 9/16	44	28	16 3/8	9 1/2	7 1/16	14 5/8	13	18	23	18	2 1/2	26	24	5	1 11/16	16	22 7/8	46 9/16	35 15/16	44 11/16	37 5/8	56 1/4	51 7/8	1	

FAN SIZE	C/L TO BASE	WEIGHT W/O MOTOR	WHEEL DIA
4	14±1 1/2	130 LBS.	12
6	14±1 1/2	160 LBS.	12
8	14±1 1/2	180 LBS.	16
10	20 1/2±1 1/2	210 LBS.	17 1/4
12	20 1/2±1 1/2	240 LBS.	18 3/16
14	24±2	320 LBS.	22
16	24±2	400 LBS.	25 1/8

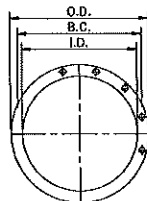


- NOTES:
1. ALL TABLED DIMENSIONS ARE IN INCHES.
 2. ALL DISCHARGE POSITIONS & ROTATIONS ARE VIEWED FROM THE SHAFT END.
 3. MOTOR FRAME SIZES VARY IN LENGTH WITH DIFFERENT MOTOR MANUFACTURER. THE STANDARD FAN BASE DIMENSIONS ARE SUBJECT TO CHANGE BASED ON THE MOTOR "C" DIMENSIONS.
 4. DIMENSIONS NOT TO BE USED FOR CONSTRUCTION CERTIFIED PRINTS ARE AVAILABLE.
 5. CLASS IV CONSTRUCTION, DIRECT DRIVE & SPECIAL ARRANGEMENT FAN BASES ARE AVAILABLE. CERTIFIED DRAWINGS ARE AVAILABLE ON REQUEST.

CMH SERIES FANS			
VERANTIS CORP.			
7251 Engle Rd, Suite 300 Plaza South One Bldg, Middleburg Hts. OH 44130			
VERANTIS SUCCESSOR IN INTEREST TO CELEBRATE AIR POLLUTION CONTROL			
DRAWN: CWD	CHK'D: DATE:	ARRANGEMENT -- 10	REV. 0

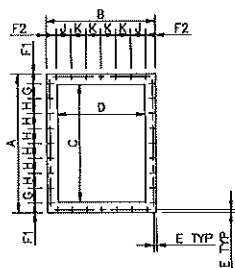
CAD File: CMH10FAN.DWG ☒ CUST. ☐ SUB.

FAN SIZE	I.D.	O.D.	B.C.	HOLES		THK
				QTY	DIA	
6	6	10 3/8	9	8	7/16	1/4
8	8	12 3/8	11	8	"	"
10	10	14 3/8	13	12	"	3/8
12	12	16 3/8	15	12	"	"
14	14	18 3/8	17	12	"	"
16	16	20 3/8	19	16	"	1/2



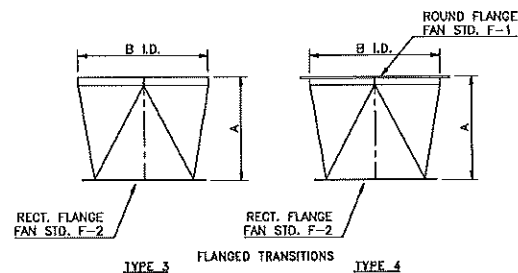
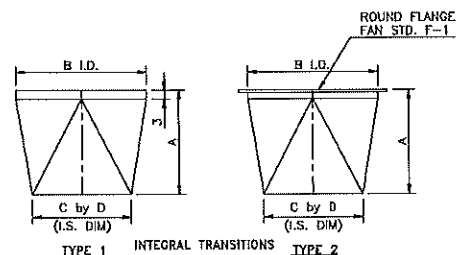
INLET FLANGE DETAIL

OUTLET FLANGE DETAIL



SIZE	A	B	C	D	E	F1	F2	G	H	J	K	THK	HOLE DIA.	QTY.
6	9 3/4	9 1/8	5 1/2	4 7/8	3/4	2 1/8	2 1/8	2 3/4	-	2 7/16	-	1/4	7/16	12
8	11 5/8	10 3/4	7 3/8	6 1/2	3/4	2 1/8	2 1/8	3 11/16	-	3 1/4	-	1/4	"	12
10	13 3/8	12 3/8	9 1/8	8 1/8	3/4	2 1/8	2 1/8	3 1/16	3	2 3/4	2 5/8	1/4	"	14
12	15 1/4	14	11	9 3/4	3/4	2 1/8	2 1/8	3 11/16	3 5/8	3 1/4	3 1/4	1/4	"	16
14	17 1/8	15 5/8	12 13/16	11 3/8	3/4	2 1/8	2 1/8	3 3/16	3 1/4	2 13/16	2 7/8	5/16	-	20
16	18 7/8	17 1/4	14 5/8	13	3/4	2 1/4	2 1/4	3 5/8	3 11/16	3 1/4	3 1/4	5/16	-	20

FAN SIZE	A	B I.D.	C	D
6	8	6	5 1/2	4 7/8
8	8	8	7 3/8	6 1/2
10	11	10	9 1/8	8 1/8
12	11	12	11	9 3/4
14	14	14	12 13/16	11 3/8
16	14	16	14 5/8	13



CMH SERIES FANS
VERANTIS CORP.
 7251 Engle Rd, Suite 300 Plaza South One Bldg, Middleburg Hts. OH 44130
 VERANTIS SUCCESSION IN INTEREST TO COLLOCATE AIR POLLUTION CONTROL

DRAWN: CVD	CHK'D: 1	ARRANGEMENT -- 10	REV. 1
DATE: 10-5-98	DATE:		

CAD File: CMH10FLO.DWG

☒ CUST. ☐ SUB.



BALDOR® • RELIANCE 

Product Information Packet

EM3714T

10HP, 1770RPM, 3PH, 60HZ, 215T, 3752M, TEFC, F1

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Part Detail									
Revision:	C	Status:	PRD/A	Change #:		Proprietary:	No		
Type:	AC	Prod. Type:	3752M	Elec. Spec:	37WGS518	CD Diagram:			
Enclosure:	TEFC	Mfg Plant:		Mech. Spec:	37H244	Layout:			
Frame:	215T	Mounting:	F1	Poles:	04	Created Date:	08-30-2010		
Base:	RG	Rotation:	R	Insulation:	F	Eff. Date:	12-16-2011		
Leads:	9#14	Literature:		Elec. Diagram:		Replaced By:			
Nameplate NP1259L									
CAT.NO.	EM3714T								
SPEC.	37H244S518G3								
HP	10								
VOLTS	208-230/460								
AMP	25.4-24/12								
RPM	1770								
FRAME	215T	HZ	60	PH	3				
SER.F.	1.15	CODE	K	DES	A	CL	F		
NEMA-NOM-EFF	91.7	PF	85						
RATING	40C AMB-CONT								
CC	010A	USABLE AT 208V							
DE	6307	ODE	6206						
ENCL	TEFC	SN							

Parts List		
Part Number	Description	Quantity
SA199522	SA 37H244S518G3	1.000 EA
RA188854	RA 37H244S518G3	1.000 EA
37FN3002C01	EXFN, PLASTIC, 6.00 OD, 1.155 ID	1.000 EA
S/P107-000-001	SUPER E PROC'S-FS & WS PLTS-POLYREX EM G	1.000 EA
HW3200A01	3/8-16X3/4 I-BLT WELDED F/S	1.000 EA
37CB3006	37 CB CASTING W/1.38 LEAD HOLE @ 6:00	1.000 EA
37GS1000SP	GASKET, CONDUIT BOX STD., .06 THICK LEXI	1.000 EA
51XW2520A12	.25-20 X .75, TAPTITE II, HEX WSHR SLTD	2.000 EA
11XW1032G06	10-32 X .38, TAPTITE II, HEX WSHR SLTD U	1.000 EA
37EP3101A01SP	FR ENDPLATE,TEFC, 37 L&M, W/GREASER	1.000 EA
HW4500A01	1641B(ALEMITE)400 UNIV, GREASE FITT	1.000 EA
HW5100A06	W2420-025 WVY WSHR (WB)	1.000 EA
37EP3100A01SP	STD PU ENDPLATE, ENCL 37 "T"-307 BRG, W/	1.000 EA
HW4500A01	1641B(ALEMITE)400 UNIV, GREASE FITT	1.000 EA
XY3118A12	5/16-18 HEX NUT DIRECTIONAL SERRATION	4.000 EA
07FH4007SP	IEC FH W/GRSR, NOTCH @ 6:00 & 3 FAN CVR	1.000 EA
51XW1032A06	10-32 X .38, TAPTITE II, HEX WSHR SLTD S	3.000 EA
37CB4516	LIPPED LID FOR 37 FRAME NEC K08X	1.000 EA
37GS1008SP	37 GS FOR CB LID - LEXIDE	1.000 EA
51XW0832A07	8-32 X .44, TAPTITE II, HEX WSHR SLTD SE	4.000 EA
HW2501F21	KEY, 5/16 SQ X 2.375	1.000 EA
HA7000A02	KEY RETAINER RING, 1 1/8 DIA, 1 3/8 DIA	1.000 EA
85XU0407S04	4X1/4 U DRIVE PIN STAINLESS	2.000 EA
LB1115	LABEL,LIFTING DEVICE	1.000 EA

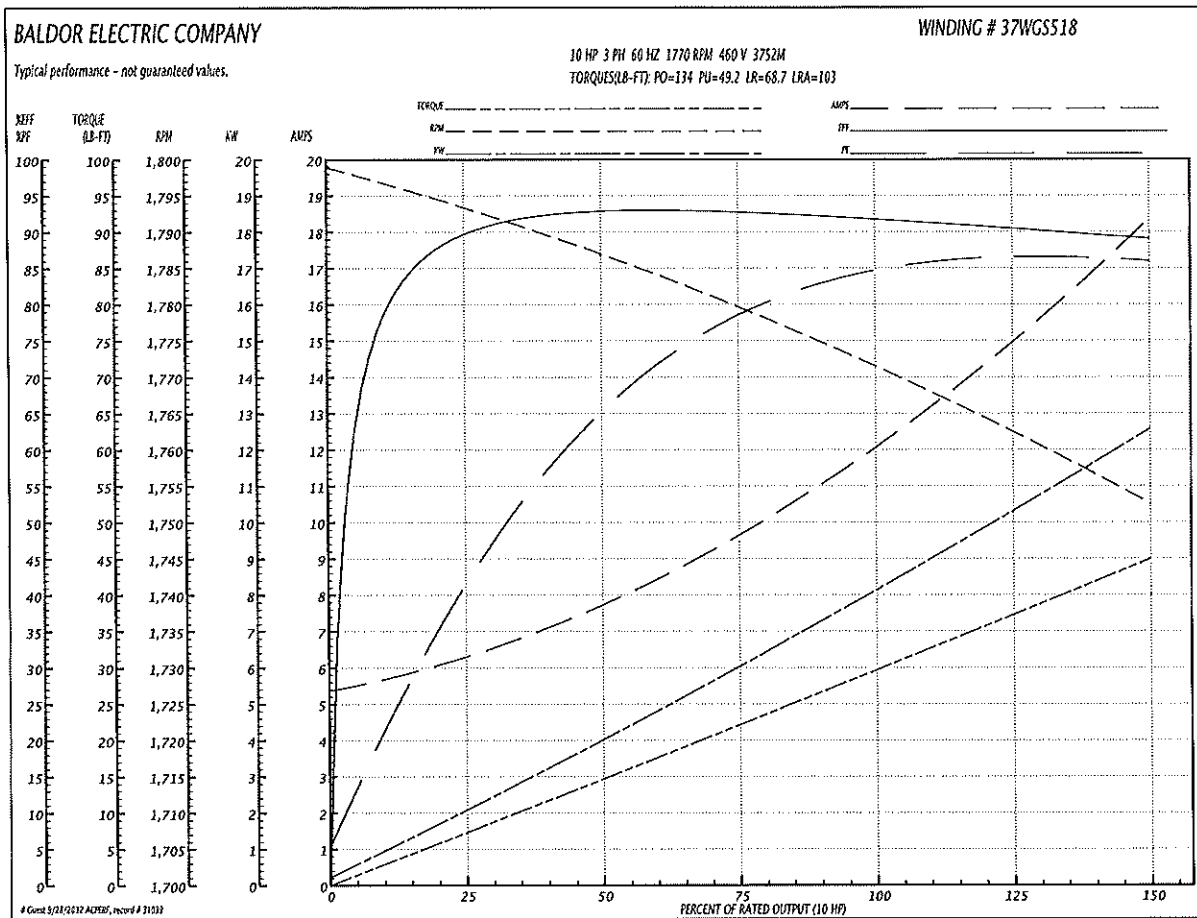
Parts List (continued)		
Part Number	Description	Quantity
MJ1000A75	GREASE, POLYREX EM EXXON	0.050 LB
51XB1214A20	12-14X1.25 HXWSSLD SERTYB	1.000 EA
HA3104A25	THRUBOLT .31-18 X 14.75	4.000 EA
MG1000Y03	WILKO 689.710 GOLD PAINT SUPER E	0.028 GA
LB1357	ENERGY GUIDE LABEL (BOX LABEL)	1.000 SH
LB1125C02	SUPER-E (STOCK CTN LABEL SUPER-E WITH FL	1.000 EA
LC0005E01	CONN.DIA./WARNING LABEL (LC0005/LB1119)	1.000 EA
NP1259L	ALUM SUPER-E UL CSA-EEV CC NEMA PREMIUM	1.000 EA
37PA1052	PACKAGING GROUP, 150 LB MTR 2 X 4 RUNNER	1.000 EA

