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ATTORNEYS AT LAW

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Tyler A. Cosby
tcosby@farris-law.com

(615) 687-4225 (direct)

July 24, 2020

VIA ELECTRONIC FILING

Chairman Robin L. Morrison
c/o Ectory Lawless
Tennessee Public Utilities Commission
502 Deaderick Street, 4th Floor
Nashville, TN 37243

RE: *Docket 20-00038 Petition of Integrated Resource Management, Inc. for a Certificate of Convenience and Necessity.*

Dear Chairman Morrison:

Attached for filing, please find a copy of Integrated Resource Management, Inc.'s State Operating Permit issued by TDEC, the proposed changes to be made to the current Tariff filed with the Petition, updated engineering design plans, and an escrow statement showing the additional funds have been deposited into the escrow account.

As required, I have mailed the original to the TPUC office. Please let us know if you require any additional information.

Sincerely,

Tyler A. Cosby

Tyler A. Cosby

Encls.

Cc: Jeffrey Cox

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

July 22, 2020

Mr. Jeffrey W. Cox, Sr.President
IRM Utility, Inc.
e-copy: envsoilconsulting@charter.net
PO Box 642
White Pine, TN 37890

Re: State Operating Permit No. SOP-19016
Integrated Resource Management, Inc.- ISHA Enclave Subdivision
McMinnville, Warren County, Tennessee

Dear Mr. Cox:

In accordance with the provisions of the Tennessee Water Quality Control Act, Tennessee Code Annotated (T.C.A.), Sections 69-3-101 through 69-3-120, the Division of Water Resources hereby issues the enclosed State Operating Permit. The continuance and/or reissuance of this Permit is contingent upon your meeting the conditions and requirements as stated therein.

Please be advised that a petition for permit appeal may be filed, pursuant to T.C.A. Section 69-3-105, subsection (i), by the permit applicant or by any aggrieved person who participated in the public comment period or gave testimony at a formal public hearing whose appeal is based upon any of the issues that were provided to the commissioner in writing during the public comment period or in testimony at a formal public hearing on the permit application. Additionally, for those permits for which the department gives public notice of a draft permit, any permit applicant or aggrieved person may base a permit appeal on any material change to conditions in the final permit from those in the draft, unless the material change has been subject to additional opportunity for public comment. Any petition for permit appeal under this subsection (i) shall be filed with the technical secretary of the Water Resources Board within thirty (30) days after public notice of the commissioner's decision to issue or deny the permit. A copy of the filing should also be sent to TDEC's Office of General Counsel.

If you have questions, please contact the Cookeville Environmental Field Office at 1-888-891-TDEC; or, at this office, please contact Ms. Anastasia Sharp at (615) 532-1508 or by E-mail at Anastasia.Sharp@tn.gov.

Sincerely,

Brad Harris, P.E.
Manager, Land-based Systems

Enclosure

cc/ec: Land-based Systems File
Cookeville Environmental Field Office

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

Permit No. SOP-19016

PERMIT

For the operation of Wastewater Treatment Facilities

In accordance with the provision of Tennessee Code Annotated section 69-3-108 and Regulations promulgated pursuant thereto:

PERMISSION IS HEREBY GRANTED TO

Integrated Resource Management, Inc.- ISHA Enclave Subdivision
McMinnville, Warren County, Tennessee

FOR THE OPERATION OF

Septic tanks, collection system and low pressure pipe (LPP) subsurface sewage disposal system located at latitude 35.580631 and longitude -85.584667 in Warren County, Tennessee to serve approximately 102 homes in the ISHA Enclave Subdivision. The design capacity of the system is .0306 MGD and will be dispersed on approximately 12.16 acres of suitable soils.

This permit is issued as a result of the application filed on June 30, 2020 in the office of the Tennessee Division of Water Resources. This permit is contingent on the submission and department approval of construction plans, specifications and other data in accordance with rules of the department. Updated plans and specifications must be approved before any further construction activity.

This permit shall become effective on: August 1, 2020

This permit shall expire on: July 31, 2025

Issuance date: July 22, 2020

for Jennifer Dodd
Director

A. GENERAL REQUIREMENTS

The treatment system shall be monitored by the permittee as specified below:

Parameter	Sample Type	Daily Maximum	Monthly Average	Measurement Frequency
Flow *	Totalizer	Report		Daily
BOD_5	Grab	Report	N/A	Semi-annually

* Report average daily flow for each calendar month.

Sampling requirements in the table above apply to effluent being discharged to the dispersal plots.

This permit allows the operation of a wastewater collection, treatment, and storage system with disposal through approved land application areas. There shall be no discharge of wastewater to any surface waters or to any location where it is likely to enter surface waters. There shall be no discharge of wastewater to any open throat sinkhole. In addition, the dispersal system shall be operated in a manner preventing the creation of a health hazard or a nuisance.

The land application component shall be operated and maintained to ensure complete hydraulic infiltration within the soil profile, transmission of the effluent away from the point of application, and full utilization of the soil profile as a portion of the treatment system.

Instances of surface saturation, ponding or pooling within the land application area as a result of system operation are prohibited. Instances of surface saturation, ponding or pooling shall be promptly investigated and noted on the Monthly Operations Report. The report shall include details regarding location(s), determined cause(s), the actions taken to eliminate the issue, and the date the corrective actions were made. Any instances of surface saturation, ponding or pooling not associated with a major precipitation event not corrected within three days of discovery shall be reported to the local Environmental Field Office at that time for investigation. Surface saturation, ponding or pooling resulting in the discharge of treated wastewater into Waters of the State or to locations where it is likely to move to Waters of the State shall be immediately reported to the local Environmental Field Office, unless the discharge is separately authorized by a NPDES permit."

The site shall be inspected by the certified operator or his/her designee, at a minimum, once per month. The inspection schedule shall at a minimum evaluate the following via onsite visits or telemetry monitoring or a combination of the two:

- the condition of the site signage,
- the operational status of the mechanical parts of the treatment system (pumps, filters, telemetry equipment, etc.)
- the condition of the land application area including the location of any ponding
- the name of the inspector
- the description of any corrective actions

B. MONITORING PROCEDURES

1. Representative Sampling

Samples and measurements taken in compliance with the monitoring requirements specified above shall be representative of the volume and nature of the monitored discharge, and shall be taken at the following location(s):

Effluent to dispersal area.

C. DEFINITIONS

"Semi-annually" means samples are to be taken every 6 months after the first full month of operation.period.

"Wastewater" for the purpose of this permit means "sewage" as defined in TCA 69-3-103

D. REPORTING

1. Monitoring Results

Monitoring results shall be recorded consistent with the general requirements imposed in Part A above and submitted quarterly.

Submittals shall be postmarked no later than 15 days after the completion of the reporting period. A copy should be retained for the permittee's files. Monitoring results shall be reported in a format approved by the division. Operation reports and any communication regarding compliance with the conditions of this permit must be sent to:

Division of Water Resources
Cookeville Environmental Field Office
1221 South Willow Avenue
Cookeville, TN 38506

Sampling results may be submitted electronically to: DWRWW.Report@tn.gov.

The first operation report is due on the 15th of the month following the quarter containing the permit effective date.

Knowingly making any false statement on any report required by this permit may result in the imposition of criminal penalties as provided for in Section 69-3-115 of the Tennessee Water Quality Control Act.

4. Signatory Requirement

All reports or information submitted to the commissioner shall be signed and certified by the persons identified in Rules 0400-40-05-.05(6)(a-c).

PART II

A. GENERAL PROVISIONS

1. Duty to Reapply

The permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of Water Resources (the "Director") no later than 180 days prior to the expiration date.

2. Right of Entry

The permittee shall allow the Director, or authorized representatives, upon the notification of permittee and presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or where records are required to be kept under the terms and conditions of this permit, and at reasonable times to copy these records;

b. To inspect at reasonable times any monitoring equipment or method or any collection, treatment, pollution management, or discharge facilities required under this permit; and

c. To sample at reasonable times any discharge of pollutants.

3. Availability of Reports

All reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Water Resources.

4. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and dispersal which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

The monitoring frequency stated in this permit shall not be construed as specifying a minimum level of operator attention to the facility. It is anticipated that visits to the treatment facility by the operator will occur at intervals frequent enough to assure proper operation and maintenance, but in no case less than one visit once a month. The permittee shall ensure that the certified operator is in charge of the facility and observes the operation of the system frequently enough to ensure its proper operation and maintenance regardless of the monitoring frequency stated in the permit

5. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

6. Severability

The provisions of this permit are severable. If any provision of this permit due to any circumstance, is held invalid, then the application of such provision to other circumstances and to the remainder of this permit shall not be affected thereby.

7. Other Information

If the permittee becomes aware that he failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, then he shall promptly submit such facts or information.

B. CHANGES AFFECTING THE PERMIT

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility.

2. Permit Modification, Revocation, or Termination

a. This permit may be modified, revoked and reissued, or terminated for cause as described in Section 69-3-108 (h) of the Tennessee Water Quality Control Act as amended.

b. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

3. Change of Ownership

This permit may be transferred to another person by the permittee if:

a. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;

b. The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and liability between them; and

c. The Director, within 30 days, does not notify the current permittee and the new permittee of his intent to modify, revoke or reissue, or terminate the permit and to require that a new application be filed rather than agreeing to the transfer of the permit.

4. Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

C. NONCOMPLIANCE

1. Effect of Noncompliance

Any permit noncompliance constitutes a violation of applicable State laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

2. Reporting of Noncompliance

a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the appropriate Division environmental field office within 24 hours from the time the permittee becomes aware of the circumstances.

(The environmental field office should be contacted for names and phone numbers of emergency response personnel.)

A written submission must be provided within five days of the time the permittee becomes aware of the circumstances unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

i. A description of the discharge and cause of noncompliance;

ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and

iii. The steps being taken to reduce, eliminate, and prevent recurrence of the non complying discharge.

b. Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph 2.a. above, the permittee shall report the noncompliance on the Quarterly Operation Report. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

D. LIABILITIES

1. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of wastewater to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct its wastewater treatment and/or discharge activities in a manner such that public or private nuisances or health hazards will not be created.

2. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law.

PART III
OTHER REQUIREMENTS

A. CERTIFIED OPERATOR

The waste treatment facilities shall be operated under the supervision of a Biological Natural System certified wastewater treatment operator and collection system shall be operated under the supervision of a the grade I certified collection system operator in accordance with the Water Environmental Health Act of 1984.

B. PLACEMENT OF SIGNS

The permittee shall place a sign at the entrance to the land application area if fenced or all reasonsable approaches to the land application area. The sign should be clearly visible to the public. The minimum sign size should be two feet by two feet (2' x 2') with one inch (1") letters. The sign should be made of durable material

WASTEWATER DISPERSAL AREA
(PERMITTEE'S NAME)
(PERMITTEE'S PHONE NUMBER)
TENNESSEE DIVISION OF WATER RESOURCES
Cookeville Environmental Field Office
PHONE NUMBER: 1-888-891-8332

No later than sixty (60) days from the effective date of the permit, the permittee shall have the above sign(s) on display in the location specified. New facilities must have the signs installed upon commencing operation.

C. ADDITION OF WASTE LOADS

The permittee may not add wasteloads to the existing treatment system without the knowledge and approval of the division.

D. SEPTIC (STEP) TANK OPERATION

The proper operation of this treatment system depends, largely, on the efficient use of the septic tank. The solids that accumulate in the tank shall be removed at a frequency that is sufficient to insure that the treatment plant will comply with the discharge requirements of this permit.

E. SEPTAGE MANAGEMENT PRACTICES

The permittee must comply with the provisions of Rule 0400-48-01-.22. If the septage is transported to another POTW for disposal, the permittee shall note the amount of septage wasted in gallons and name of the facility the hauler intends to use for disposal of the septage on the monthly operation report. Sludge or any other material removed by any treatment works must be disposed of in a manner which prevents its entrance into or pollution of any surface or subsurface waters. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, TCA 68-31-101 et seq. and Tennessee Hazardous Waste Management Act, TCA 68-46-101 et seq.

F. OWNERSHIP OF THE TREATMENT FACILITIES

a. The permittee shall own the treatment facilities (and the land upon which they are constructed) including the land to be utilized for wastewater dispersal.
A perpetual easement (properly recorded) may be accepted in lieu of ownership. Evidence of ownership of the treatment facility land application site(s) and/or a copy of the perpetual easement(s) must be furnished to the division for approval prior to construction of the wastewater collection and dispersal system. Signed agreements stating the intent of the existing landowner to transfer ownership may be provided to support permit issuance. Final SOP's will not be issued without establishing ownership/access rights.

Attachment 1

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

Underground Injection Control Authorization No. **WAR 0000012**

In accordance with Tennessee Code Annotated section 69-3-108 and Rule Chapter 0400-45-06, the following person is authorized to construct and operate a Class V Injection Well at the identified property:

Jeffrey Cox Sr. IRM Utility
ISHA Enclave Subdivision
ISHA Drive
McMinnville, Warren County, Tennessee

This injection well is a subsurface fluid distribution system and is authorized by rule. Fluids authorized for underground injection through this well are limited to sanitary waste. Construction, operation, and abandonment of the injection well must comply with all provisions identified in Rule 0400-45-06-.14 located at http://publications.tnsosfiles.com/rules/0400/0400-45/0400-45-06.20140505.pdf. A paper copy of this rule will be provided upon request.

This authorization is issued as a result of the application received on 6/21/2019 by the Tennessee Department of Environment and Conservation, Division of Water Resources, and in conformity with plans, specifications, and other data submitted in support of the application. Activities associated with the construction, operation and abandonment of this injection well must not present a hazard to groundwater that is currently used or has the potential to be used as an underground source of drinking water.

The owner/operator of a Class V injection well is responsible for notifying the Division of a change in the owner or operator of the well, change in nature of injected fluids, or intent to abandon the well when it is no longer used or is usable for its intended purpose.

If the owner/operator wishes to continue the activity regulated by this authorization after the expiration date of this authorization, the applicant must apply for and obtain a new authorization prior to the expiration of this authorization.

This authorization shall become effective upon the issuance of State Operating Permit number SOP-19016 and shall run concurrently.

Allen Rather

Allen Rather
Land Based Systems Unit
Division of Water Resources

RATIONALE

Integrated Resource Management, Inc.

STATE OPERATION PERMIT NO. SOP-19016
McMinnville, Warren County, Tennessee

Permit Writer: Ms. Anastasia Sharp

FACILITY CONTACT INFORMATION:
Mr. Jeffrey Cox
President
Phone: (865) 674-0828
envsoilconsulting@charter.net
ISHA Drive
White Pine, TN 37890

Activity Description:	Treatment of domestic wastewater via a low pressure pipe subsurface sewage disposal system to support the construction of the ISHA Enclave development
Facility location:	Latitude 35.580631 and Longitude -85.584667
Name of the nearest stream:	No discharge allowed.
Treatment system:	septic tanks, collection system and low pressure pipe system
Permit period:	This permit will be issued for a five year period effective from the issuance date on the title page.
Terms & Conditions:	BOD_5 is a standard measure of sewage strength. The 45 mg/L daily maximum limit is the required treatment standard for domestic waste water in Tennessee. Ammonia and BOD5 reporting serve to demonstrate the treatment system is meeting minimum treatment standards. Land application, versus stream discharge, enables reduced monitoring frequency for these parameters. Narrative conditions for subsurface sewage disposal and septage management are proposed in support of proper system operation to prevent runoff to streams and avoidance of nuisance conditions
Financial Security:	Municipalities and Utility Districts are government entities exempt from the financial security requirement in TCA 69-3-122. (or) Privately-owned public utilities provide financial security to the Public Utility Commission to comply with TCA 69-3-122.

Annual Maintenance Fee: An annual maintenance fee for the permit will apply after permit issue and upon receipt of an invoice. The fee is currently $350.00 for non-discharging facilities with influent flow less than 0.075 MGD.

Items Requisite for Operation: Actual operation of the sewerage system is contingent on the following items (items may occur in any order):

- Approval of sewerage system construction plans and specifications per TCA 69-3-108(i),
- Final construction inspection and submission of O &M manual per Rule 0400-40-02-.09,
- Issuance of a Certificate of Convenience and Necessity (CCN) by the Public Utility Commission,
- Utility ownership of sewerage system assets consistent with Rule 0400-40-16-.02(8). Sewerage system assets broadly consist of those units integral to the collection, treatment and disposal of both the solid and liquid component of sewage (i.e. septic tanks and pumps, collection lines, treatment system and low pressure pipe distribution area and related appurtenances), and

Wastewater Utility Service

COMMERCIAL SEWER SERVICE TERRITORIES

Service Territory	County	TRA Docket No.
Cove Mountain Realty	Sevier	03-00467
Valley Mart Exxon	Sevier	03-00467
Lot 23—The River Club	Knox	04-00152
Wild Briar Ridge★	Sevier	05-00056
Sterling Springs★	Sevier	05-00055
Lost Creek Campground	Union	07-00010
Mountain Shangrila★	Sevier	06-00156
Flat Hollow★	Campbell	07-00009
Riverstone Estates★	Decatur	09-00099
Cove Creek	Sevier	10-000122
Waterside Douglas Lake★	Jefferson	18-00063
Isha Enclave ★	Van Buren	20-00038

★ These Service Territories contain a mix of both commercial and residential properties.

Wastewater Utility Service

RESIDENTIAL SEWER SERVICE TERRITORIES

Service Territory	County	TRA Docket No.	Rate Class
Emory Pointe	Roane	04-00101	Rate Class 1
Wild Pear Shores	Jefferson	04-00153	Rate Class 1
Compass Pointe	Blount	04-00266	Rate Class 1
Wild Briar Ridge★	Sevier	05-00056	Rate Class 1
Sterling Springs★	Sevier	05-00055	Rate Class 1
Mountain Shangrila★	Sevier	06-00156	Rate Class 1
Flat Hollow★	Campbell	07-00009	Rate Class 1
Riverstone Estates1	Decatur	09-00099	Rate Class 1
Waterside Douglas Lake★	Jefferson	18-00063	Rate Class 1
Isha Enclave ★	Van Buren	20-00038	Rate Class 1

★ Combined residential and commercial territories.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

July 22, 2020

Mr. Darrell M. Hall
Engineer
e-copy: dhalltare@frontier.com
TARE, Inc.
2242 Hwy 70 E
P.O. Box 846
Crossville, TN 38557

Subject: **Integrated Resource Management, Inc.**
County: Van Buren
Wastewater Project Number: 19.0595R
Project: Isha Enc

Dear Mr. Hall:

The Tennessee Department of Environment and Conservation, Division of Water Resources, acknowledges the receipt of construction documents on June 30, 2020.

The project consists of STEP effluent collection to low pressure pipe subsurface disposal system.

Approval is granted in accordance with certain requirements of the Water Quality Control (WQC) Act of 1977 and Regulations of the Water Quality Control Board. **On the coversheet(s) of the site's set of plans and specifications, an approval date and its expiration date will be stamped by the division. Any indication of tampering with the bound set of documents will be subject to investigation and prosecution.** One complete set of construction documents, bearing the official stamp, must be kept at the construction site.

Approval expires one year from the stamped approval date (July 22, 2021) unless construction is either underway or complete. Any request for extension must be made prior to this expiration date. Significant deviations from the approved plan documents must be submitted and approved in writing before such changes are made. Minor changes made during construction need not have prior written approval. Modifications, however, may be required by this Department should the changes be deemed inappropriate. It is advisable, therefore to obtain prior approval in cases where the significance of the change is uncertain.

The Division of Water Resources is authorized to inspect the construction work to verify compliance with the approved plans and specifications, which are on the site. Therefore, the engineer shall notify our staff at the Cookeville Environmental Field Office by calling (931) 520-6688 before the start of construction.