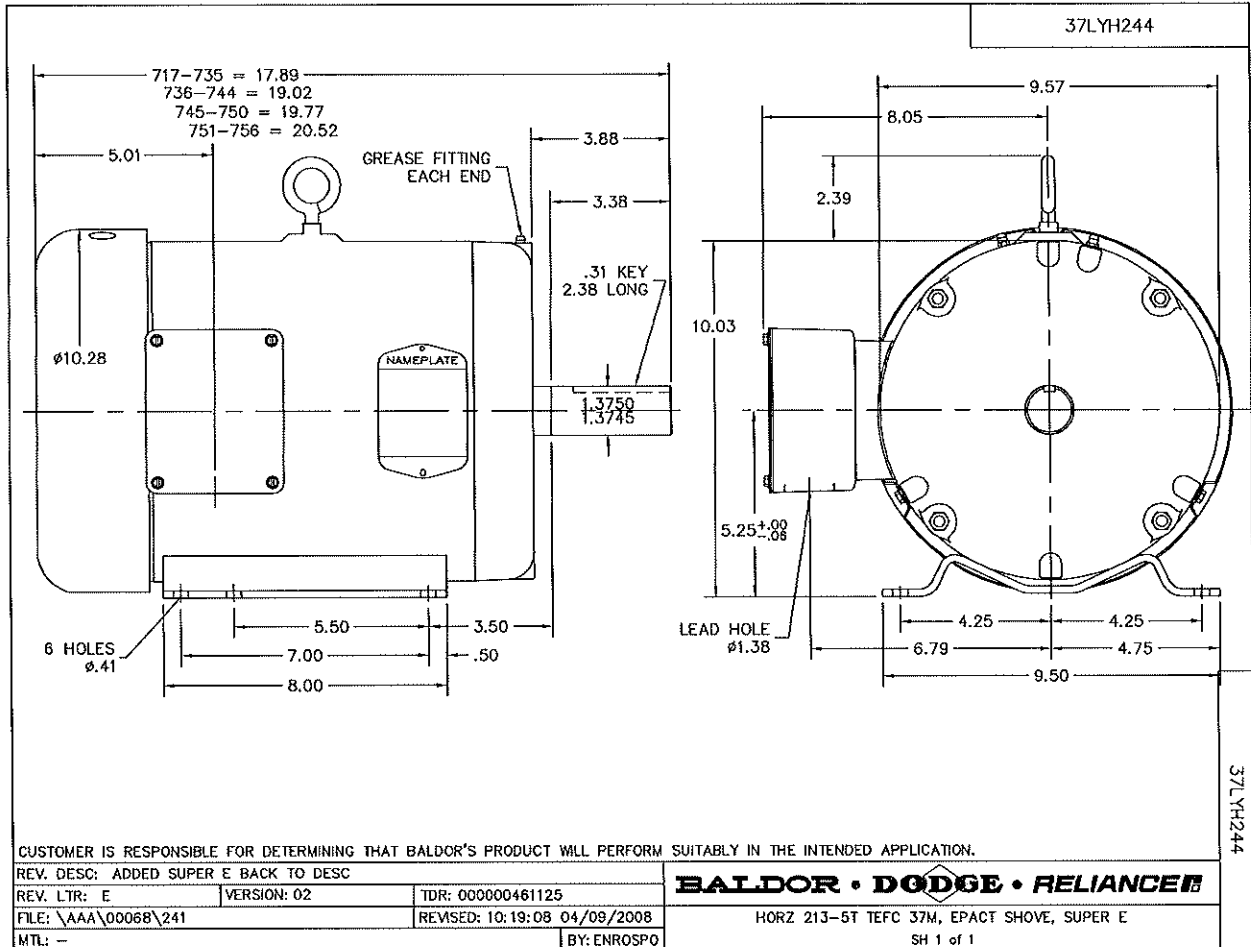
Accessories		
Part Number	Description	Multiplier
37-3301	C FACE KIT	P1

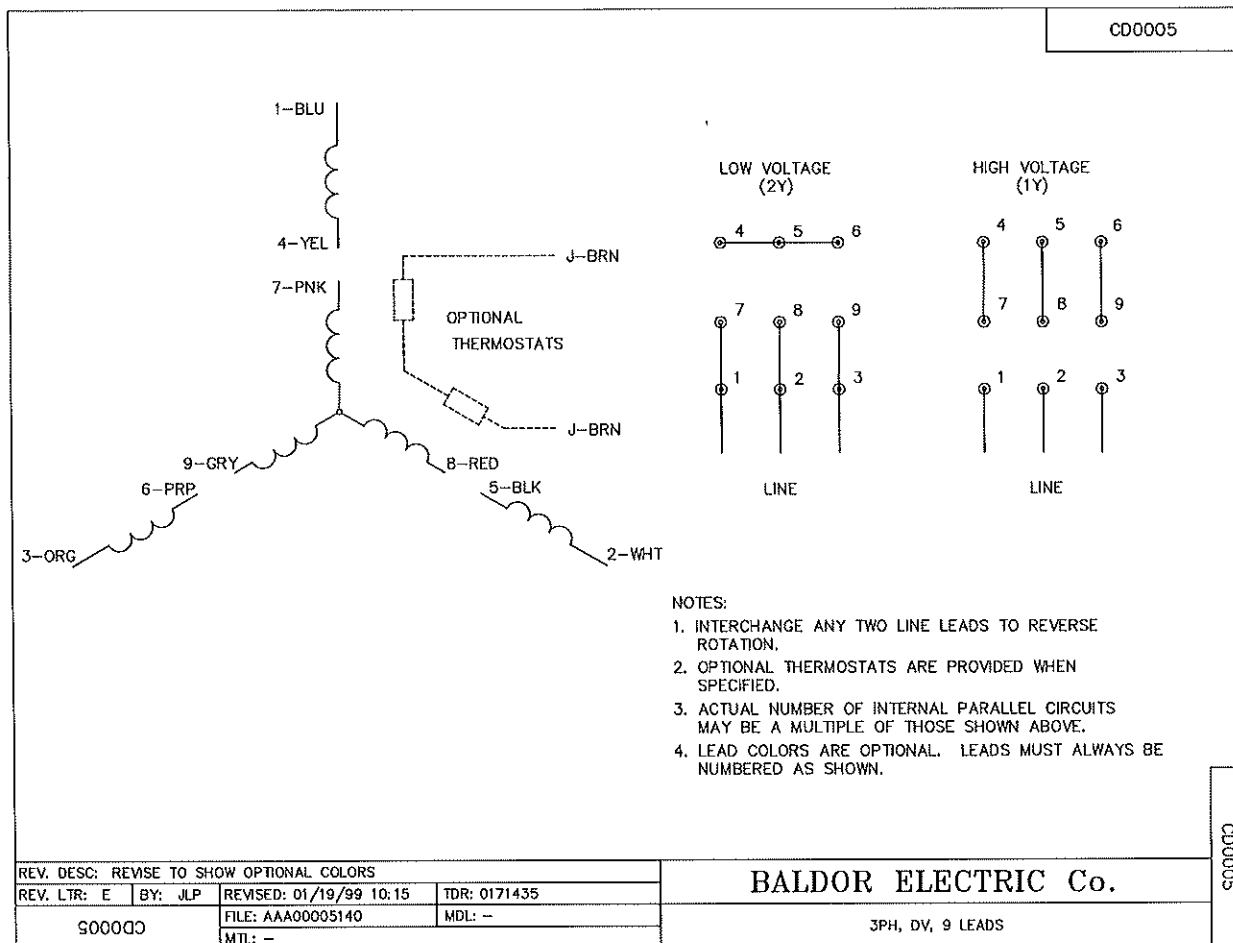
Performance Data at 460V, 60Hz, 10.0HP (Typical performance - Not guaranteed values)

General Characteristics							
Full Load Torque:		29.5 LB-FT		Start Configuration:		DOL	
No-Load Current:		5.49 Amps		Break-Down Torque:		134.0 LB-FT	
Line-line Res. @ 25°C.:		0.93503 Ohms A Ph / 0.0 Ohms B Ph		Pull-Up Torque:		49.2 LB-FT	
Temp. Rise @ Rated Load:		63 C		Locked-Rotor Torque:		68.7 LB-FT	
Temp. Rise @ S.F. Load:		81 C		Starting Current:		103.0 Amps	
Load Characteristics							
% of Rated Load	25	50	75	100	125	150	S.F.
Power Factor:	42.0	66.0	79.0	85.0	84.0	87.0	84.0
Efficiency:	88.9	92.1	92.4	91.8	90.3	89.0	90.9
Speed:	1793.9	1786.8	1779.7	1771.8	1762.7	1752.5	1766.0
Line Amperes:	6.14	7.63	9.58	11.9	15.4	18.1	14.0

Performance Graph at 460V, 60Hz, 10.0HP Typical performance - Not guaranteed values





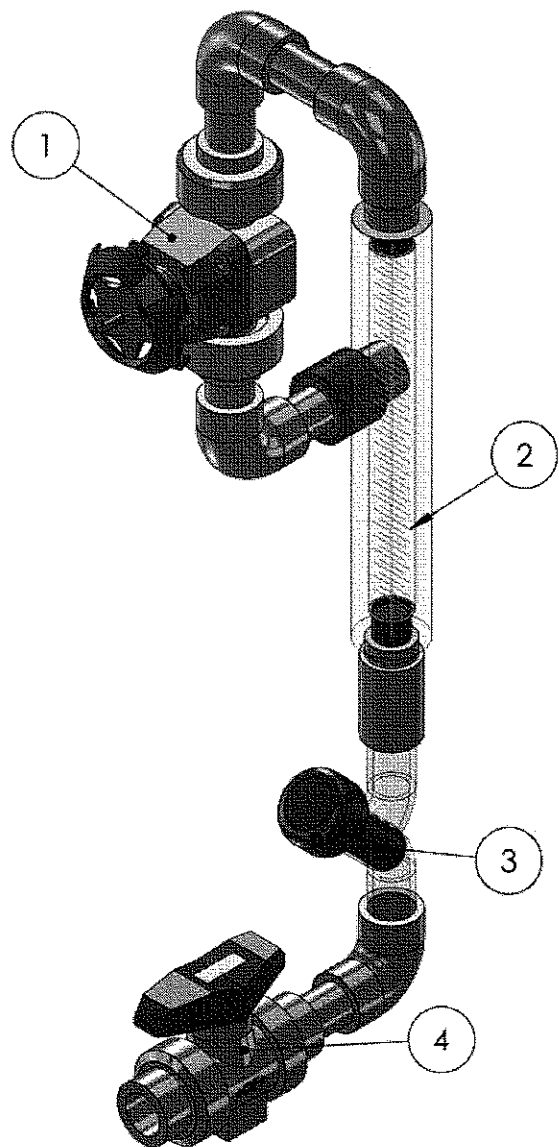




Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

D.5. STARTUP SYSTEM





ITEM	PART NUMBER	QTY	DESCRIPTION	VENDOR	DATA SHEET PAGE NUMBER
1	161.514.613	1	3/4" DIAPHRAGM VALVE TRUE UNION SOCKETENDS	GEORG FISCHER	1
2	F-40750LN-12	1	ROTOMETER EPDM SEALS 1-10 GPM	BLUE WHITE	3
3	192.306.350	1	3/4" PVC LINE STRAINER	GEORG FISCHER	6
4	161.546.343	1	3/4" BALL VALVE TRUE UNION SOCKET ENDS	GEORG FISCHER	8

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MATERIAL
SEE TABLE

FINISH



DRAWN BY RK	DATE 09/26/12	ENG APPR.	DATE	QC APPR.	DATE
----------------	------------------	-----------	------	----------	------

PART NAME
MAKE-UP WATER ASSEMBLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: ±1° FRACTIONS: ±1/4 TWO PLACE DECIMAL: ±.060 THREE PLACE DECIMAL: ±.030	SIZE	DWG. NO.	REV
	B	MW000215_P1217-S	A
	SCALE: 1 : 6		SHEET 1 OF 1

Component Specification

Manufacturer	GEORG FISCHER
Part Number	192.306.350
Description	3/4" PVC LINE STRAINER

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

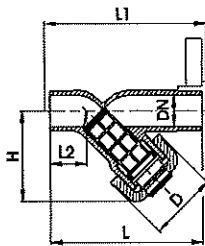
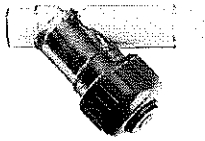
Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

GF Piping Systems Datasheet

valid from
1/6/09

Line strainers



Type 306 Translucent Line Strainer PVC Transparent body with solvent cement spigots ASTM/ANSI

Model:

- Protects valves, pumps, etc. from becoming damaged
- Easy dismantling for cleaning the screens
- With screen PVC, perforation $\varnothing$ 0.8 mm

Size	DN [inch]	PN	EPDM Part No.	FPM Part No.	lbs	D [inch]	L [inch]	L1 [inch]	L2 [inch]	H [inch]	
1/2	0.59	150	192 306 300	192 306 349	0.243	1.69	5.63	5.87	1.46	2.56	
3/4	0.79	150	192 306 350	192 306 399	0.375	1.85	6.30	6.54	1.77	2.99	
1	0.98	150	192 306 400	192 306 449	0.562	2.20	6.85	7.09	1.85	3.54	
1 1/4	1.26	150	192 306 450	192 306 499	0.902	2.52	7.40	7.64	2.09	4.09	
1 1/2	1.57	150	192 306 500	192 306 549	1.400	3.23	8.07	8.31	2.13	4.88	
2	1.97	150	192 306 550	192 306 599	2.205	3.74	8.86	9.09	2.48	5.83	
3	3.15	150	192 306 650	192 306 699	6.173	4.72	12.24	12.64	3.54	8.07	

The technical data are not binding and not expressly warranted characteristics of the goods. They are subject to change. Our General Conditions of Sale apply.



Georg Fischer Rohrleitungssysteme AG, Postfach, CH-8201 Schaffhausen/Switzerland

Component Specification

Manufacturer	GEORG FISCHER
Part Number	161.546.343
Description	¾" BALL VALVE TYPE 546 PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

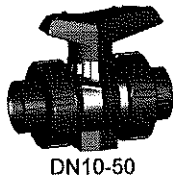
Manufacturer	
Part Number	
Description	

GF Piping Systems Datasheet

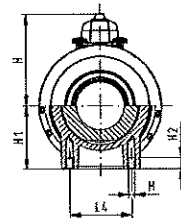
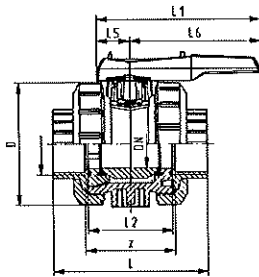
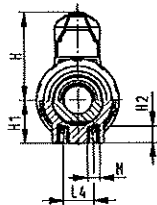
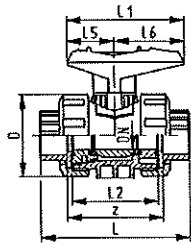
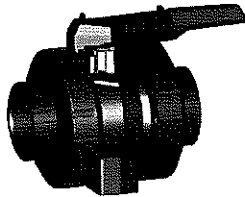
valid from:
7/9/08

Ball valves

Ball Valve Type 546 PVC With Mounting Inserts With solvent cement sockets inch ASTM Inclusive 2 threaded valve ends NPT



DN10-50



Model:

- Designed for easy installation and removal
- z-dimension, valve end and valve nut are **not compatible** with Type 370 and Type 346
- Ball seals PTFE
- Integrated stainless steel mounting inserts
- Threaded valve ends are only enclosed for 3/8" to 2"

Option:

- Contact customer service for customization
- Multifunctional module with integrated limit switches
- Pneumatic or electric actuators from GF

Size	DN [inch]	PN	Cv-value [gal (US) /min]	EPDM Part No.	FPM Part No.	lbs
3/8	0.39	240	5	161 546 341	161 546 351	0.406
1/2	0.59	240	13	161 546 342	161 546 352	0.428
3/4	0.79	240	25	161 546 343	161 546 353	0.648
1	0.98	240	49	161 546 344	161 546 354	0.946
1 1/4	1.26	240	70	161 546 345	161 546 355	1.631
1 1/2	1.57	240	112	161 546 346	161 546 356	2.205
2	1.97	240	217	161 546 347	161 546 357	3.935
2 1/2	2.56	240	350	161 546 348	161 546 358	10.803
3	3.15	240	490	161 546 349	161 546 359	16.314
4	3.94	240	770	161 546 350	161 546 360	25.353