Approval of these construction documents should not be construed as a permit for any activities related to this project. Activities which may require a permit under the WQC Act and Regulations include, but are not limited to, the following: streambank vegetation removal; creek crossing(s) for equipment or utility lines; construction within twenty (20) feet of a stream bank; construction in or near a marshy area or wetland, and/or land disturbance equal to or greater than one acre. Additionally, this approval does not authorize connection and use

of sewer that will cause or contribute to collection system overflow or overload of receiving wastewater treatment facility.

The Cookeville Environmental Field Office should also be contacted for determinations regarding whether modification of the existing NPDES or SOP permit, an Aquatic Resource Alteration Permit (ARAP) and/or a National Pollutant Discharge Elimination System (NPDES) construction stormwater permit will need to be obtained prior to the beginning of construction of this project.

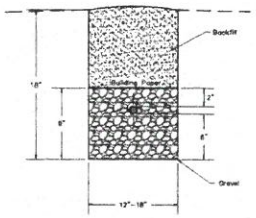
The division's most recent TDEC Technical/Engineering Documents, including "Design Criteria for Sewage Works Construction Plans and Documents", Chapters 1-17 is available on our website: https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html.

To expedite matters, please reference the assigned wastewater project number 19.0595R on any future correspondence. If you have any questions, please feel free to contact Ms. Anastasia Sharp at (615) 532-1508 or by E-mail at *anastasia.sharp@tn.gov*.

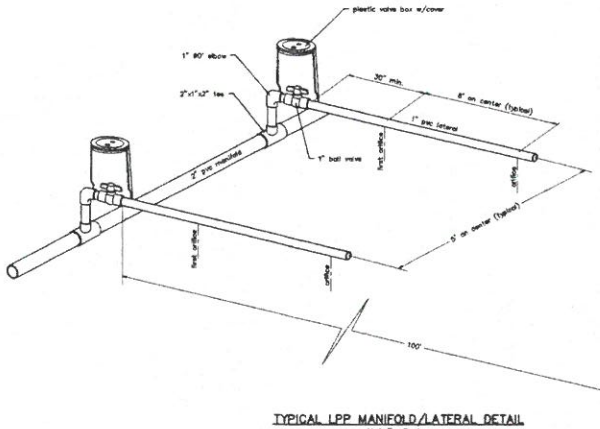
Sincerely,

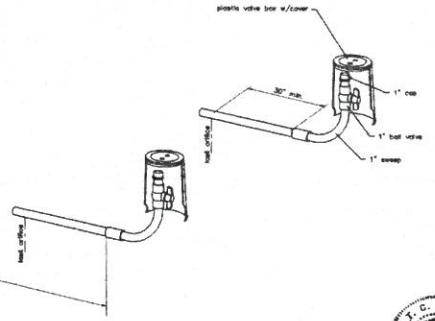
Brad Harris, P.E.
Manager, Land-Based Systems

cc: Land-Based Systems File



TYPICAL LPP LATERAL DITCH SECTION
Not To Scale





TYPICAL LPP MANIFOLD/LATERAL DETAIL
Not To Scale

LEGEND

	PROPERTY LIMITS
1900	EXISTING CONTOUR (10' interval)
LPSS	AREA RESERVED FOR SUBSURFACE WASTE DISPOSAL DUPLICATION
	DISPOSAL AREA SOIL LIMITS
	NATURAL DRAINWAY
(97)	LOT NUMBER
5pi	5 PORT INDEXING VALVE
3pi	3 PORT INDEXING VALVE
Avr	AIR VACUUM RELEASE VALVE
LPPS	LOW PRESSURE SANITARY SEWER COLLECTOR
W	6" WATER LINE
	LOW PRESSURE SEWER AIR RELEASE VALVE

WPN 19.0595R
ISHA Enclave Subdivision
APPROVED

THE DOCUMENT BEARING THIS STAMP HAS BEEN RECEIVED AND REVIEWED BY THE

TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION

DIVISION OF WATER RESOURCES

AND IS HEREBY APPROVED BY THE COMMISSIONER

July 22, 2020

THIS APPROVAL SHALL NOT BE CONSTRUED AS CREATING A PRESUMPTION OF CORRECT OPERATION OR AS WARRANTING BY THE COMMISSIONER THAT THE APPROVED FACILITIES WILL REACH THE DESIGNED GOALS.

APPROVAL EXPIRES ONE YEAR FROM ABOVE DATE

T. C. MILLER 0
REGISTERED ENGINEER
STATE OF TENNESSEE

TARE, INC.
Terre-Aqua Resource Engineering, Inc.
Crossville, Tennessee

REVISED FOR TDEC REVIEW MARCH, 2020

ISHA FOUNDATION, INC.
MCMINNVILLE, TENNESSEE

ISHA ENCLAVE SUBDIVISION
SANITARY SEWER SYSTEM

Drawing Title
LOW PRESSURE PIPE
DISPOSAL FIELD INSTALLATION

drawn	date	check	date	appvd.	date	scale	proj. no.	sheet
DMH	2/20	TM	2/20	TCM	2/20	NOTED	3823	2 of 4

TARE, INC. Engineering Consultants

2242 Highway 70 East
P.O. Box 846
Crossville, TN 38557

Telephone 931/484-7543
Fax 931/484-7544

June 1, 2020

Ms. Anastasia Sharp
Tennessee Department of
Environment and Conservation
Division of Water Resources
William R. Snodgrass-Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, TN 37243-1102

Subject: ISHA Enclave Subdivision
Sub-Surface Disposal System
Highway 8
Van Buren County, Tennessee
Wastewater Project No. 19.0595R

Ms. Sharp,

To follow are responses to your letter dated May 27, 2020.

1. The distance between laterals as shown on the plans and as described in the calculations is 5' on center.
2. The calculations have been revised to account for the friction loss through the indexing valves.
3. The calculations have been revised to account for the supply line volumes in the dose calculations.
4. Dosing will be applied to each bed 3 times per day. Dosing volumes will be controlled by the pump float settings in the dosing tank. A timer override will be included in the pump controls to fine adjust the application rate and prevent over dosing. The pumps will be set to run the prescribed time to apply the dose. The pumps will dose the first bed of the first field then switch off to allow for a rest period of no less than 30 minutes. When the pumps switch on the indexing valves will switch flow to the first bed of the next field and so on until all the beds have been cycled through then repeat the process to total 3 doses.
5. Distribution laterals will be installed level and on contour based on actual field verified conditions. As built drawings will be prepared upon completion of installation.
6. An enlarged view denoting the proposed locations of the indexing and air/vacuum release valves has been included with this response.
7. The lateral trench backfill specifications has been added to the typical backfill section.
8. STEP collection system flow calculations have been included with this response.

Please contact me if you have any questions or comments.

Sincerely,

TARE, INC.