Size	D [inch]	H [inch]	H1 [inch]	H2 [inch]	L [inch]	L1 [inch]	L2 [inch]	L4 [inch]	L5 [inch]	L6 [inch]	M	z [inch]
3/8	1.97	2.24	1.06	0.47	4.13	3.03	2.20	0.98	1.26	1.77	6	2.64
1/2	1.97	2.24	1.06	0.47	4.13	3.03	2.20	0.98	1.26	1.77	6	2.40
3/4	2.28	2.64	1.18	0.47	4.76	3.82	2.56	0.98	1.54	2.28	6	2.76
1	2.68	2.87	1.42	0.47	5.24	3.82	2.80	0.98	1.54	2.28	6	2.99
1 1/4	3.31	3.54	1.73	0.59	6.06	5.04	3.35	1.77	2.13	2.91	8	3.54
1 1/2	3.82	3.82	2.01	0.59	6.46	5.04	3.50	1.77	2.13	2.91	8	3.70
2	4.88	4.57	2.52	0.59	7.20	5.98	3.98	1.77	2.60	3.43	8	4.21
2 1/2	6.54	5.87	3.35	0.59	9.17	10.63	5.35	2.76	2.52	8.11	8	5.67
3	7.87	6.34	4.13	0.59	10.00	10.63	5.55	2.76	2.52	8.11	8	5.94
4	9.37	7.01	4.84	0.87	11.85	12.60	6.46	4.72	2.52	10.08	12	6.85

Component Specification

Manufacturer	GEORG FISCHER
Part Number	161.514.613
Description	3/4" DIAPHRAGM VALVE PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
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Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

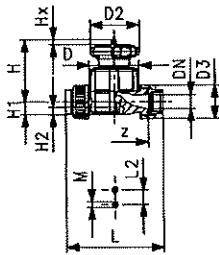
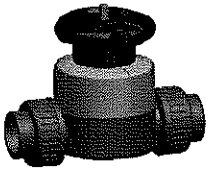
Manufacturer	
Part Number	
Description	

GF Piping Systems Datasheet

valid from
11/16/10

Diaphragm Valves New Generation

Type 514 Diaphragm Valve PVC With solvent cement sockets ASTM



Model:

- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Handwheel with built-in locking mechanism
- Designed for easy installation and removal
- Short overall length

Option:

- Contact customer service for customization
- Self adjusting multifunctional module with integrated limit switches
- PN16 available as a configuration

Size	DN [mm]	PSI	Cv-value [gal (US) /min]	EPDM Part No.	PTFE/EPDM Part No.	lbs
1/2	15	150	33.02	161 514 612	161 514 632	0.408
3/4	20	150	71.60	161 514 613	161 514 633	0.540
1	25	150	127.08	161 514 614	161 514 634	1.185
1 1/4	32	150	200.53	161 514 615	161 514 635	1.447
1 1/2	40	150	333.68	161 514 616	161 514 636	2.572
2	50	150	456.54	161 514 617	161 514 637	3.445

Size	D [inch]	D2 [inch]	D3 [inch]	L [inch]	L2 [inch]	H [inch]	H1 [inch]	H2 [inch]	M	z [inch]	Lift = Hx [inch]
1/2	2.56	2.56	1.69	5.55	0.98	2.87	0.55	0.47	M6	3.78	0.28
3/4	3.15	2.56	2.01	6.50	0.98	3.19	0.71	0.47	M6	4.49	0.39
1	3.46	3.43	2.28	7.05	0.98	4.21	0.87	0.47	M6	4.80	0.51
1 1/4	3.98	3.43	2.83	8.03	1.77	4.53	1.02	0.59	M8	5.51	0.59
1 1/2	4.61	5.31	3.27	9.06	1.77	5.83	1.26	0.59	M8	6.30	0.75
2	5.67	5.31	3.94	10.55	1.77	6.54	1.54	0.59	M8	7.48	0.98

The technical data are not binding and not expressly warranted characteristics of the goods. They are subject to change. Our General Conditions of Sale apply.

Georg Fischer Piping Systems Ltd, Postfach, CH-8201 Schaffhausen/Switzerland Phone +41 -(0)52-631 1111 e-mail: info.ps@georgfischer.com Internet: <http://www.piping.georgfischer.com>

Component Specification

Manufacturer	BLUE WHITE
Part Number	F-40750LN-12
Description	ROTAMETER, EPDM SEALS, 1-10 GPM

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

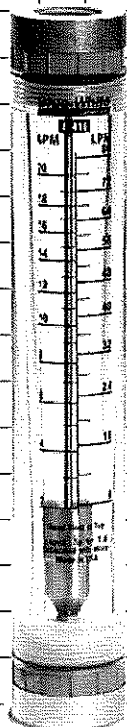
Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

F-410N

3/4", 1" F/NPT

Rod Guided Float



Features:

- Tough machined acrylic meter body, highly polished to a clear finish.
- Direct reading permanent scale.
- White back reflector for easy reading.
- F/NPT adapters with high grade Viton o-ring seals and aluminum "stress ring" thread supports.
- 316 stainless steel or Hastelloy rod guided floats.
- Acceptable in direct sunlight applications.

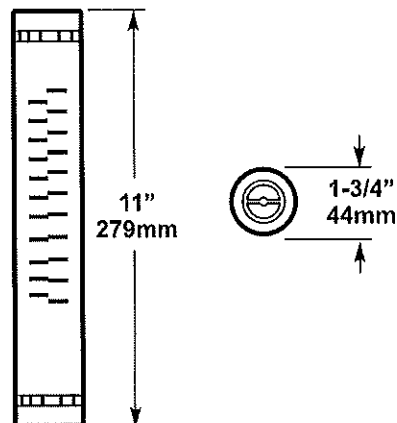
Materials of Construction:

Meter Body:Cast Acrylic Rod
 Adapters:Polypropylene
 Guide Rod Holder:Polypropylene
 O-ring seals:Viton[®] (optional EP)
 Float:
 Standard Series316SS
 K- SeriesHastelloy
 Guide Rod:
 Standard Series316SS
 K- SeriesHastelloy

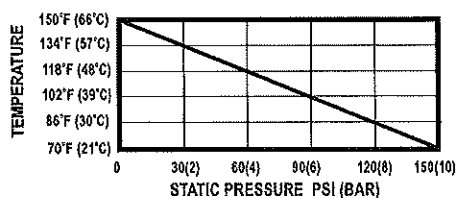
Specifications:

Max. working pressure:150 PSI (10.3 bar) @ 70° F (21° C)
 Max. Fluid Temperature:150° F (65° C) @ 0 PSI
 Full scale accuracy:+/- 5%
 Calibration fluid:water, specific gravity 1.0
 Scale length:5" (127mm)
 Environment:Acceptable for direct sunlight exposure.
 Maximum pressure drop:2 PSI
 Approximate shipping wt: ...2 lb. (.91 kg)

Dimensions:



Maximum Temperature vs. Pressure



Installation Requirements:

1. Misalignment will damage the meter!

Flowmeter must be installed in an exact vertical plane to ensure accuracy. Be certain of proper plumbing alignments. Misalignment may cause the o-ring seals to leak.

2. Pipe dope and glue will damage the meter!

Use only Teflon® tape on the threaded adapters. The meter body and plastic fittings cannot tolerate PVC Glue and/or pipe dope. Even fumes can cause severe damage. If you are installing your flowmeter to a glued pipe configuration, install the flowmeter *after* all glued fittings are dried and lines are purged of all fumes. **Never** hold the meter body with pliers or like tools. **DO NOT OVER-TIGHTEN!**

3. Vibration and heavy loads will damage the meter!

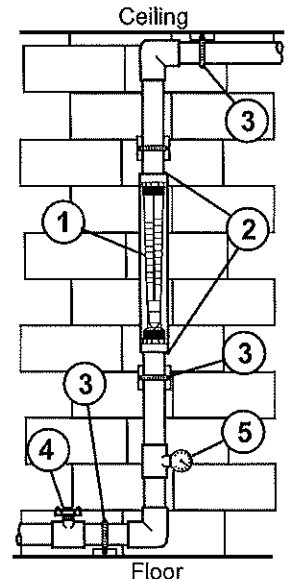
Wall, floor and ceiling mounts and supports must be carefully aligned with the meter body and sturdy enough to support the plumbing and prevent vibration. Never allow the flowmeter to support the weight of related piping.

4. Solenoid valves will damage the meter!

Avoid a system that will impose a sudden burst of flow to the meter. Such a burst will cause the float to impact the float stop with destructive force. Solenoid valves, or other quick opening valves cannot be used unless meter is protected against sudden bursts of flow.

5. High pressures and temperatures will damage the meter!

The maximum acceptable temperature and pressure is interdependent. The maximum acceptable working pressure is dependant on the actual fluid temperature. The maximum acceptable fluid temperature is dependant on the actual working pressure. (see Temperature Vs. Pressure chart).



Flow Range and Model Options:

Standard Series

- Equipped with 316 SS guide rod

Models for Liquid

MODEL NUMBER	Dual Scale Range		Adapter F/NPT	Adapter Material	Float Material
	GPM	LPM			
F-40750LN-12	1 to 10	4 to 38	3/4"	Polypropylene	316 SS
F-40750LN-16	1 to 10	4 to 38	1"	Polypropylene	316 SS
F-41017LN-12	1 to 17	4 to 64	3/4"	Polypropylene	316 SS
F-41017LN-16	1 to 17	4 to 64	1"	Polypropylene	316 SS
F-41000LN-12	2 to 20	8 to 80	3/4"	Polypropylene	316 SS
F-41000LN-16	2 to 20	8 to 80	1"	Polypropylene	316 SS

Models for Air

MODEL NUMBER	Dual Scale Range		Adapter F/NPT	Adapter Material	Float Material
	SCFM	M ³ /HR			
F-40750GN-12	4 to 45	8 to 80	3/4"	Polypropylene	316 SS
F-40750GN-16	4 to 45	8 to 80	1"	Polypropylene	316 SS
F-41017GN-12	5 to 75	10 to 125	3/4"	Polypropylene	316 SS
F-41017GN-16	5 to 75	10 to 125	1"	Polypropylene	316 SS
F-41000GN-12	10 to 80	20 to 140	3/4"	Polypropylene	316 SS
F-41000GN-16	10 to 80	20 to 140	1"	Polypropylene	316 SS

K-Series

- Equipped with Hastelloy guide rod

K-Series models are specially equipped for highly corrosive applications.

Models for Liquid

MODEL NUMBER	Dual Scale Range		Adapter F/NPT	Adapter Material	Float Material
	GPM	LPM			
F-40750LK-12	1 to 10	4 to 38	3/4"	Polypropylene	Hastelloy
F-40750LK-16	1 to 10	4 to 38	1"	Polypropylene	Hastelloy
F-41017LK-12	1 to 17	4 to 64	3/4"	Polypropylene	Hastelloy
F-41017LK-16	1 to 17	4 to 64	1"	Polypropylene	Hastelloy
F-41000LK-12	2 to 20	8 to 80	3/4"	Polypropylene	Hastelloy
F-41000LK-16	2 to 20	8 to 80	1"	Polypropylene	Hastelloy

Correction factor formulas for AIR models

PRESSURE CORRECTION

$$\sqrt{\frac{14.7 + \text{Working PSIG}}{14.7}}$$

TEMPERATURE CORRECTION

$$\sqrt{\frac{520}{460 + \text{Working Temp } ^\circ\text{F}}}$$

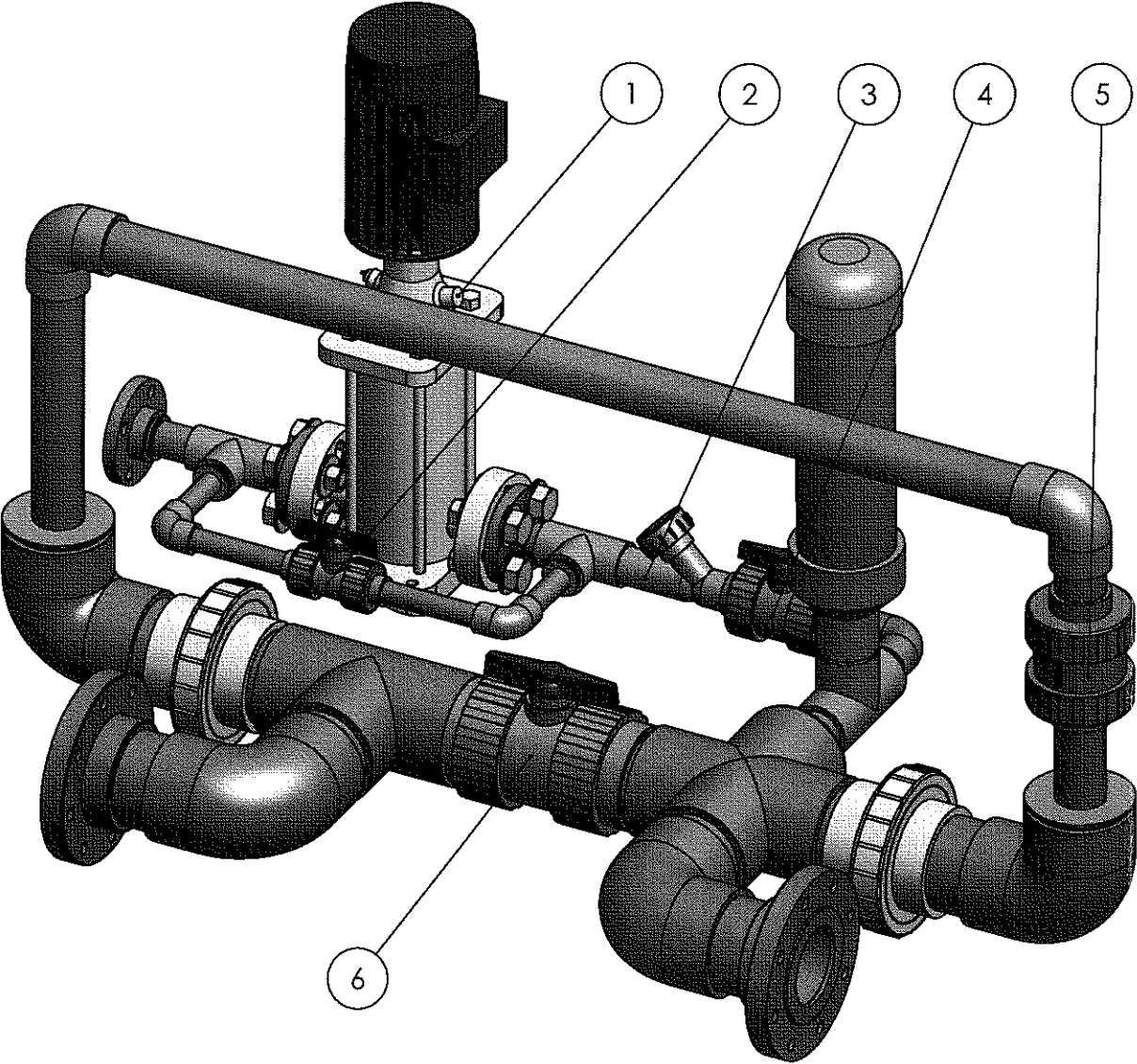
Notes:

1) Liquid models calibrated with water, Sp.Gr. 1.0. Custom Sp.Gr. calibrations available. Contact the factory.