Darrell M. Hall

enclosures

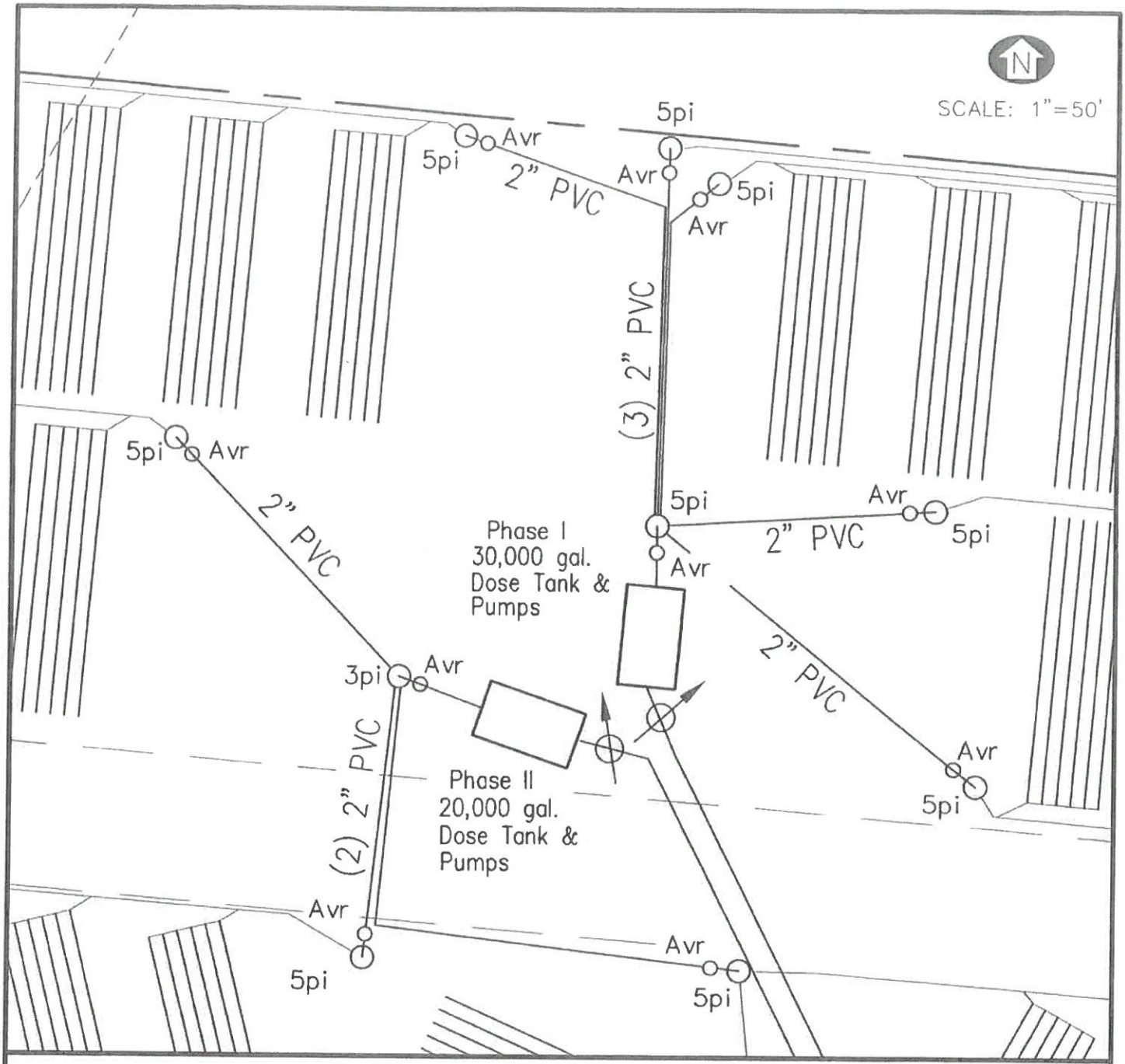
Cc: ISHA Enclave
Jeffrey Cox

PROJECT:	**ISHA Foundation ISHA Enclave PHASE I**								
DATE:	4/23/2020								
REVISED:	5/27/2020								
DESIGN CRITERIA SUMMARY									
DESIGN FLOW:	19,200 gpd								
SOIL ABSORPTION RATE	0.275 GPD/SF								
TRENCH LENGTHS:	100								
LATERAL PIPE SIZE:	1.25-INCH								
MANIFOLD PIPE SIZE:	2-INCH								
DOSING HOLE SIZE:	5/32-INCH (FOR 1.25-INCH PIPE AND LENGTHS OF 100 FT)								
HOLE SPACING:	6-FT								
DIST BETWEEN LATERAL	5-FT								
HIGHEST LATERAL EL:	1910								
DISTRIBUTION VALVE EL	1910								
PUMP ELEVATION:	1900								
LOW PRESSURE PIPE DESIGN SUMMARY									
ABSORPTION AREA									
(1)	DAILY WASTE FLOW IN GALLONS PER DAY					=	19200	GPD	
(2)	LOADING RATE IN GALLONS PER DAY/SQUARE FOOT					=	0.275	GPD/SF	
	(TABLE 1)								
(3)	ABSORPTION AREA REQUIRED ((1)/(2))					=	69818	SF	
DISTRIBUTION SYSTEM									
(4)	TOTAL LENGTH OF DISTRIBUTION LINES					=	13964	LF	
	((3)/DIST BETWEEN LATERALS (5 FT))								
	NUMBER OF 600 LF BEDS					=	25	beds	
(5)	CALCULATE THE NUMBER OF HOLES				6' on center	=	2327	total	
	((4)/HOLE SPACING IN FEET)					=	93.09	per bed	
(6)	DETERMINE THE FLOW RATE PER HOLE					=	0.64	GPM	
	(USE HOLE SIZE AND PRESSURE HEAD FROM TABLE III)								
(7)	CALCULATE TOTAL DOSING RATE ((5) X (6))					=	59.58	GPM/bed	
						=			
PUMP SELECTION									
(8)	ELEVATION HEAD (PUMP TO HIGH POINT IN MANIFOLD)					=	10	FT	
(9)	PRESSURE HEAD (USUALLY 1 TO 6 FEET)					=	5	FT	
(10)	FRICTION HEAD (PIPE SIZES X FACTOR IN CHART)					=	4	FT	
					indexing valve	=	13.8	FT	
(11)	TOTAL DYNAMIC HEAD ((8)+(9)+(10))					=	32.8	FT	
(12)	MINIMUM PUMP REQUIREMENTS (((7) GPM @ (19) FT)					=	59.58	GPM	32.8 FT Head
DOSING VOLUME PER BED									

(13)	MANIFOLD VOLUME		2	INCH							
	(LINEAR FT OF MANIFOLD X STORAGE CAPACITY IN A 2" PIPE)										
	25	LF X (3.14 x (1/12)^2 =		25	LF	x	0.021806	SF	=	0.55	CF
		2" SUPPLY LINE		370	LF	x	0.021806	SF	=	8.07	CF
									=	8.61	CF
										64.43	GAL
(14)	LATERAL VOLUME		1.25	INCH							
	(LINEAR FT OF LATERALS - 1650 X STORAGE CAPACITY)										
	600	LF X (3.14 x (0.75/12)^2 =		600	LF	x	0.008518	SF	=	5.11	CF
									=	38.23	GAL
(15)	MINIMUM DOSING VOLUME ((13) + 5 X (14)) PER BED										
					64.43		+	191	=	255.57	GAL
			Dose Time in minutes =		255.57		/	59.58	=	4.29	min
(16)	DESIGN DOSING VOLUME (MUST BE MORE THAN (15):						TOTAL FLOW (FROM (1))			19200	GPD
					beds			doses			
	TOTAL DOSE PER DAY =		255.57	x	25		x	3	=	19167.54	GPD - OK
					FINAL DESIGN DOSING VOLUME				=	**19167.54**	**GPD**
					DOSING EACH BED 3 TIMES DAILY						

PROJECT:	**ISHA Foundation ISHA Enclave PHASE II**									
DATE:	4/23/2020									
REVISED:	5/27/2020									
DESIGN CRITERIA SUMMARY										
DESIGN FLOW:	11,400 gpd									
SOIL ABSORPTION RATE	0.275 GPD/SF									
TRENCH LENGTHS:	100									
LATERAL PIPE SIZE:	1.25-INCH									
MANIFOLD PIPE SIZE:	2-INCH									
DOSING HOLE SIZE:	5/32-INCH (FOR 1.25-INCH PIPE AND LENGTHS OF 100 FT)									
HOLE SPACING:	6-FT									
DIST BETWEEN LATERAL	5-FT									
HIGHEST LATERAL EL:	1910									
DISTRIBUTION VALVE EL	1910									
PUMP ELEVATION:	1900									
LOW PRESSURE PIPE DESIGN SUMMARY										
ABSORPTION AREA										
(1)	DAILY WASTE FLOW IN GALLONS PER DAY						=	11400	GPD	
(2)	LOADING RATE IN GALLONS PER DAY/SQUARE FOOT						=	0.275	GPD/SF	
	(TABLE 1)									
(3)	ABSORPTION AREA REQUIRED ((1)/(2))						=	41455	SF	
DISTRIBUTION SYSTEM										
(4)	TOTAL LENGTH OF DISTRIBUTION LINES						=	8291	LF	
	((3)/DIST BETWEEN LATERALS (USUALLY 5 FT))									
	NUMBER OF 600 LF BANKS						=	15	beds	
(5)	CALCULATE THE NUMBER OF HOLES					6' on center	=	1382	total	
	((4)/HOLE SPACING IN FEET)						=	92.12	per bed	
(6)	DETERMINE THE FLOW RATE PER HOLE						=	0.64	GPM	
	(USE HOLE SIZE AND PRESSURE HEAD FROM TABLE III)									
(7)	CALCULATE TOTAL DOSING RATE ((5) X (6))						=	58.96	GPM/bed	
							=			
PUMP SELECTION										
(8)	ELEVATION HEAD (PUMP TO HIGH POINT IN MANIFOLD)						=	10	FT	
(9)	PRESSURE HEAD (USUALLY 1 TO 6 FEET)						=	5	FT	
(10)	FRICTION HEAD (PIPE SIZES X FACTOR IN CHART)						=	4	FT	
						indexinf valve	=	13.8	FT	
(11)	TOTAL DYNAMIC HEAD ((8)+(9)+(10))						=	32.8	FT	
(12)	MINIMUM PUMP REQUIREMENTS (((7) GPM @ (19) FT)						=	58.96	GPM	32.8 FT Head

DOSING VOLUME PER BED											
(13)	MANIFOLD VOLUME		2	INCH							
	(LINEAR FT OF MANIFOLD X STORAGE CAPACITY IN A 2" PIPE)										
	25	LF X (3.14 x (1/12)^2 =	25	LF	x	0.021806	SF	=	0.55	CF	
		2" SUPPLY LINE	350	LF	x	0.021806	SF	=	7.63	CF	
								=	57.63	GAL	
(14)	LATERAL VOLUME		1.25	INCH							
	(LINEAR FT OF LATERALS - 1650 X STORAGE CAPACITY)										
	600	LF X (3.14 x (0.75/12)^2 =	600	LF	x	0.008518	SF	=	5.11	CF	
									=	38.23	GAL
(15)	MINIMUM DOSING VOLUME ((13) + 5 X (14)) PER BED										
					57.63	+	191		=	248.77	GAL
		Dose Time in minutes			248.77	/	58.96		=	4.22	min.
(16)	DESIGN DOSING VOLUME (MUST BE MORE THAN (15):					TOTAL FLOW (FROM (1))				11400	GPD
					beds		doses				
	TOTAL DOSE PER DAY =	248.77	x		15	x	3	=		11194.77	GPD - OK
					FINAL DESIGN DOSING VOLUME			=		**11194.77**	**GPD**
					DOSING EACH BED 3 TIMES DAILY						



LEGEND

5pi 5 PORT INDEXING VALVE
3pi 3 PORT INDEXING VALVE
Avr AIR VACUUM RELEASE VALVE
⌀ COLLECTION SYSTEM AIR RELEASE

ISHA FOUNDATION, INC.

MCMINNVILLE, TENNESSEE

ISHA ENCLAVE SUBDIVISION
DISPOSAL SYSTEM VALVE LOCATIONS

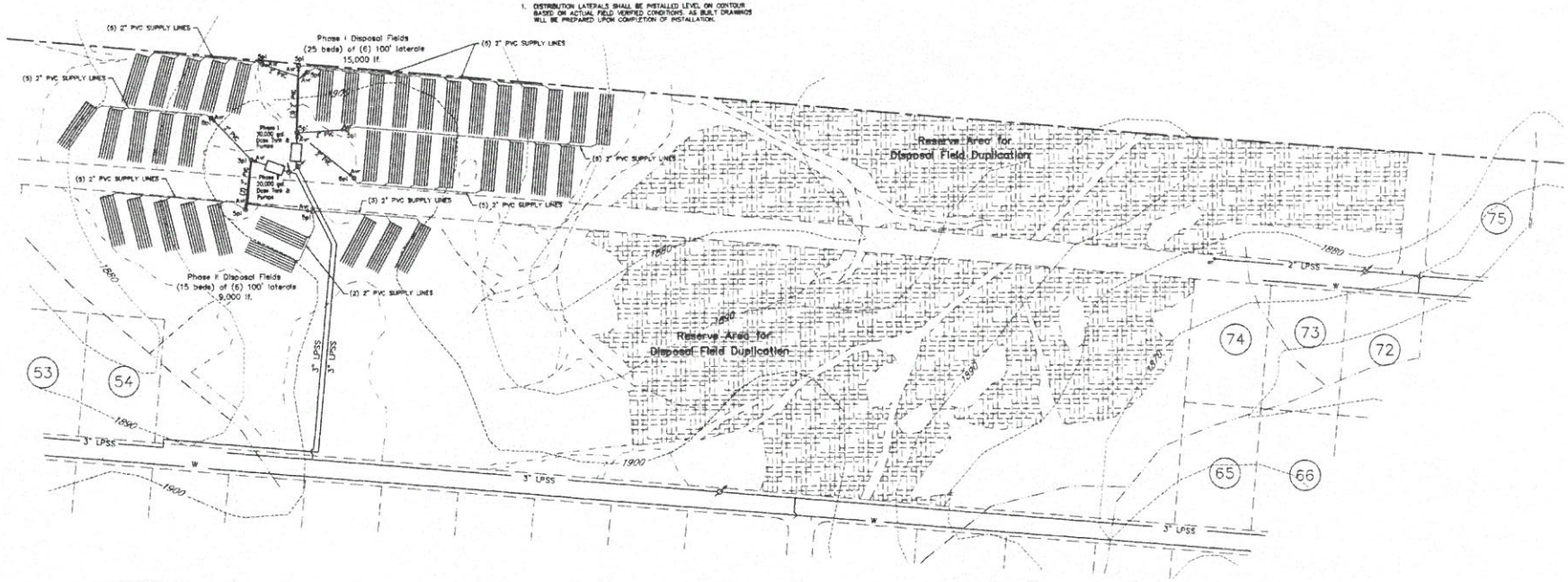
MAY, 2020

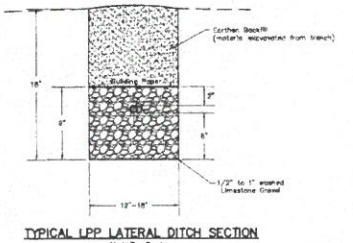
Low Pressure STEP Sewer Collection System						Revised April, 2020								
ISHA Enclave Subdivision														
McMinnville, Tennessee														
SDR-21 PVC														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	No. of	Accumulated	Max. No.	Max.	Pipe	Max.	Length	Friction	Friction	Accumulated	Max. Main	Min Pump	Elev.	Max. Total
Branch	Pumps	Total	Pumps on	Flow (gpm)	Size	Vel. (ft/sec)	L.F.	Loss (ft/100)	Loss Total	Friction Loss	Elev. (ft)	Elev. (ft)	Diff. (ft)	Head (ft)
1	32	90	8	88	3	3.72	1962	1.52	29.82	29.82	1915	1875	40	69.82
2	14	14	4	44	2	4.06	860	2.83	24.34	24.34	1915	1875	40	64.34
3	17	58	7	77	3	3.1	1405	1.09	15.31	15.31	1915	1895	20	35.31
4	9	9	3	33	2	3.16	686	1.78	12.21	12.21	1915	1900	15	27.21
5	2	16	4	44	2	4.06	564	2.83	15.96	15.96	1915	1900	15	30.96
6	9	9	3	33	2	3.16	639	1.78	11.37	11.37	1915	1900	15	26.37
7	7	7	3	33	2	3.16	609	1.78	10.84	10.84	1915	1900	15	25.84
9	0	90	8	88	3	3.72	573	1.52	8.71	8.71	1915	1900	15	23.71
8	0	71	8	88	3	3.72	573	1.52	8.71	8.71	1905	1875	30	38.71
10	45	71	8	88	3	3.72	2500	1.52	38.00	38.00	1905	1865	40	78.00
11	6	6	3	33	2	3.16	354	1.78	6.30	6.30	1905	1840	65	71.30
12	3	20	5	55	3	2.48	530	0.72	3.82	3.82	1905	1855	50	53.82
13	5	5	3	33	2	3.16	292	1.78	5.20	5.20	1905	1840	65	70.20
14	12	12	4	44	2	4.06	800	2.83	22.64	22.64	1905	1865	40	62.64

Scale: 1"=100'

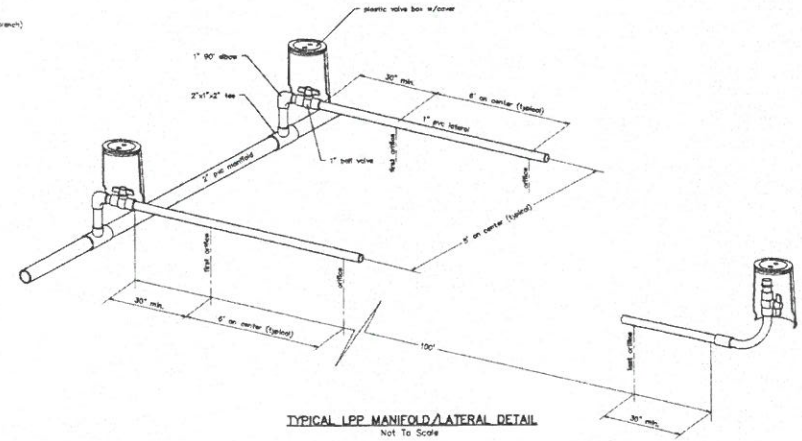
NOTE:

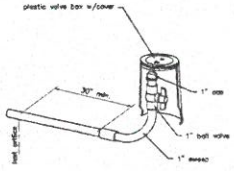
1. DISTRIBUTION LATERALS SHALL BE INSTALLED LEVEL ON CONTOUR BASED ON ACTUAL FIELD VERIFIED CONDITIONS. AS BUILT DRAWINGS WILL BE PREPARED UPON COMPLETION OF INSTALLATION.





TYPICAL LPP LATERAL DITCH SECTION
Not To Scale





TYPICAL LPP MANIFOLD/LATERAL DETAIL
Not To Scale

LEGEND

- PROPERTY LIMITS
- 1900 EXISTING CONTOUR (10' Interval)
- AREA RESERVED FOR SUBSURFACE WASTE DISPOSAL DUPLICATION
- DISPOSAL AREA SOIL LIMITS
- NATURAL DRAINWAY
- (75) LOT NUMBER
- 5pi 5 PORT INDEXING VALVE
- 3pi 3 PORT INDEXING VALVE
- Avr AIR VACUUM RELEASE VALVE
- LPSS LOW PRESSURE SANITARY SEWER COLLECTOR
- w 6" WATER LINE
- LOW PRESSURE SEWER AIR RELEASE VALVE

TARE, INC.
Terre-Aqua Resource Engineering, Inc.
Crossville, Tennessee

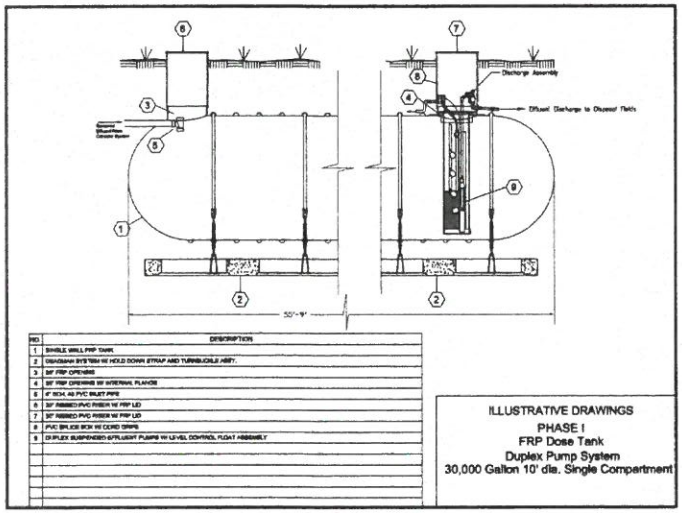
REVISED FOR TDEC REVIEW MAY, 2020
REVISED FOR TDEC REVIEW MARCH, 2020

ISHA FOUNDATION, INC.
MCMINNVILLE, TENNESSEE

ISHA ENCLAVE SUBDIVISION
SANITARY SEWER SYSTEM

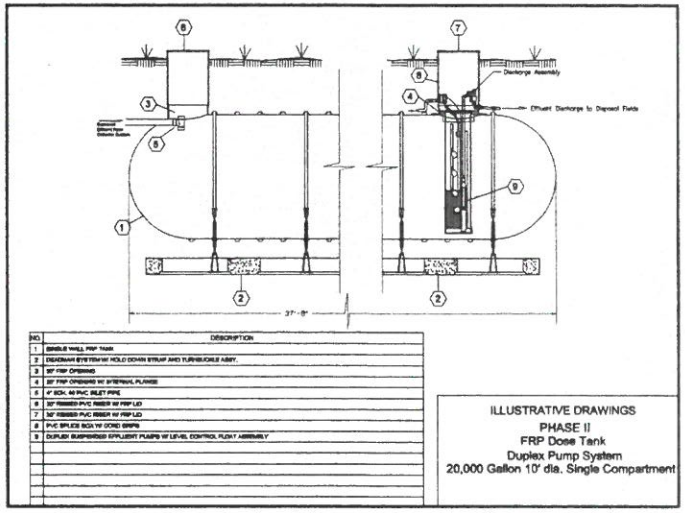
Drawing Title
LOW PRESSURE PIPE
DISPOSAL FIELD INSTALLATION

drawn	date	check	date	apprvd.	date	scale	proj. no	sheet
DMH	2/20	TM	2/20	TDM	2/20	NOTED	3822	2 of 4