2) Air models calibrated at standard Conditions (70°F @ 14.7 PSia). Temperature and pressure correction may be required. Contact the factory for custom calibrations.

ITEM NO.	TITLE	DESCRIPTION	PART NO	VENDOR	QTY.	DATA SHEET PAGE NUMBER
1	Centrifugal Pump	CRI(E) 5-7, Ø1¼", ANSI 150	96084641	GRUNDFOS	1	1
2	Ball Valve	Ø¾" SCH 80, TYPE 21, SOC x SOC	1601007	ASAHI	1	5
3	Strainer	1¼", SCH 80, MESH 20, SPIG x SPIG	192 306 450	GEORG FISCHER	1	10
4	Ball Valve	Ø1¼" SCH 80, TYPE 21, SOC x SOC	1601012	ASAHI	1	5
5	Check Valve	Ø2" SCH 80, TYPE S4, SOC x SOC	PV3-200-VS	ASAHI	1	12
6	Ball Valve	Ø4" SCH 80, TYPE 21, SOC x SOC	1601040	ASAHI	1	5

FOR SUBMITTAL ONLY



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MATERIAL
SEE TABLE

FINISH

DRAWN BY: RK DATE: 10/01/2012 ENG APPR. DATE QC APPR. DATE

PART NAME: Startup System, Ø1½", CRI(E) 5-7

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
ANGULAR: ±1°
FRACTIONS: ±1/4
TWO PLACE DECIMAL: ±.060
THREE PLACE DECIMAL: ±.030

SIZE: B DWG. NO.: RS000750_P1217 REV: A
SCALE: 1 : 30 SHEET 1 OF 1



Component Specification

Manufacturer	GRUNDFOS
Part Number	96084641
Description	CRI 5-7 A-FGJ-I-E HQQE; CENTRIFUGAL PUMP; 1¼" ANSI 150

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
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Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	



Company name: DUFF CO.
 Created by: PAUL ROSEN
 Phone: 610-275-4453
 Fax: 610-279-6299
 Date: 04/26/2011

Description	Value
Product name:	CRI 5-7 A-FGJ-I-E HQQE
Product No:	96084641
EAN number:	5700395194791

Technical:	
Speed for pump data:	3452 rpm
Rated flow:	30.38 US GPM
Rated head:	158 ft
Impellers:	7
Type of shaft seal:	HQQE
Approvals on nameplate:	NEMA
Curve tolerance:	ISO 9906 Annex A
Stages:	7
Pump version:	A
Model:	A
Cooling:	TEFC

Materials:	
Material, pump housing:	Stainless steel 1.4408 DIN W.-Nr. A 351 CF 8M ASTM
Material, impeller:	Stainless steel 1.4301 DIN W.-Nr. 304 AISI

Material code:	I
Code for rubber:	E

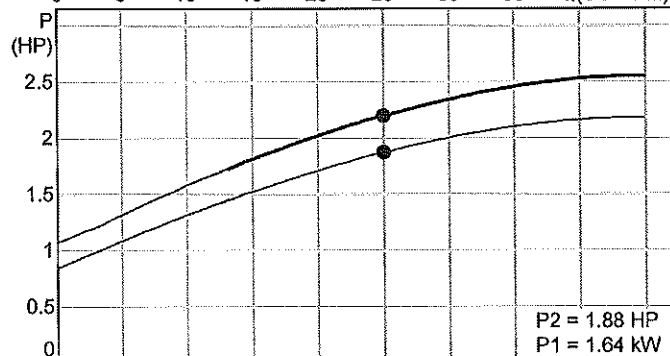
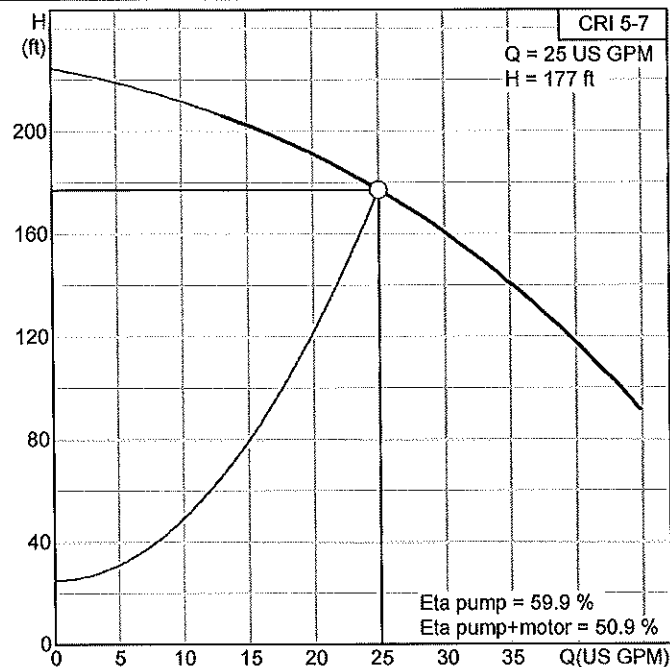
Installation:	
Maximum ambient temperature:	104 °F
Max pressure at stated temp:	363 / 250 psi / °F 363 / -4 psi / °F

Standard, pipe connection:	ANSI
Connect code:	FGJ
Size, pipe connection:	1 1/2
Pressure stage, pipe connec.:	C 7300
Flange size for motor:	56C

Liquid:	
Liquid temperature range:	-4 .. 248 °F

Electrical data:	
Motor type:	90CC
Number of poles:	2
P2:	2 HP
Power (P2) required by pump:	2 HP
Mains frequency:	60 Hz
Rated voltage:	3 x 208-230 / 460 V
Rated current:	5.70-5.40 / 2.7 A
Starting current:	810-900 %
Cos phi - power factor:	0.88-0.84
Rated speed:	3480-3510 rpm
Full load motor efficiency:	85.5 %
Enclosure class (IEC 34-5):	IP55
Insulation class (IEC 85):	F
Motor protec:	NONE
Motor No:	85900705

Others:	
Net weight:	70.3 lb
Gross weight:	78.1 lb
Shipping volume:	2.83 ft³

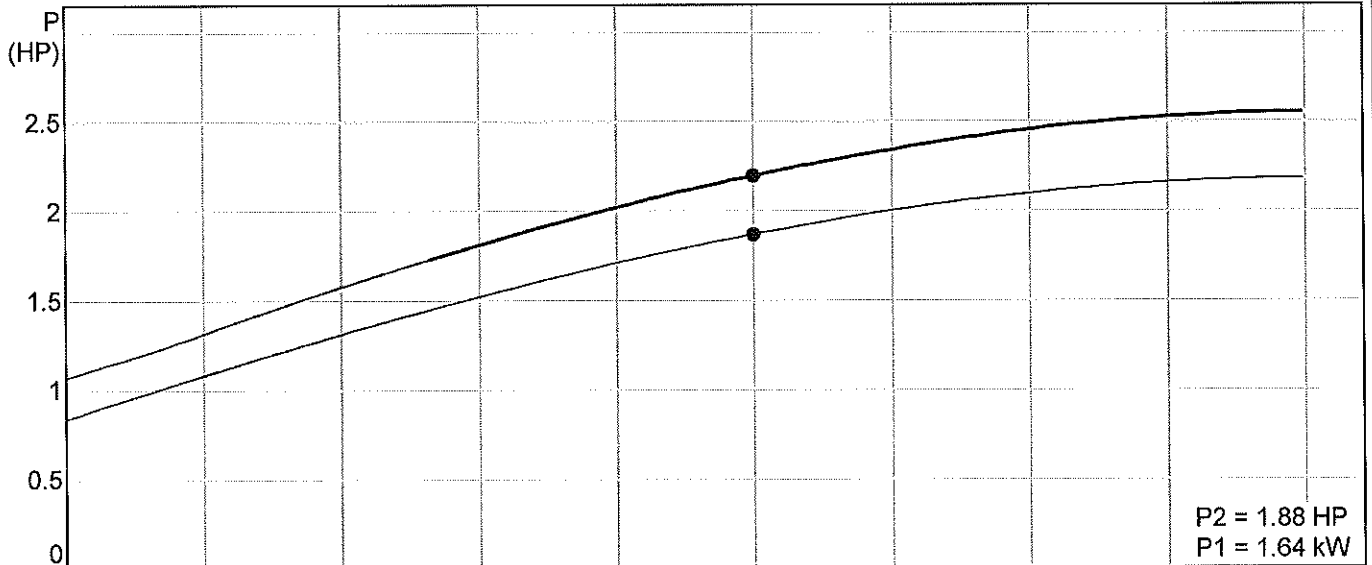
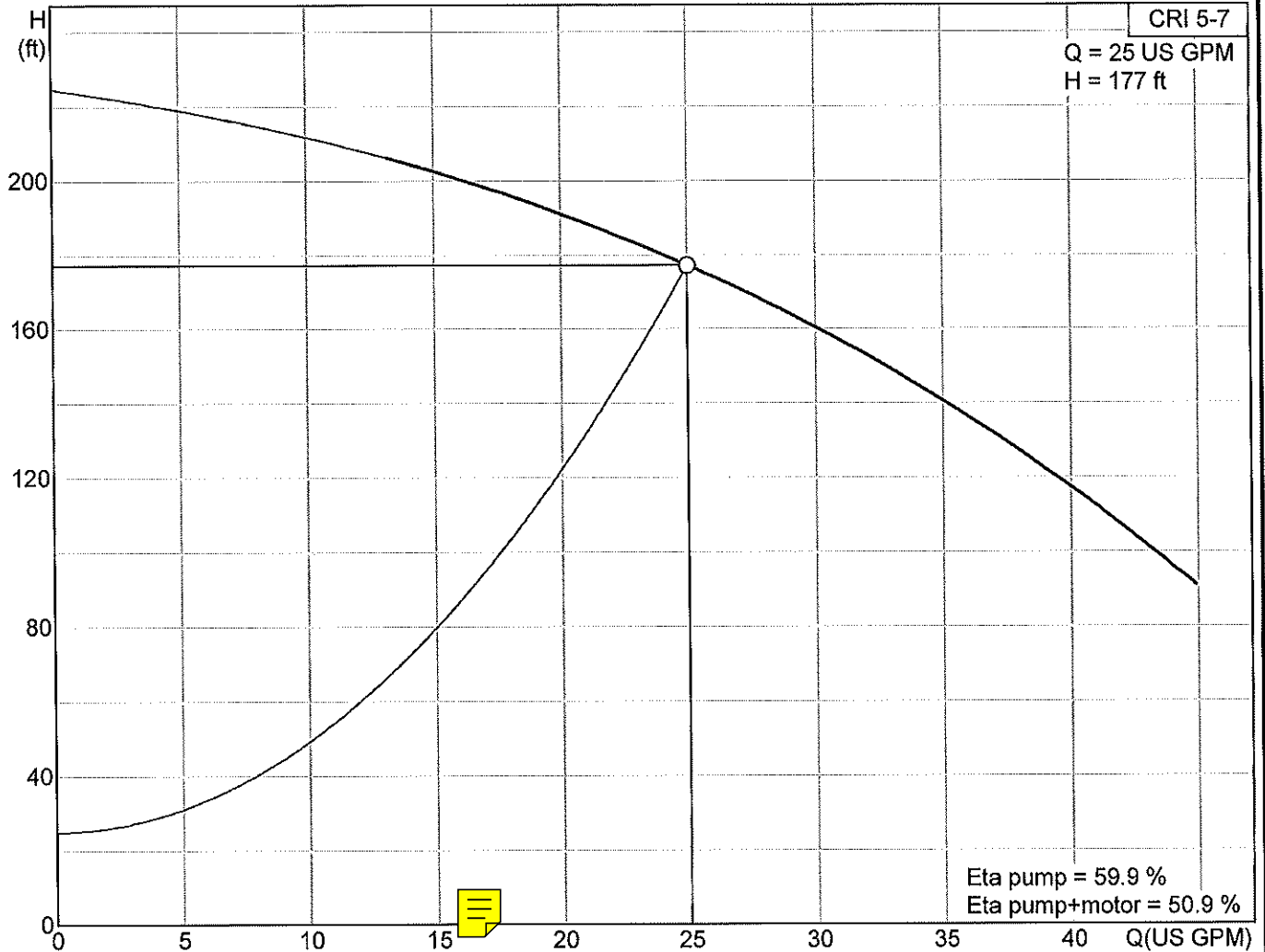


GRUNDFOS®

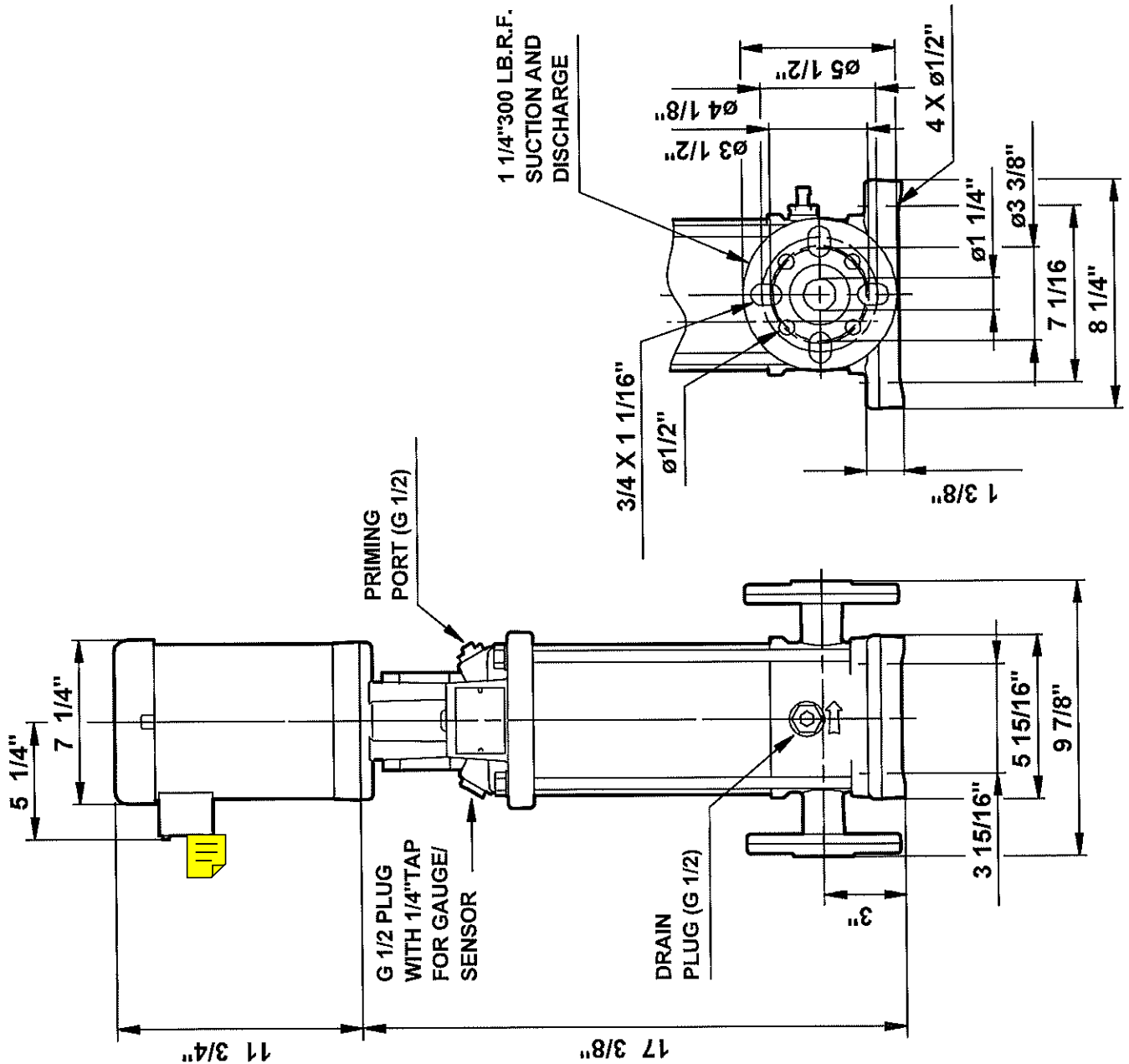


Company name: DUFF CO.
Created by: PAUL ROSEN
Phone: 610-275-4453
Fax: 610-279-6299
Date: 04/26/2011

96084641 CRI 5-7



96084641 CRI 5-7



Note! All units are in [mm] unless others are stated.