NO.	DESCRIPTION
1	SINGLE WALL FRP TANK
2	CRADDAH SYSTEM W/ HOLD DOWN STRAP AND TURNBUCKLE ASSY.
3	30" FRP OPENING
4	30" FRP OPENING W/ INTERNAL FLANGE
5	4" SCH. 40 PVC INLET PIPE
6	30" RISER PVC RISER W/ FRP LID
7	30" RISER PVC RISER W/ FRP LID
8	PVC SPLICE BOX W/ CORD GRIPS
9	DUPLEX SUSPENDED EFFLUENT PUMPS W/ LEVEL CONTROL FLOAT ASSEMBLY

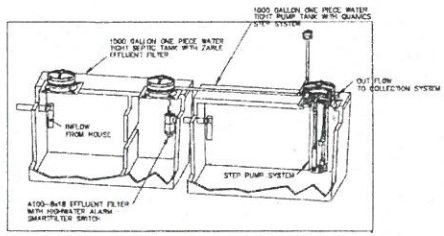
ILLUSTRATIVE DRAWINGS
PHASE I
FRP Dose Tank
Duplex Pump System
30,000 Gallon 10' dia. Single Compartment



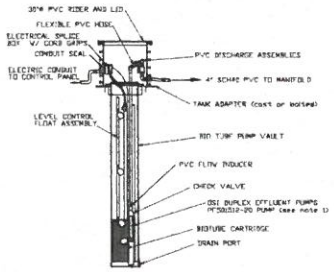
NO.	DESCRIPTION
1	SINGLE WALL FRP TANK
2	CRADDAH SYSTEM W/ HOLD DOWN STRAP AND TURNBUCKLE ASSY.
3	30" FRP OPENING
4	30" FRP OPENING W/ INTERNAL FLANGE
5	4" SCH. 40 PVC INLET PIPE
6	30" RISER PVC RISER W/ FRP LID
7	30" RISER PVC RISER W/ FRP LID
8	PVC SPLICE BOX W/ CORD GRIPS
9	DUPLEX SUSPENDED EFFLUENT PUMPS W/ LEVEL CONTROL FLOAT ASSEMBLY

ILLUSTRATIVE DRAWINGS
PHASE II
FRP Dose Tank
Duplex Pump System
20,000 Gallon 10' dia. Single Compartment

NOTES:
1. ALL PUMPS, PIPING AND APPURTENANCES SHALL BE AS SPECIFIED OR EQUAL AS APPROVED BY THE ENGINEER AND UTILITY OPERATOR.



RESIDENTIAL SEPTIC TANK W/DOSING TANK DETAIL
Not To Scale



DOSING TANK PUMP INSTALLATION DETAIL
Not To Scale

TARE, INC.
Terre-Aqua Resource Engineering, Inc.
Crossville, Tennessee

REVISED FOR TDEC REVIEW MARCH, 2020

ISHA FOUNDATION, INC.
MCMINNVILLE. TENNESSEE

ISHA ENCLAVE SUBDIVISION
SANITARY SEWER SYSTEM

Drawing Title
DOSING TANK DETAILS

drawn	date	check	date	appvd.	date	scale	proj. no.	sheet
DMH	2/20	TM	2/20	TGM	2/20	NOTED	3822	2 of 2

Isha Duplex Cut Sheets

March 12, 2020

Prepared by: Mark Inman

Premier Systems LLC

615-809-2613

Mark.Inman@PremierSystemsLLC.com

Part Number	Discription	Page
PVU95-3625-L	Universal Biotube Pump Vault , 36" cartridge	2
PF501512-20	**Effluent Pump; 1.5Hp, 50gpm, 230V, 60Hz, Single Phase, 20' lead	4
MF4P-63FS-20	Float Assembly; 63" stem, Field Set-20' Cord	9
MVP-DAX2DMSA	MVP Duplex Panel, 230V w/SA	11
SBEX1-4	PVC Splice Box w/ 1 - 4 Cord Grips Available	13
G2L	2" Grommet, Loose	15
HV200BSPRX	Hose & Valve Assembly,2" Hi-Pressure w/ Ball Check, X-Flex	16
K-Rain 6000	Distributing Valve	18

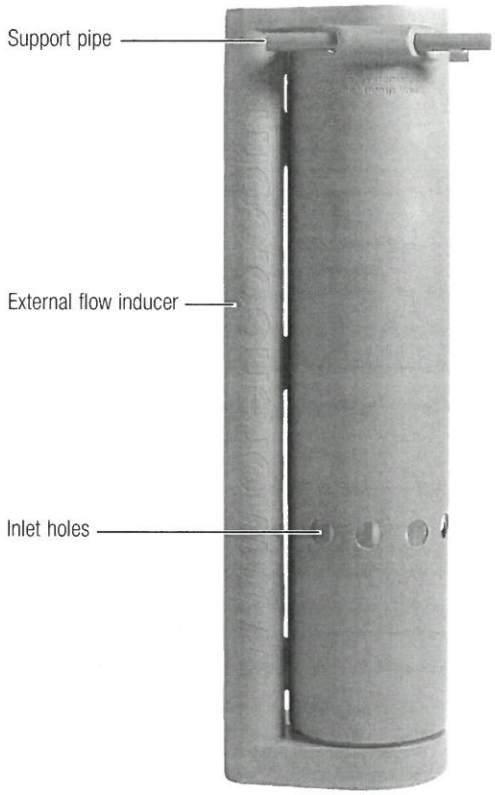
Orenco SYSTEMS **Technical Data Sheet** PVU95-3619-L

Universal Biotube® Pump Vaults

For use with Orenco® 4-inch (100-mm) Submersible Effluent Pumps

Applications

Orenco Biotube® Pump Vaults are used to filter effluent that is pumped from septic tanks or separate dosing tanks in STEP systems and onsite wastewater treatment systems. They remove two-thirds of suspended solids, on average. Pump vaults house a Biotube effluent filter and one or two Orenco high-head effluent pumps and can be used in single-compartment septic tanks with flows up to 40 gpm (2.5 L/sec). When flows are greater than 40 gpm (2.5 L/sec), a double-compartment septic tank or separate dosing tank is recommended.



Side view

General

The Orenco Biotube Pump Vault includes a molded polyethylene housing with an internal Biotube filter cartridge constructed of polypropylene and PVC. Schedule 80 PVC support pipes are included to suspend the vault in a tank opening. "Earless" 68-inch (1727-mm) vaults, which rest on the bottom of the tank instead of on support pipes, are also available. The filter cartridge can be removed without pulling the pump or the vault. Effluent enters through inlet holes around the perimeter of the Biotube vault and flows through the Biotubes to the external flow inducer. The external flow inducer accommodates one or two pumps. Orenco Biotube Pump Vaults are covered by U.S. patents #4,439,323 and 5,492,635.

Standard Models

PVU57-1819, PVU68-2419, PVU84-2419, PVU95-3625.

Product Code Diagram

PVU [ ] [95] - [36] [19] - [L]

Support pipe length:
Blank = standard, for 24" (600 mm) riser
L = long, for 30" (750 mm) riser
NB = no support pipe bracket (earless)

Inlet hole height, standard:
13" (330 mm)
19" (482 mm)
25" (635 mm)

Cartridge height, standard:
18" (457 mm)
24" (610 mm)
36" (914 mm)

Vault height:*
57" (1448 mm)
68" (1727 mm)
72" (1829 mm)
84" (2134 mm)
95" (2413 mm)
or custom specification

Biotube® filter mesh:
Blank = 1/8" (3.2 mm) mesh
P = 1/16" (1.6 mm) mesh

Universal Pump Vault

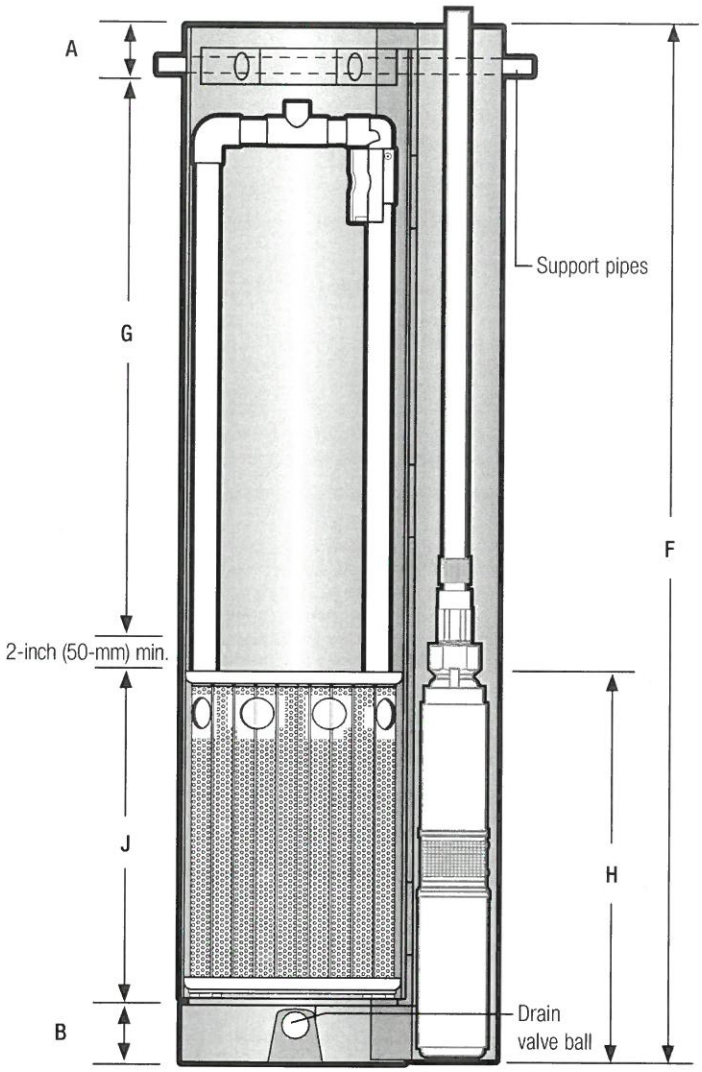
* Custom heights from 42" to 135" available