Component Specification

Manufacturer	ASAHI
Part Number	1601007
Description	¾" BALL VALVE PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	ASAHI
Part Number	1601012
Description	1 ¼" BALL VALVE PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	ASAHI
Part Number	1601040
Description	4" BALL VALVE PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

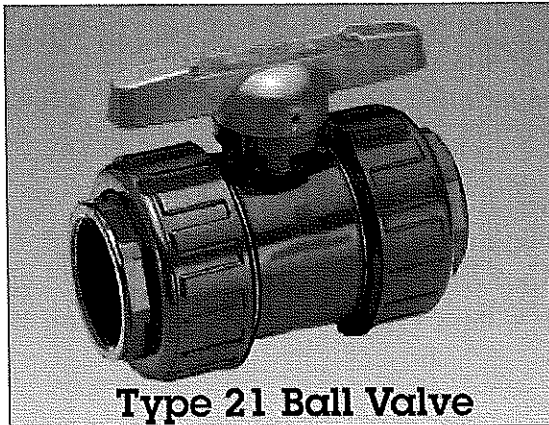
Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	



Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	



Standard Features (Sizes 1/2" - 6")

- Pressure rated up to 230 psi (PVC, CPVC, PVDF)
- Double O-ring seals on stem for added protection.
- Full bore, sizes 1/2" - 2"
- Full vacuum rated, all sizes
- Blocks in two directions, upstream and downstream, leaving full pressure at the opposite end of the valve
- Integrally molded ISO mounting pad for both manual and actuated operations
- Integrally molded base pad to mount valves securely on panel mounting
- PTFE seats with elastomeric backing cushions ensure bubble-tight shut-off and a low fixed torque, while at the same time compensating for wear
- True Union design for easier installation or repairs without expanding the pipe system
- Built-in spanner wrench on the handle for valve disassembly and assembly
- Two sets of end connectors (socket and threaded) included with all PVC and CPVC valves in sizes 1/2" - 2"
- CPVC threaded end connectors on sizes 1/2" - 1" come with stainless steel reinforcing rings

Options

- Pneumatic and electric actuators & accessories
- Stem extensions
- 2" square operating nut or "T" nut
- Locking and/or spring return handles
- Limit switches
- Vented Ball

Specifications

Sizes: 1/2" - 6"
Models: PVC & CPVC: Socket, Threaded and Flanged (ANSI)
 PP & PVDF: IPS and Metric (DIN)
 Socket, Threaded, Butt and Flanged (ANSI)
Bodies: PVC, CPVC, PP and PVDF
Seats: PTFE backed with EPDM or FKM
Seals: EPDM or FKM or AFLAS®†

Sizes 1/2" - 4" PVC/EPDM/FKM Models available with NSF-61 Certification

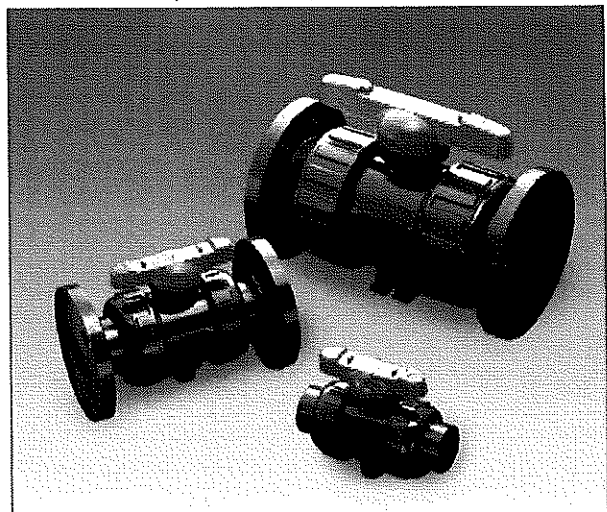
† Trademark of Asahi Glass Co., Ltd.

Parts List (Sizes 1/2" - 2")

PARTS				
NO.	DESCRIPTION	PCS.	MATERIAL	
1	Body	1	PVC, CPVC, PP, PVDF	
2	Ball	1	PVC, CPVC, PP, PVDF	
3	Carrier	1	PVC, CPVC, PP, PVDF	
4	End Connector	2	PVC, CPVC, PP, PVDF	
5	Union Nut	2	PVC, CPVC, PP, PVDF	
6	Stem	1	PVC, CPVC, PP, PVDF	
7	Seal	2	PTFE	
8	O-Ring (A)	2	EPDM	FKM, Others
9	O-Ring (B)	1	EPDM	FKM, Others
10	O-Ring (C)	2	EPDM	FKM, Others
11	O-Ring (D)	1	EPDM	FKM, Others
12	O-Ring (E)	1	EPDM	FKM, Others
13	Stop Ring*	2	PVDF	
14	Handle	1	ABS	
4a	Ring**	2	304 Stainless Steel	

* Used for flanged end

** Used for CPVC body, threaded end, 1/2" - 1"



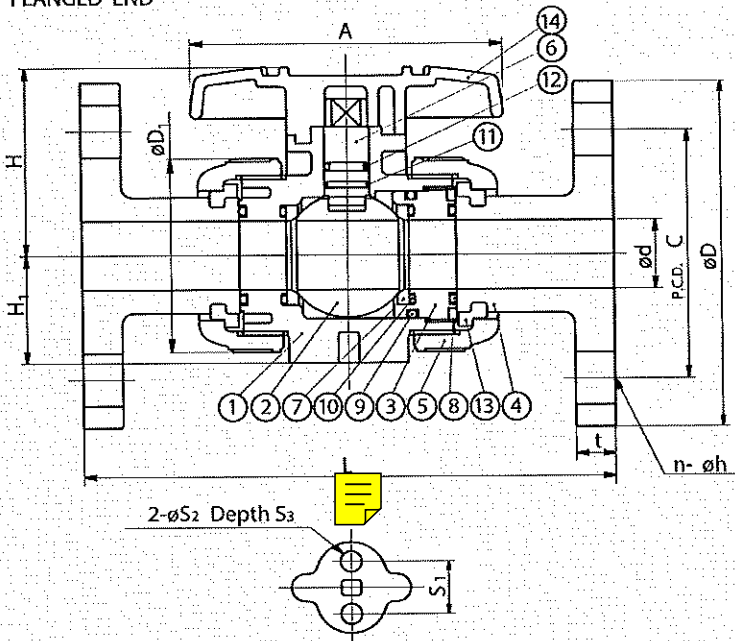
ASAHI/AMERICA

Rev. E 09-08

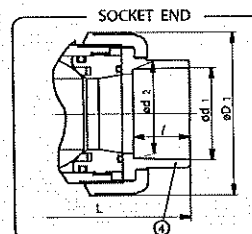
Type 21

Ball Valves

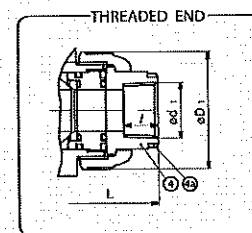
FLANGED END



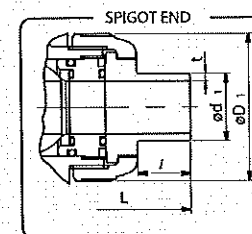
SOCKET END



THREADED END



SPIGOT END



Dimensions (Sizes 1/2" – 2")

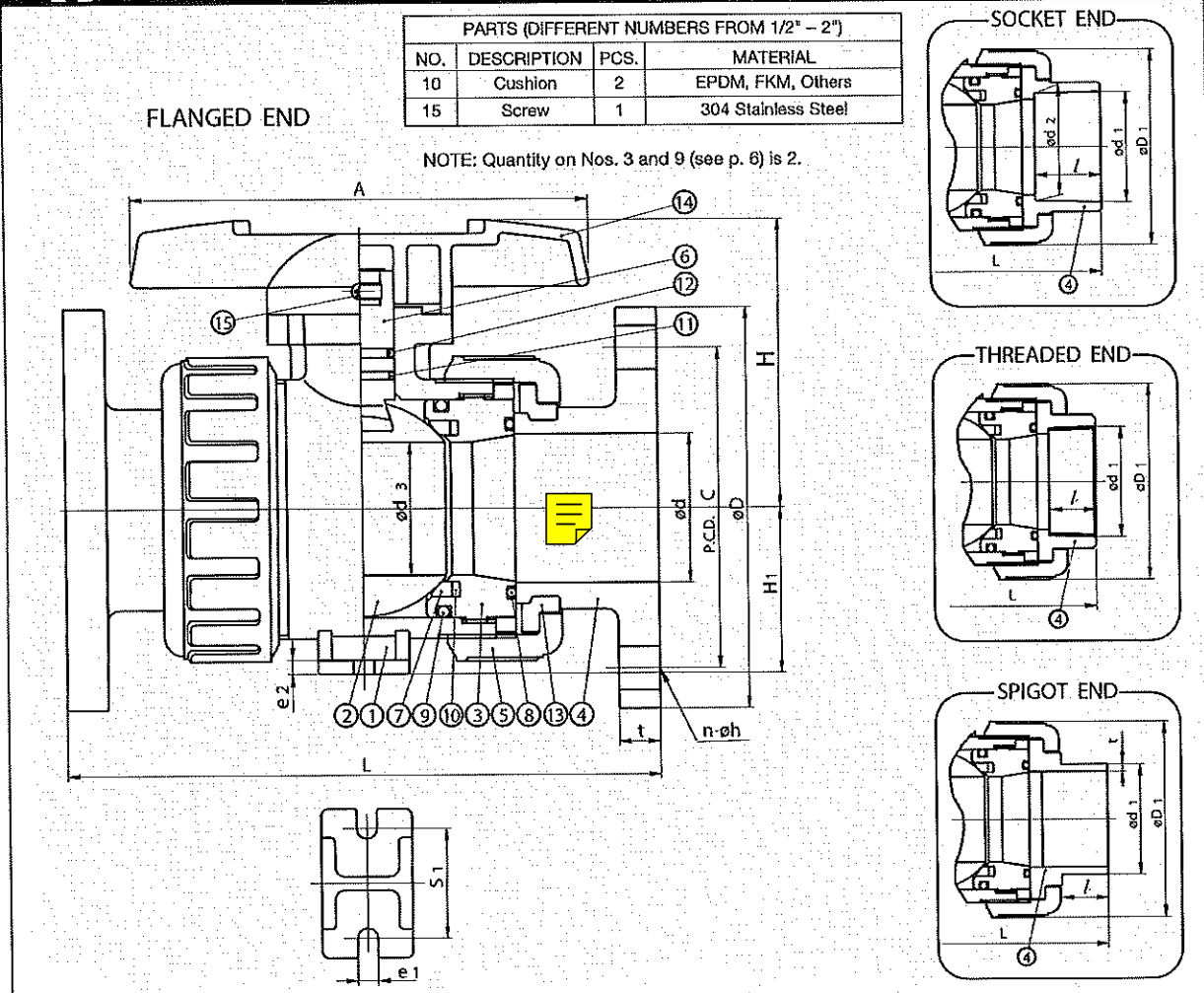
NOMINAL SIZE		FLANGED								SOCKET									
		ANSI CLASS 150								PVC, CPVC		PP, PVDF (DIN)				PP, PVDF (IPS)			
										ASTM SCH 80		DIN 16962							
		d	D	C	n	h	L	t	d1	d2	L	d1	d2	L	L	d1	L	L	L
1/2	15	0.59	3.50	2.38	4	0.62	5.63	0.47	0.848	0.836	0.875	4.45	0.768	0.760	0.57	3.90	0.83	0.87	4.45
3/4	20	0.79	3.88	2.75	4	0.62	6.77	0.55	1.058	1.046	1.000	5.08	0.985	0.957	0.63	4.49	1.03	1.00	5.08
1	25	0.98	4.25	3.12	4	0.62	7.36	0.55	1.325	1.310	1.125	5.75	1.240	1.232	0.71	4.84	1.30	1.13	5.75
1 1/4	32	1.26	4.62	3.50	4	0.62	7.48	0.63	1.670	1.655	1.250	6.46	1.553	1.543	0.81	5.47	1.65	1.25	6.46
1 1/2	40	1.57	5.00	3.88	4	0.62	8.35	0.63	1.912	1.894	1.375	7.24	1.947	1.937	0.93	5.83	1.89	1.37	7.24
2	50	2.01	6.00	4.75	4	0.75	9.21	0.63	2.387	2.369	1.500	8.23	2.461	2.445	1.08	6.93	2.36	1.50	8.23

NOMINAL SIZE		THREADED								SPIGOT (BUTT END)									
										PP, PVDF									
		d1	L	L	D1	H	H1	A	d1	L	t	t	L	S1	S2	S3	S3	S3	S3
1/2	15	1/2-14 NPT	0.59	4.02	1.89	2.03	1.14	3.62	0.787	0.728	0.098	0.075	4.882	0.75	0.29	0.43	0.43	0.43	0.43
3/4	20	3/4-14 NPT	0.67	4.72	2.36	2.34	1.38	3.94	0.984	0.866	0.106	0.075	5.670	0.75	0.29	0.43	0.43	0.43	0.43
1	25	1-11 1/2 NPT	0.79	5.16	2.76	2.68	1.54	4.33	1.260	0.886	0.118	0.094	6.063	0.75	0.29	0.43	0.43	0.43	0.43
1 1/4	32	1 1/4-11 1/2 NPT	0.87	5.91	3.23	3.17	1.85	4.76	1.575	1.024	0.146	0.094	6.850	1.18	0.35	0.59	0.59	0.59	0.59
1 1/2	40	1 1/2-11 1/2 NPT	0.98	6.42	3.94	3.50	2.17	5.16	1.969	1.260	0.181	0.118	7.638	1.18	0.35	0.59	0.59	0.59	0.59
2	50	2-11 1/2 NPT	1.10	7.76	4.96	4.04	2.60	6.26	2.480	1.417	0.228	0.118	8.819	1.18	0.35	0.59	0.59	0.59	0.59

35 Green Street, P.O. Box 653, Malden, MA 02148 • Tel: 800-343-3618 • 781-321-5409 • Fax: 800-426-7058 • E-mail: asahi@asahi-america.com
 Register at our interactive web site for on line ordering, product availability, order tracking, and many useful features: www.asahi-america.com

Type 21

Ball Valves



Dimensions (Sizes 2-1/2" - 4") FOR 6" SIZE CONSULT FACTORY

NOMINAL SIZE			FLANGED							SOCKET										
			ANSI CLASS 150						PVC, CPVC				PP, PVDF (DIN)				PP, PVDF (IPS)			
									ASTM SCH 80			L	d1	d2	/	L	d1	d2	/	L
INCHES	mm	d	D	C	n	h	L	t	d1	d2	/	L	d1	d2	/	L	d1	/	L	
21/2	65	2.56	7	5.5	4	0.75	10.2	0.71	2.889	2.868	1.75	9.45	2.923	2.911	1.22	8.15	2.88	1.752	9.45	
3	80	3.07	7.5	6	4	0.75	11.97	0.71	3.516	3.492	1.875	11.1	3.512	3.498	1.4	9.88	3.48	1.874	11.1	
4	100	3.94	9	7.5	8	0.75	14.65	0.71	4.518	4.491	2	13.9	4.293	4.278	1.63	12.2	4.48	2.252	14.37	

NOMINAL SIZE		THREADED								SPIGOT (BUTT END)							
										PP,PVDF							
										DIN 3442		PP	PVDF				
										d ₁	/	t	t				
INCHES	mm	d ₁	/	L	d ₃	D ₁	H	H ₁	A	d ₁	/	t	t	L	e ₁	e ₂	S ₁
2 1/2	65	2 1/2 - 8NPT	1.26	8.46	2.28	5.24	4.96	2.83	7.87	2.953	1.496	0.272	0.142	9.72	0.35	0.24	1.89
3	80	3 - 8NPT	1.38	10.39	2.70	5.98	5.51	3.35	9.45	3.543	1.496	0.323	0.169	11.61	0.43	0.28	2.17
4	100	4 - 8NPT	1.77	14.17	3.54	8.27	7.01	4.33	11.81	4.331	1.752	0.394	0.209	12.72	0.43	0.31	2.56

Type 21

Ball Valves

Pressure vs. Temperature (PSI, WATER, NON-SHOCK)

NOMINAL SIZE		PVC				CPVC						PP				PVDF				
		30° F 70° F	71° F 105° F	106° F 120° F	121° F 140° F	30° F 70° F	71° F 105° F	106° F 120° F	121° F 140° F	141° F 175° F	176° F 195° F	-5° F 86° F	86° F 120° F	121° F 140° F	141° F 175° F	-5° F 70° F	71° F 105° F	106° F 140° F	141° F 175° F	176° F 210° F
1/2-2	15-50	230	170	150	30	230	170	150	120	75	55	150	110	90	55	230	185	150	115	85
2 1/2	65	230	170	150	NA	230	170	150	120	75	55	150	95	70	40	230	185	150	115	85
3	80	230	170	150	NA	230	170	150	85	55	40	150	95	70	40	230	185	150	100	70
4-6	100-150	150	150	150	NA	150	150	150	85	55	40	150	95	70	40	150	150	150	100	70

Sample Specification

All TYPE 21 Ball Valves, sizes 1/2" to 4", shall be of true union design with two-way blocking capability. All O-rings shall be EPDM or FKM with PTFE seats. PTFE seats shall have elastomeric backing cushion of the same material as the valve seals. Stem shall have double O-rings and be of blowout-proof design. The valve handle shall double as carrier removal and/or tightening tool. ISO mounting pad shall be integrally molded to valve body for actuation. PVC conforming to ASTM D1784 Cell Classification 12454-A, CPVC conforming to ASTM D1784 Cell Classification 23567-A, PP Conforming to ASTM D4101 Cell Classification PP0210B67272, PVDF conforming to ASTM D3222 Cell Classification Type II. The ball valves, except PP, shall have a pressure rating of 230 psi for sizes 1/2" to 3" and 150 psi for 4" (150 psi for PP, all sizes) at 70 ° F. Type 21 Ball Valves must carry a two-year guarantee, as manufactured by Asahi/America, Inc.

Cv Values

NOMINAL SIZE		Cv
INCHES	mm	
1/2	15	14
3/4	20	29
1	25	47
1 1/4	32	72
1 1/2	40	155
2	50	190
2 1/2	65	365
3	80	410
4	100	680

Weight (POUNDS)

NOMINAL SIZE		SOCKET THREADED	FLANGED
INCHES	mm		
1/2	15	0.44	1.10
3/4	20	0.66	1.54
1	25	1.10	2.70
1 1/4	32	1.54	3.30
1 1/2	40	2.64	4.40
2	50	4.40	8.15
2 1/2	65	6.17	8.80
3	80	9.70	13.00
4	100	24.00	26.67

Caution

- Never remove valve from pipeline under pressure.
- Always wear protective gloves and goggles.
- Watch out for trapped fluid in valve. It is safe to close valve before removing it from the pipeline.

Caution

- Do not use ball valves where media has suspended particles. Use the following valves:
Butterfly Valves – PVDF disc is most abrasion resistant and make sure of chemical compatibility.
Diaphragm Valves – Elastomeric diaphragm is designed for handling suspended particles.
- Volatile fluids such as sodium hypochlorite (NaClO) and hydrogen peroxide (H₂O₂) could be trapped and gasified within the valve. We can provide you with a Type 21 ball valve with a *vented ball* to relieve pressure build-up inside the valve.

Troubleshooting

What if the fluid still flows when valve is closed?

1. Carrier is not properly tightened. Tighten it.
2. PTFE seat is damaged or worn. Replace seat.
3. Foreign material is caught between ball and PTFE seat. Remove material and clean.
4. Ball is damaged or worn. Change ball.

What if fluid leaks outside of valve?

1. Union nut not properly tightened. Retighten.
2. Carrier is not properly tightened. Thread it in firmly.
3. Carrier or face O-ring is damaged, worn, or missing. Replace O-ring.

What if handle does not rotate smoothly?

1. Foreign material has formed on the ball or seat. Clean both.
2. Internal part(s) chemically attacked or swollen. Refer to Asahi/America Chemical Resistance Chart for compatibility. Replace part(s) as required.
3. Carrier over-tightened. Retighten properly.

What if handle rotates too freely?

1. Stem is damaged. Replace stem.
2. Handle is not engaged with stem. Disassemble and reengage. Inspect.

Component Specification



Manufacturer	GEORG FISCHER
Part Number	192 306 450
Description	1¼" LINE STRAINER EPDM SEALS SOLVENT CEMENT SPIGOTS ASTM/ ANSI

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

GF Piping Systems Datasheet

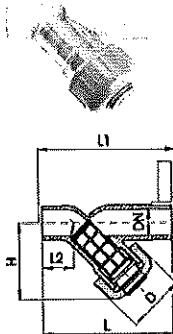
valid from
3/4/10

Line strainers

Type 306 Translucent Line Strainer PVC Transparent body with solvent cement spigots ASTM/ ANSI

Model:

- Protects valves, pumps, etc. from becoming damaged
- Easy dismantling for cleaning the screens
- With screen PVC, perforation $\varnothing$ 0.8 mm, 20 mesh, 1/32 inch



Size	DN [inch]	PN	EPDM Part No.	FPM Part No.	lbs	D [inch]	L [inch]	L1 [inch]	L2 [inch]	H [inch]
1/4	0.59	150	192 306 300	192 306 349	0.243	1.69	5.63	5.87	1.46	2.56
3/4	0.79	150	192 306 350	192 306 399	0.375	1.85	6.30	6.54	1.77	2.99
1	0.98	150	192 306 400	192 306 449	0.562	2.20	6.85	7.09	1.85	3.54
1 1/4	1.26	150	192 306 450	192 306 499	0.902	2.52	7.40	7.64	2.09	4.09
1 1/2	1.57	150	192 306 500	192 306 549	1.400	3.23	8.07	8.31	2.13	4.88
2	1.97	150	192 306 550	192 306 599	2.205	3.74	8.86	9.09	2.48	5.83
3	3.15	150	192 306 650	192 306 699	6.173	4.72	12.24	12.64	3.54	8.07

The technical data are not binding and not expressly warranted characteristics of the goods. They are subject to change. Our General Conditions of Sale apply.

Georg Fischer Piping Systems Ltd, Postfach, CH-8201 Schaffhausen/Switzerland Phone +41 -(0)52-631 1111 e-mail: info.ps@georgfischer.com Internet: <http://www.piping.georgfischer.com>



Component Specification

Manufacturer	ASHAI
Part Number	PV3-200-VS
Description	2" CHECK VALVE PVC SCHED 80 EPDM SEALS TRUE UNION SOCKET ENDS

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

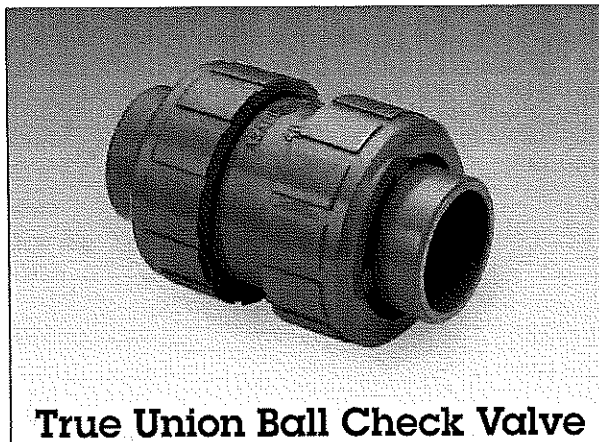
Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	

Manufacturer	
Part Number	
Description	



Specifications

- Sizes:** True Union : 1/2" - 2"
Single Union: 3" - 4"
- Models:** Socket, Threaded, Flanged (ANSI), Butt End
- Bodies:** PVC, CPVC, PP and PVDF
- Seats:** EPDM, FKM, PTFE
- Seals:** EPDM, FKM, PTFE
- Option:** Foot Valve

Sizes 1/2" - 4" PVC/EPDM/FKM Models are available with NSF-61 Certification

Standard Features (Sizes 1/2" - 2")

- Uniseat/seal of EPDM or FKM
- Ball is the only moving part. It unseats to permit flow in one direction but seals against seat to prevent backflow.
- May be used vertically or horizontally
- Minimum shut-off of 5 psi
- All sizes rated for full vacuum service
- Solid thermoplastic ball

Options:

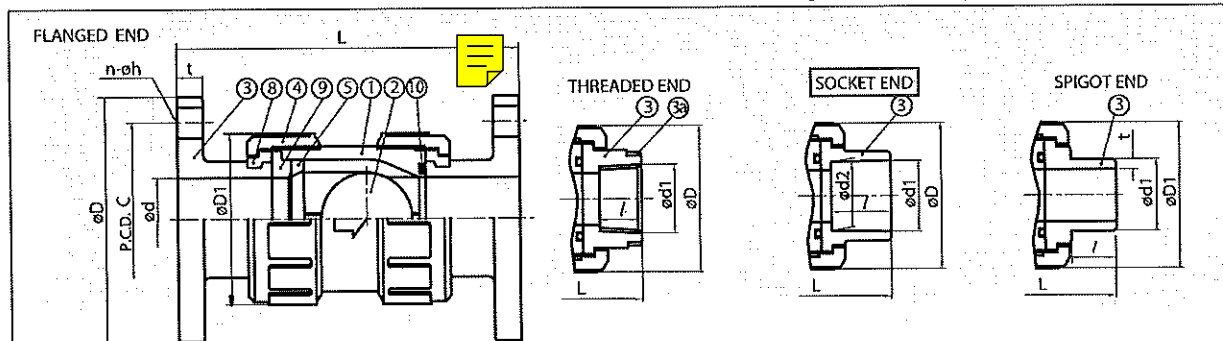
- PTFE coated FKM uniseat/seal
- Spring-loaded ball to assist ball in seating faster

Parts List - True Union (Sizes 1/2" - 2")

PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC, CPVC, PP, PVDF
2	Ball	1	PVC, CPVC, PP, PVDF
3	End Connector	2	PVC, CPVC, PP, PVDF
4	Union Nut	2	PVC, CPVC, PP, PVDF
5	Stop Ring (A)	1	PVC, CPVC, PP, PVDF
8	Stop Ring (B)*	1	PVDF
9	Seat	1	EPDM, FKM, PTFE
10	O-Ring	1	EPDM, FKM, PTFE
3a	Ring**	1	Stainless Steel 304

* Used for flanged end

** Used for CPVC body, threaded end; 1/2" - 1"



Dimensions (Sizes 1/2" - 2")

NOMINAL SIZE	FLANGED								THREADED								SOCKET												SPIGOT(BUTT END)				
	ANSI CLASS 150																PVC, CPVC				PP, PVDF (DIN)				PP, PVDF (JIS)				PP, PVDF				
																	PP, PVDF				DIN 16962								DIN 3442				
	INCHES	MM	D	C	n	h	L	t	d ₁	l	L	d	D ₁	d ₁	d ₂	l	L	d ₁	d ₂	l	L	d ₁	l	L	d ₁	l	t	t	L				
1/2	15	3.50	2.38	4	0.62	5.12	0.47	1/2-14NPT	0.59	3.39	0.59	1.89	0.848	0.836	0.688	3.43	0.768	0.760	0.57	3.19	0.83	0.87	3.31	0.787	0.728	0.098	0.075	4.00					
3/4	20	3.88	2.75	4	0.62	6.10	0.55	3/4-14NPT	0.67	4.06	0.79	2.36	1.058	1.046	0.719	3.86	0.965	0.957	0.63	3.70	1.03	1.00	4.43	0.984	0.868	0.106	0.075	4.35					
1	25	4.25	3.12	4	0.62	6.50	0.55	1-11½NPT	0.79	4.45	0.98	2.76	1.325	1.310	0.875	4.37	1.240	1.232	0.71	4.13	1.30	1.13	4.35	1.260	0.868	0.118	0.094	4.75					
1 1/4	32	-	-	-	-	-	-	1¼-11½NPT	0.87	5.00	1.22	3.78	1.670	1.655	0.938	4.92	-	-	-	-	-	-	-	-	-	-	-	-	-				
1 1/2	40	5.00	3.88	4	0.62	7.56	0.63	1½-11½NPT	0.98	5.94	1.57	3.78	1.912	1.894	1.094	5.94	1.947	1.937	0.93	5.62	1.89	1.37	5.57	1.969	1.260	0.181	0.118	5.75					
2	50	6.00	4.75	4	0.75	8.43	0.63	2-11½NPT	1.10	6.97	2.01	4.17	2.387	2.369	1.156	6.77	2.461	2.445	1.08	6.69	2.36	1.50	6.49	2.480	1.417	0.228	0.118	6.50					