Tank Access and Riser Diameters

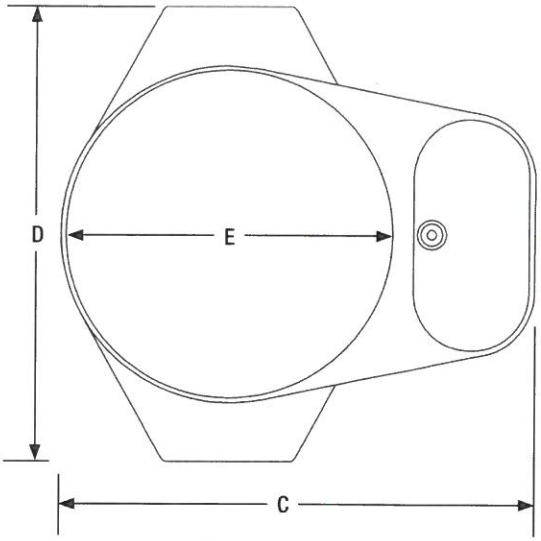
Diameter, in. (mm)	PVU with simplex pump	PVU with duplex pumps
Tank access, minimum	19 (483)	19 (483)
Tank access, recommended	20 (508)	20 (508)
Riser, minimum	24 (600)	30 (750)

Materials of Construction

Support pipe	Schedule 80 PVC
Biotube® vault	Polyethylene
Biotube filter cartridge	Polypropylene/PVC
Float stem	Schedule 40 PVC
Drain valve ball	Polypropylene



Side view cutaway



Top view

Dimensions

A, in. (mm)	3 (76)
B, in. (mm)	4 (102)
C, in. (mm)	17.3 (439)
D, in. (mm)	16.6 (422)
E, in. (mm)	12 (305)

Specifications

Model	PVU57-1819	PVU68-2419	PVU84-2419	PVU95-3625
F, vault height, in. (mm)	57 (1448)	68 (1727)	84 (1727)	95 (2413)
G, lowest float setting point, in. (mm)	29 (737)	35 (889)	51 (1295)	50 (1270)
H, inlet hole height, in. (mm)*	19 (483)	19 in. (483)	19 (482)	25 (635)
J, Biotube® cartridge height, in. (mm)	18 (457)	24 (610)	24 (610)	36 (914)
Biotube mesh opening, in. (mm)	0.125 (3)	0.125 (3)	0.125 (3)	0.125 (3)
Filter flow area, ft^2 (m^2)	4.4 (0.4)	5.9 (0.5)	5.9 (0.5)	9.0 (0.84)
Filter surface area, ft^2 (m^2)	14.5 (1.35)	19.7 (1.83)	19.7 (1.83)	30 (2.79)
Maximum flow rate, gpm (L/sec)	140 (8.8)	140 (8.8)	140 (8.8)	140 (8.8)

** May vary depending on the configuration of the tank.*

PF Series 60-Hz, 4-inch (100-mm) Submersible Effluent Pumps

Applications

Our 4-inch (100-mm) Submersible Effluent Pumps are designed to transport screened effluent (with low TSS counts) from septic tanks or separate dosing tanks. All our pumps are constructed of lightweight, corrosion-resistant stainless steel and engineered plastics; all are field-serviceable and repairable with common tools; 60-Hz PF Series models are CSA certified to the U.S. and Canadian safety standards for effluent pumps, meeting UL requirements.

Orenco's Effluent Pumps are used in a variety of applications, including pressurized drainfields, packed bed filters, mounds, aerobic units, effluent irrigation, effluent sewers, wetlands, lagoons, and more. These pumps are designed to be used with a Biotube® pump vault or after a secondary treatment system.

C US
LR80980
LR2053896

Powered by Franklin Electric

Features/Specifications

To specify this pump for your installation, require the following:

- Minimum 24-hour run-dry capability with no deterioration in pump life or performance*
- Patented 1/8-inch (3-mm) bypass orifice to ensure flow recirculation for motor cooling and to prevent air bind
- Liquid end repair kits available for better long-term cost of ownership
- TRI-SEAL™ floating impeller design on 10, 15, 20, and 30 gpm (0.6, 1.0, 1.3, and 1.9 L/sec) models; floating stack design on 50 and 75 gpm (3.2 and 4.7 L/sec) models
- Franklin Electric Super Stainless motor, rated for continuous use and frequent cycling
- Type SOOW 600-V motor cable

** Not applicable for 5-hp (3.73 kW) models*

Standard Models

See specifications chart, pages 2-3, for a list of standard pumps. For a complete list of available pumps, call Orenco.

Product Code Diagram

PF [50] [15] [1] [2] [ ] - [20]

- Pump, PF Series
- Nominal flow, gpm (L/sec): 10 = 10 (0.6); 15 = 15 (1.0); 20 = 20 (1.3); 30 = 30 (1.9); 50 = 50 (3.2); 75 = 75 (4.7)
- Horsepower (kW): 03 = ⅓ hp (0.25); 05 = ½ hp (0.37); 07 = ¾ hp (0.56); 10 = 1 hp (0.75); 15 = 1½ hp (1.11); 20 = 2 hp (1.50); 30 = 3 hp (2.24); 50 = 5 hp (3.73)
- Frequency: 1 = single-phase 60 Hz; 3 = three-phase 60 Hz
- Voltage, nameplate: 1 = 115*; 2 = 230; 200 = 200; 4 = 460
- Check valve: Blank = no internal check valve; CV = internal check valve†
- Cord length, ft (m):‡ Blank = 10 (3); 20 = 20 (6); 30 = 30 (9); 50 = 50 (15)

* ½-hp (0.37kW) only
† Available for 10 gpm (0.6 L/sec), 1/2 hp (0.37 kW) only
‡ Note: 20-ft cords are available only for single-phase pumps through 1½ hp