35 Green Street, P.O. Box 653, Malden, MA 02148 • Tel: 800-343-3618 • 781-321-5409 • Fax: 800-426-7058 • E-mail: asahi@asahi-america.com
Register at our interactive web site for on line ordering, product availability, order tracking, and many useful features: www.asahi-america.com



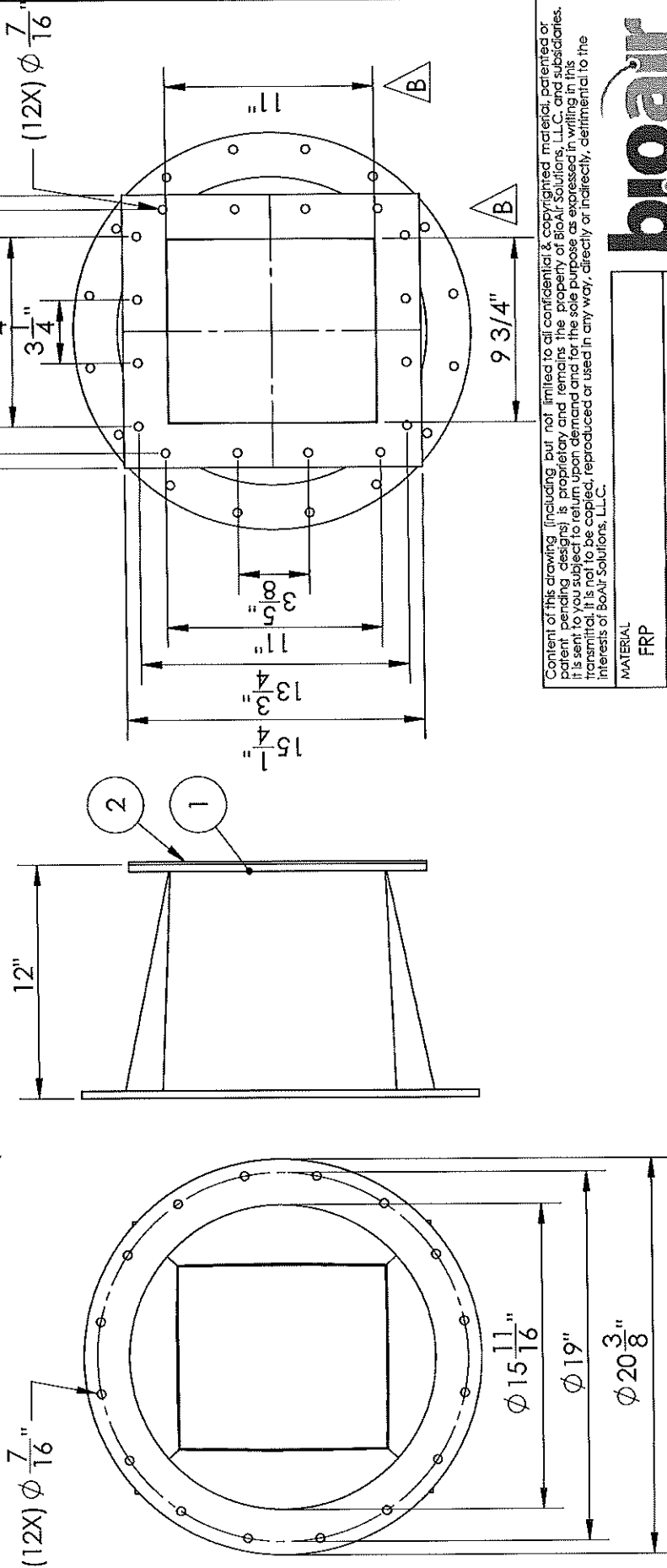
Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

D.6. INTERCONNECTING DUCTWORK

REV.	DATE	ECN#	REVISION RECORD	DRICK
A	04/19/2012			KZ
B	08/13/2012		ADDED INTERNAL FLANGE DIMENSION	KZ

NOTES:

1. CONSTRUCTED OF FRP PER ASTM 3982
2. FLANGE TO BE SPOT FACED, HOLES TO STRADDLE RADIAL CENTERLINES
3. ALL EXTERIOR SURFACES (INCLUDING FLANGES) TO BE COATED WITH EXTERIOR TOP COAT
4. DESIGN CONDITIONS:
 - CHEMICAL ENVIRONMENT: MAX. 5% H₂SO₄ (SULFURIC ACID)
 - TEMPERATURE: -13°F (-25°C) to +131°F (55°C)
 - PRESSURE RATING: +/- 10" W.C. (2.5kPa)



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bioair
Solutions, LLC

MATERIAL
FRP
FINISH
CCP BASE WHITE W005 GEL COAT

DRAWN BY
KZ
DATE
04/19/2012
ENG APPR.
DATE
04/19/2012
QC APPR.
DATE

PART NAME

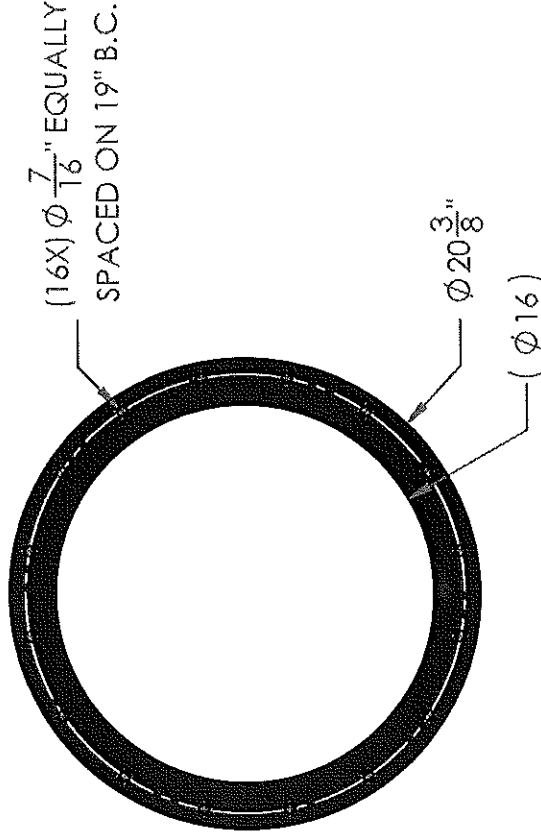
BLOWER TRANSITION Ø16" PS15-69

ITEM	DESCRIPTION	QTY	MATERIAL
1	FRP BLOWER TRANSITION Ø16" PS15-69 x RE	1	FRP
2	RECTANGULAR GASKET 15 1/4" x 14"	1	EPDM

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE ANGULAR: ±1° TWO PLACE DECIMAL: ±.2 THREE PLACE DECIMAL: ±.2	SIZE	DWG. NO.	REV
	A	BT161200	B
SCALE: 1 : 12		SHEET 1 OF 1	

NOTE:

1. UNAFLEX MIGHTY SPAN STYLE 600 EPDM FLANGED FLEX CONNECTOR
2. Ø16" PS15-69 BOLT PATTERN



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MATERIAL
SEE NOTE #1

FINISH

DRAWN BY	DATE	ENG APPR.	DATE	QC APPR.	DATE
TT	05/02/2011				

PART NAME

SINGLE ARCH, Ø16", PS15-69

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
ANGULAR: ±1°
FRACTIONS: ±1/4
TWO PLACE DECIMAL: ±.060
THREE PLACE DECIMAL: ±.030

SIZE DWG. NO.
A **FC160000**

REV
A

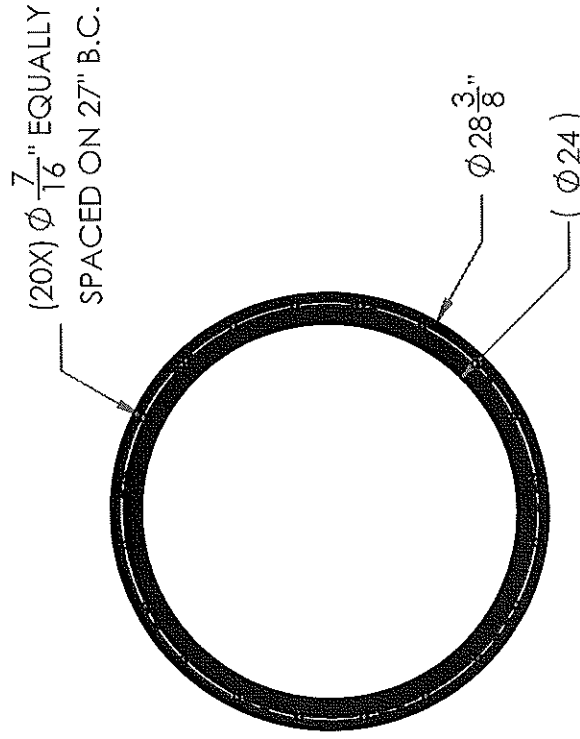
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SHEET 1 OF 1

REV.	DATE	ECN#	REVISION RECORD	DR	CK
A	05/02/2011			TT	

NOTES:

1. UNAFLEX MIGHTY SPAN STYLE 600 EPDM FLANGED FLEX CONNECTOR
2. 24" Ø PS15-69 BOLT PATTERN



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MATERIAL	SEE NOTE #1
FINISH	

DRAWN BY	DATE	ENG APPR.	DATE	QC APPR.	DATE
TT	02/09/2011				

PART NAME

FLANGED FLEX CONNECTOR Ø24" SINGLE ARCH

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: ±1° FRACTIONS: ±1/4 TWO PLACE DECIMAL: ±.060 THREE PLACE DECIMAL: ±.030	SIZE	DWG. NO.	REV
	A	FC240000	A
SCALE: 1 : 12		SHEET 1 OF 1	

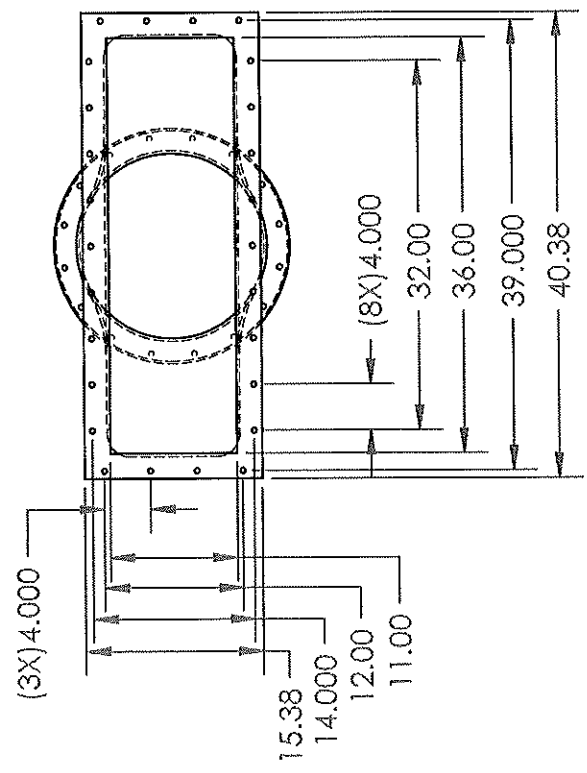
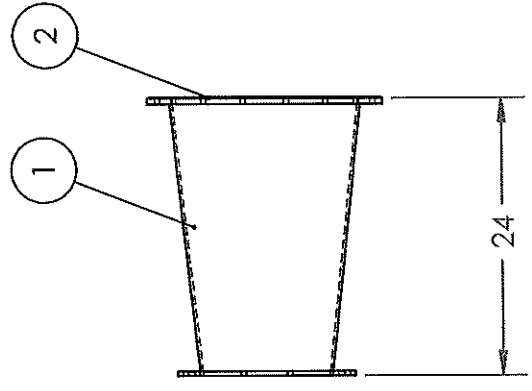
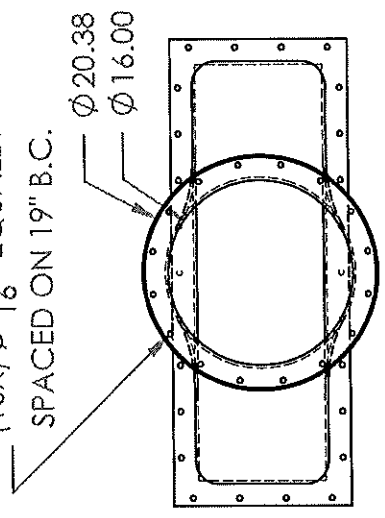
REV.	DATE	ECN#	REVISION RECORD	DR	CK
A	02/09/2011			TT	

Notes:

1. CONSTRUCTED OF FRP PER ASTM 3982

REV.	DATE	ECN#	REVISION RECORD	DRICK
A	03/20/2009			IT

(16X) $\phi \frac{7}{16}$ " EQUALLY
SPACED ON 19" B.C.



ITEM	DESCRIPTION	QTY.	MATERIAL
1	16" PS15-69 X 36"x11" RECT TRANSITION	1	FRP
2	16" EPDM DUCT FLANGE GASKET	1	EPDM

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bioair
Breathe Better

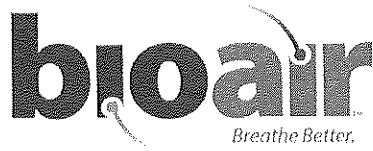
MATERIAL
FRP - SEE NOTE #1

FINISH
CCP BASE WHITE W005 GEL COAT

DRAWN BY	DATE	ENG APPR.	DATE	QC APPR.	DATE
TT	03/20/2009				

PART NAME
Ø16" PS15-69 X 36"x11" FRP RECT TRANSITION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: ±1° FRACTIONS: ±1/4 TWO PLACE DECIMAL: ±0.060 THREE PLACE DECIMAL: ±0.030	SIZE	DWG. NO.	REV
	A	TP163600	A
		SCALE: 1 : 16	SHEET 1 OF 1

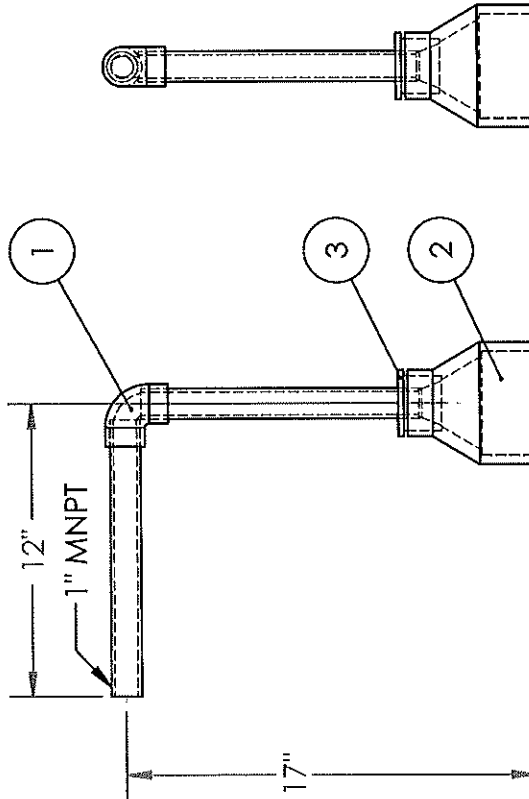


Englewood Water District
Water Reclamation Facility Bioscrubber
BioAir Project No. P1217
BioAir Submittal No. 01-10/12
October 2012

D.7. OTHER

NOTES:

1. ALL PIPE TO BE PVC SCHEDULE 80
2. ALL SOCKET CONNECTIONS SOLVENT CEMENTED



REV.	DATE	ECN#	REVISION RECORD	DRCK
A	12/22/2009			IT
B	03/31/2010		REMOVED FABRICATED FUNNEL; ADDED ITEMS 3 & 4	IT
C	02/28/2011		PVC PIPE & ELBOW WAS 316SS	IT

ITEM	PART NUMBER	QTY.	DESCRIPTION	MATERIAL
1	806-010	1	1" PVC SCH80 SOCKET ELBOW	SPEARS OR EQUIV.
2	829-420	1	PVC SCH80 4 X 2 SOCKET REDUCER COUPLING	SPEARS OR EQUIV.
3	837-249	1	PVC SCH80 FLUSH STYLE REDUCER BUSHING 2" X 1"	SPEARS OR EQUIV.

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MATERIAL	SEE TABLE
FINISH	

DRAWN BY	DATE	ENG APPR.	DATE
TT	12/22/2009		

PART NAME
AIR SAMPLING SYSTEM Ø 1" PIPE Ø 12" OFFSET

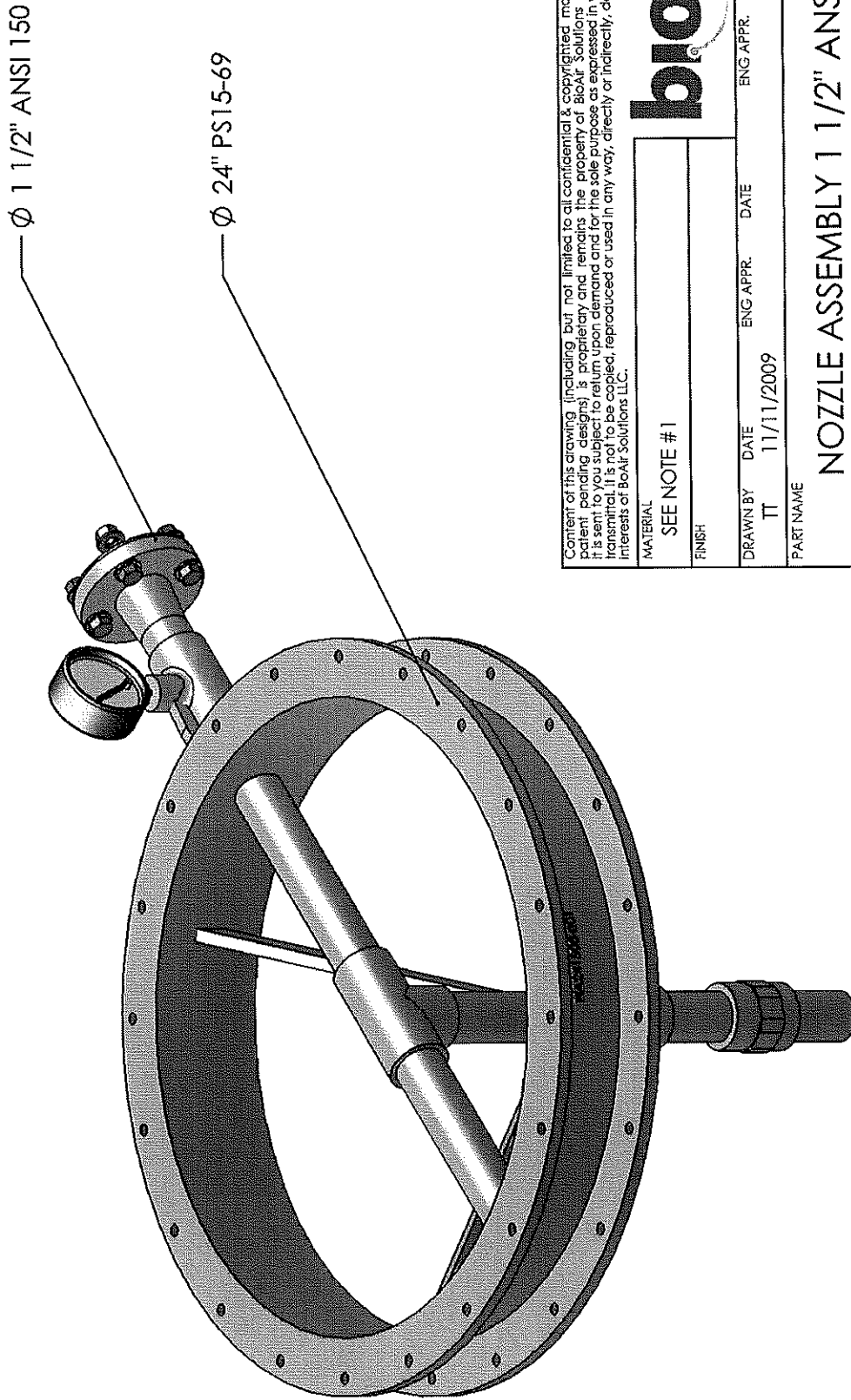
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: ±1° FRACTIONS: ±1/4 TWO PLACE DECIMAL: ±.060 THREE PLACE DECIMAL: ±.030	SIZE	DWG. NO.	REV
	A	AS101200	C
SCALE: 1 : 6		SHEET 1 OF 1	



FOR SUBMITTAL ONLY

NOTES:

1. CONSTRUCTED OF POLYPROPYLENE; ALL MATERIAL CONNECTIONS WELDED
2. 30 PSI / 207 kPa PRESSURE INDICATION
3. PRESSURE TESTED TO 80 PSI / 552 kPa
4. SPRAY PATTERN TESTED PRIOR TO SHIPPING



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MATERIAL	SEE NOTE #1
FINISH	

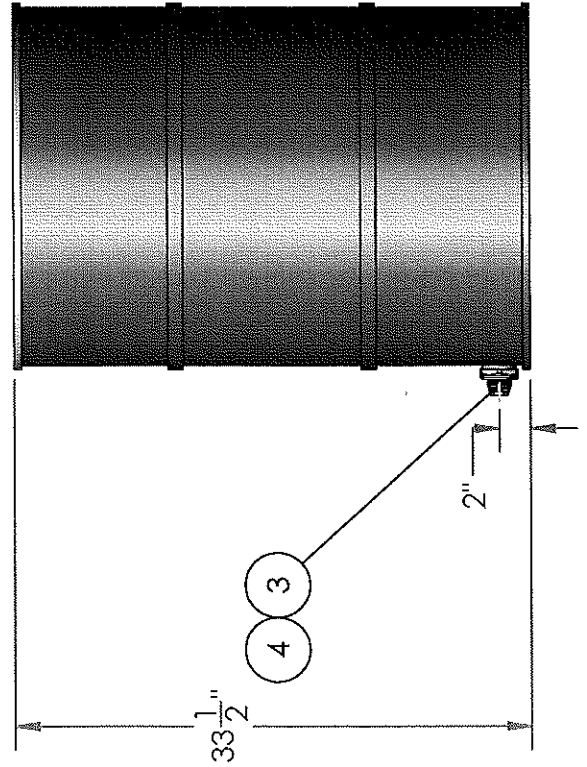
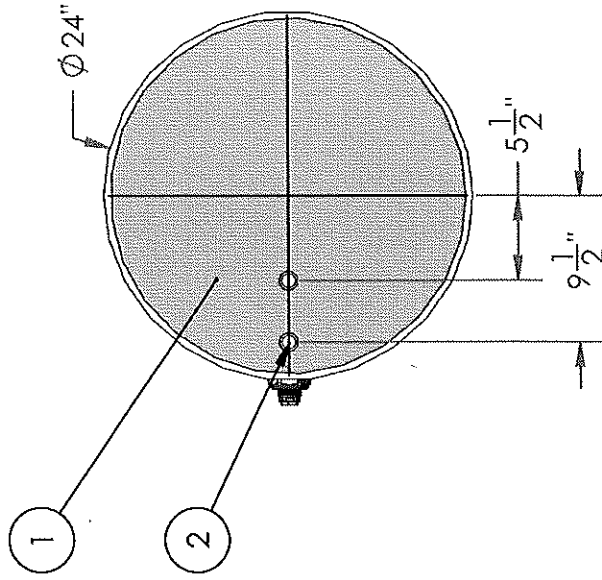
DRAWN BY	DATE	ENG APPR.	DATE
TT	11/11/2009		

PART NAME	NOZZLE ASSEMBLY 1 1/2" ANSI		
-----------	-----------------------------	--	--

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: ±1° FRACTIONS: 1/4 TWO PLACE DECIMAL: ±.060 THREE PLACE DECIMAL: ±.030	SIZE	DWG. NO.	REV
	A	NA241500	A

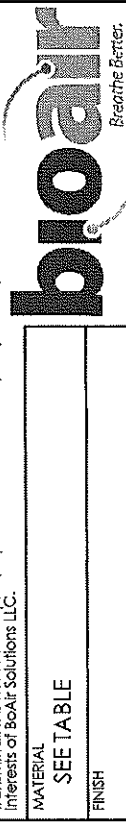
SCALE: 1 : 6	SHEET 1 OF 1
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REV.	DATE	ECN#	REVISION RECORD	DRICK
A	06/15/2011			TT



ITEM	DESCRIPTION	QTY.	VENDOR	MATERIAL
1	HDPE NUTRIENT BARREL 55 GAL	1	CARY COMPANY	NB550100
2	1/4" CABLE GLAND	2	MCMASER-CARR	69915K54
3	1/2" FPT PVC TANK ADAPTER	1	SPEARS	8172-005
4	1/2" PVC MPT PLUG	1	SPEARS	805-005

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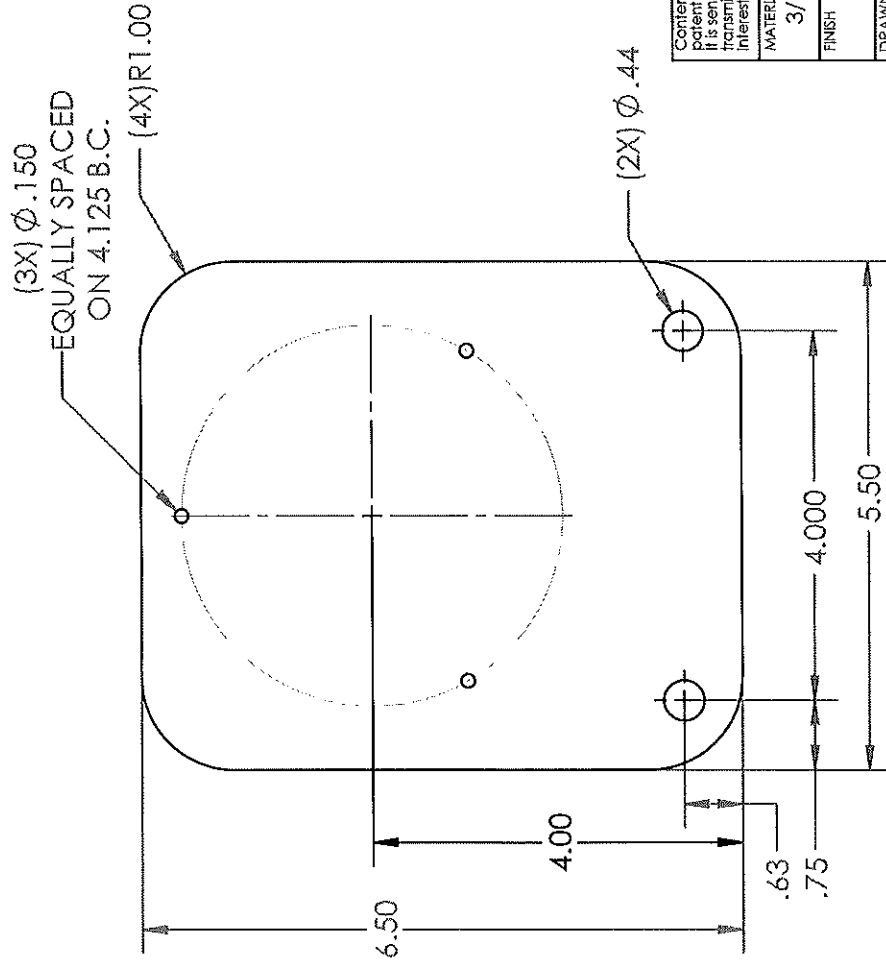
DRAWN BY	DATE	ENG APPR.	DATE	ENG APPR.	DATE
TT	06/15/2011				

PART NAME: NUTRIENT BARREL ASSEMBLY 55GAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: $\pm 1^\circ$ FRACTIONS: $\pm 1/4$ TWO PLACE DECIMAL: $\pm .060$ THREE PLACE DECIMAL: $\pm .030$	SIZE	DWG. NO.	REV
	A	NB550200	B
		SCALE:	SHEET 1 OF 1

REV.	DATE	ECN#	REVISION RECORD	DRICK
A	11/08/2011			TT

- NOTES:
1. DEBURR ALL HOLES
 2. BREAK SHARP EDGES



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MATERIAL	3/16" THK 316 STAINLESS STEEL PLATE
FINISH	

bioair
Breathe Better.

DRAWN BY	DATE	ENG APPR.	DATE
TT	11/08/2011		

PART NAME

DIFFERENTIAL PRESSURE GAUGE MOUNTING BRACKET, S/S 316

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: ANGULAR: $\pm 1^\circ$ FRACTIONS: $\pm 1/4$ TWO PLACE DECIMAL: $\pm .030$ THREE PLACE DECIMAL: $\pm .010$	SIZE	DWG. NO.	REV
	A	SW000100	A
SCALE: 1 : 2		SHEET 1 OF 1	