Specifications

Pump Model	Design gpm (L/sec)	Horsepower (kW)	Phase	Nameplate voltage	Actual voltage	Design flow amps	Max amps	Impellers	Discharge size and material [1]	Length, in. (mm)	Min. liquid level, [2] in. (mm)	Weight, [3] lb (kg)	Rated cycles/day
PF100511	10 (0.6)	0.50 (0.37)	1	115	120	12.7	12.7	6	1 ¼ in. GFP	23.0 (660)	16 (406)	26 (12)	300
PF100511CV	10 (0.6)	0.50 (0.37)	1	115	120	12.7	12.7	6	1 ¼ in. GFP	23.0 (660)	16 (406)	26 (12)	300
PF100512	10 (0.6)	0.50 (0.37)	1	230	240	6.3	6.3	6	1 ¼ in. GFP	23.0 (660)	16 (406)	26 (12)	300
PF10053200	10 (0.6)	0.50 (0.37)	3	200	208	3.8	3.8	6	1 ¼ in. GFP	23.0 (660)	16 (406)	26 (12)	300
PF100712 [4,5]	10 (0.6)	0.75 (0.56)	1	230	240	8.3	8.3	8	1 ¼ in. GFP	25.9 (658)	17 (432)	30 (14)	300
PF10073200 [4,5]	10 (0.6)	0.75 (0.56)	3	200	208	5.1	5.2	8	1 ¼ in. GFP	25.4 (645)	17 (432)	31 (14)	300
PF101012 [5,6]	10 (0.6)	1.00 (0.75)	1	230	240	9.6	9.6	9	1 ¼ in. GFP	27.9 (709)	18 (457)	33 (15)	100
PF10103200 [5,6]	10 (0.6)	1.00 (0.75)	3	200	208	5.5	5.5	9	1 ¼ in. GFP	27.3 (693)	18 (457)	37 (17)	300
PF102012 [5,6,7,8]	10 (0.6)	2.00 (1.49)	1	230	240	12.1	12.1	18	1 ¼ in. SS	39.5 (1003)	22 (559)	48 (22)	100
PF102032 [5,6,8]	10 (0.6)	2.00 (1.49)	3	230	240	7.5	7.6	18	1 ¼ in. SS	37.9 (963)	20 (508)	44 (20)	300
PF10203200 [5,6,8]	10 (0.6)	2.00 (1.49)	3	200	208	8.7	8.7	18	1 ¼ in. SS	37.9 (963)	20 (508)	44 (20)	300
PF150311	15 (1.0)	0.33 (0.25)	1	115	120	8.7	8.8	3	1 ¼ in. GFP	19.5 (495)	15 (380)	23 (10)	300
PF150312	15 (1.0)	0.33 (0.25)	1	230	240	4.4	4.5	3	1 ¼ in. GFP	19.5 (495)	15 (380)	23 (10)	300
PF200511	20 (1.3)	0.50 (0.37)	1	115	120	12.3	12.5	4	1 ¼ in. GFP	22.3 (566)	18 (457)	25 (11)	300
PF200512	20 (1.3)	0.50 (0.37)	1	230	240	6.4	6.5	4	1 ¼ in. GFP	22.5 (572)	18 (457)	26 (12)	300
PF20053200	20 (1.3)	0.50 (0.37)	3	200	208	3.7	3.8	4	1 ¼ in. GFP	22.3 (566)	18 (457)	26 (12)	300
PF201012 [4,5]	20 (1.3)	1.00 (0.75)	1	230	240	10.5	10.5	7	1 ¼ in. GFP	28.4 (721)	20 (508)	33 (15)	100
PF20103200 [4,5]	20 (1.3)	1.00 (0.75)	3	200	208	5.8	5.9	7	1 ¼ in. GFP	27.8 (706)	20 (508)	33 (15)	300
PF201512 [4,5]	20 (1.3)	1.50 (1.11)	1	230	240	12.4	12.6	9	1 ¼ in. GFP	34.0 (864)	24 (610)	41 (19)	100
PF20153200 [4,5]	20 (1.3)	1.50 (1.11)	3	200	208	7.1	7.2	9	1 ¼ in. GFP	30.7 (780)	20 (508)	35 (16)	300
PF300511	30 (1.9)	0.50 (0.37)	1	115	120	11.8	11.8	3	1 ¼ in. GFP	21.3 (541)	20 (508)	28 (13)	300
PF300512	30 (1.9)	0.50 (0.37)	1	230	240	6.2	6.2	3	1 ¼ in. GFP	21.3 (541)	20 (508)	25 (11)	300
PF30053200	30 (1.9)	0.50 (0.37)	3	200	208	3.6	3.6	3	1 ¼ in. GFP	21.3 (541)	20 (508)	25 (11)	300
PF300712	30 (1.9)	0.75 (0.56)	1	230	240	8.5	8.5	5	1 ¼ in. GFP	24.8 (630)	21 (533)	29 (13)	300
PF30073200	30 (1.9)	0.75 (0.56)	3	200	208	4.9	4.9	5	1 ¼ in. GFP	24.6 (625)	21 (533)	30 (14)	300
PF301012 [4]	30 (1.9)	1.00 (0.75)	1	230	240	10.4	10.4	6	1 ¼ in. GFP	27.0 (686)	22 (559)	32 (15)	100
PF30103200 [4]	30 (1.9)	1.00 (0.75)	3	200	208	5.8	5.8	6	1 ¼ in. GFP	26.4 (671)	22 (559)	33 (15)	300
PF301512 [4,5]	30 (1.9)	1.50 (1.11)	1	230	240	12.6	12.6	8	1 ¼ in. GFP	32.8 (833)	24 (610)	40 (18)	100
PF30153200 [4,5]	30 (1.9)	1.50 (1.11)	3	200	208	6.9	6.9	8	1 ¼ in. GFP	29.8 (757)	22 (559)	34 (15)	300
PF301534 [4,5]	30 (1.9)	1.50 (1.11)	3	460	480	2.8	2.8	8	1 ¼ in. GFP	29.5 (685)	22 (559)	34 (15)	300
PF302012 [5,6,7]	30 (1.9)	2.00 (1.49)	1	230	240	11.0	11.0	10	1 ¼ in. SS	35.5 (902)	26 (660)	44 (20)	100
PF30203200 [5,6]	30 (1.9)	2.00 (1.49)	3	200	208	9.3	9.3	10	1 ¼ in. SS	34.0 (864)	24 (610)	41 (19)	300
PF303012 [5,6,7,8]	30 (1.9)	3.00 (2.23)	1	230	240	16.8	16.8	14	1 ¼ in. SS	44.5 (1130)	33 (838)	54 (24)	100
PF303032 [5,6,8]	30 (1.9)	3.00 (2.23)	3	230	240	10.0	10.1	14	1 ¼ in. SS	44.3 (1125)	27 (686)	52 (24)	300
PF305012 [5,6,7,8]	30 (1.9)	5.00 (3.73)	1	230	240	25.6	25.8	23	1 ¼ in. SS	66.5 (1689)	53 (1346)	82 (37)	100
PF305032 [5,6,8]	30 (1.9)	5.00 (3.73)	3	230	240	16.6	16.6	23	1 ¼ in. SS	60.8 (1544)	48 (1219)	66 (30)	300
PF30503200 [5,6,8]	30 (1.9)	5.00 (3.73)	3	200	208	18.7	18.7	23	1 ¼ in. SS	60.8 (1544)	48 (1219)	66 (30)	300
PF500511	50 (3.2)	0.50 (0.37)	1	115	120	12.1	12.1	2	2 in. SS	20.3 (516)	24 (610)	27 (12)	300
PF500512	50 (3.2)	0.50 (0.37)	1	230	240	6.2	6.2	2	2 in. SS	20.3 (516)	24 (610)	27 (12)	300
PF500532	50 (3.2)	0.50 (0.37)	3	230	240	3.0	3.0	2	2 in. SS	20.3 (516)	24 (610)	28 (13)	300
PF50053200	50 (3.2)	0.50 (0.37)	3	200	208	3.7	3.7	2	2 in. SS	20.3 (516)	24 (610)	28 (13)	300
PF500534	50 (3.2)	0.50 (0.37)	3	460	480	1.5	1.5	2	2 in. SS	20.3 (516)	24 (610)	28 (13)	300
PF500712	50 (3.2)	0.75 (0.56)	1	230	240	8.5	8.5	3	2 in. SS	23.7 (602)	25 (635)	31 (14)	300
PF500732	50 (3.2)	0.75 (0.56)	3	230	240	3.9	3.9	3	2 in. SS	23.7 (602)	25 (635)	32 (15)	300

Specifications, cont.

Pump Model	Design gpm (L/sec)	Horsepower (kW)	Phase	Nameplate voltage	Actual voltage	Design flow amps	Max amps	Impellers	Discharge size and material [1]	Length, in. (mm)	Min. liquid level, [2] in. (mm)	Weight, [3] lb (kg)	Rated cycles/day
PF50073200	50 (3.2)	0.75 (0.56)	3	200	208	4.9	4.9	3	2 in. SS	23.1 (587)	26 (660)	32 (15)	300
PF500734	50 (3.2)	0.75 (0.56)	3	460	480	1.8	1.8	3	2 in. SS	34.8 (884)	25 (635)	31 (14)	300
PF501012	50 (3.2)	1.00 (0.75)	1	230	240	10.1	10.1	4	2 in. SS	27.0 (686)	26 (660)	35 (16)	100
PF50103200	50 (3.2)	1.00 (0.75)	3	200	208	5.7	5.7	4	2 in. SS	26.4 (671)	26 (660)	39 (18)	300
PF501034	50 (3.2)	1.00 (0.75)	3	460	480	2.2	2.2	4	2 in. SS	26.4 (671)	26 (660)	39 (18)	300
PF501512[4]	50 (3.2)	1.50 (1.11)	1	230	240	12.5	12.6	5	2 in. SS	32.5 (826)	30 (762)	41 (19)	100
PF50153200[4]	50 (3.2)	1.50 (1.11)	3	200	208	7.0	7.0	5	2 in. SS	29.3 (744)	26 (660)	35 (16)	300
PF503012 [4, 5, 7, 8]	50 (3.2)	3.00 (2.23)	1	230	240	17.7	17.7	8	2 in. SS	43.0 (1092)	37 (940)	55 (25)	100
PF50303200 [4, 5, 8]	50 (3.2)	3.00 (2.23)	3	200	208	13.1	13.1	8	2 in. SS	43.4 (1102)	30 (762)	55 (25)	300
PF503034 [4, 5, 8]	50 (3.2)	3.00 (2.23)	3	460	480	5.3	5.3	8	2 in. SS	40.0 (1016)	31 (787)	55 (25)	300
PF505012 [5,6,7,8]	50 (3.2)	5.00 (3.73)	1	230	240	26.2	26.4	13	2 in. SS	65.4 (1661)	55 (1397)	64 (29)	300
PF505032 [5,6,7,8]	50 (3.2)	5.00 (3.73)	3	230	240	16.5	16.5	13	2 in. SS	59.3 (1506)	49 (1245)	64 (29)	300
PF751012	75 (4.7)	1.00 (0.75)	1	230	240	9.9	10.0	3	2 in. SS	27.0 (686)	27 (686)	34 (15)	100
PF751512	75 (4.7)	1.50 (1.11)	1	230	240	12.1	12.3	4	2 in. SS	33.4 (848)	30 (762)	44 (20)	100

1 *GFP = glass-filled polypropylene; SS = stainless steel. The 1 ¼-in. NPT GFP discharge is 2 7⁄8 in. octagonal across flats; the 1 ¼-in. NPT SS discharge is 2 1⁄8 in. octagonal across flats; and the 2-in. NPT SS discharge is 2 7⁄8 in. hexagonal across flats. Discharge is female NPT threaded, U.S. nominal size, to accommodate Orenco® discharge hose and valve assemblies. Consult your Orenco Distributor about fittings to connect hose and valve assemblies to metric-sized piping.*

2 *Minimum liquid level is for single pumps when installed in an Orenco Biotube® Pump Vault or Universal Flow Inducer. In other applications, minimum liquid level should be top of pump. Consult Orenco for more information.*

3 *Weight includes carton and 10-ft (3-m) cord.*

4 *High-pressure discharge assembly required.*

5 *Do not use cam-lock option (Q) on discharge assembly.*

6 *Custom discharge assembly required for these pumps. Contact Orenco.*

7 *Capacitor pack (sold separately or installed in a custom control panel) required for this pump. Contact Orenco.*

8 *Torque locks are available for all pumps, and are supplied with 3-hp and 5-hp pumps.*

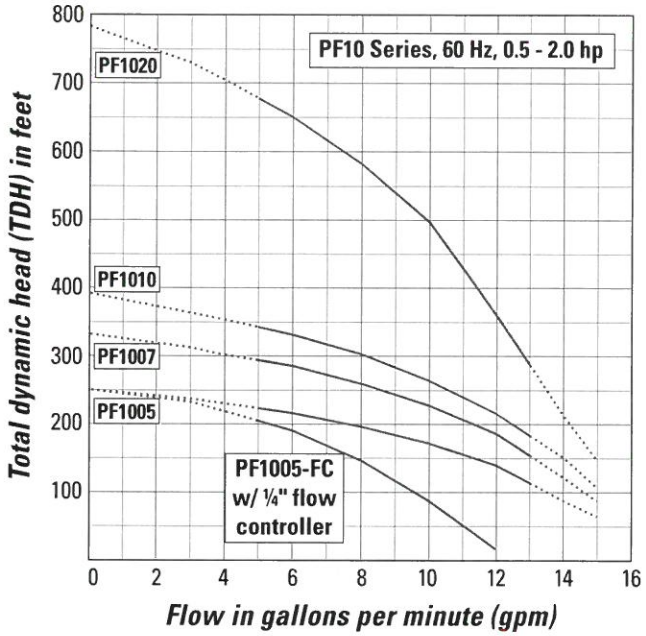
Materials of Construction

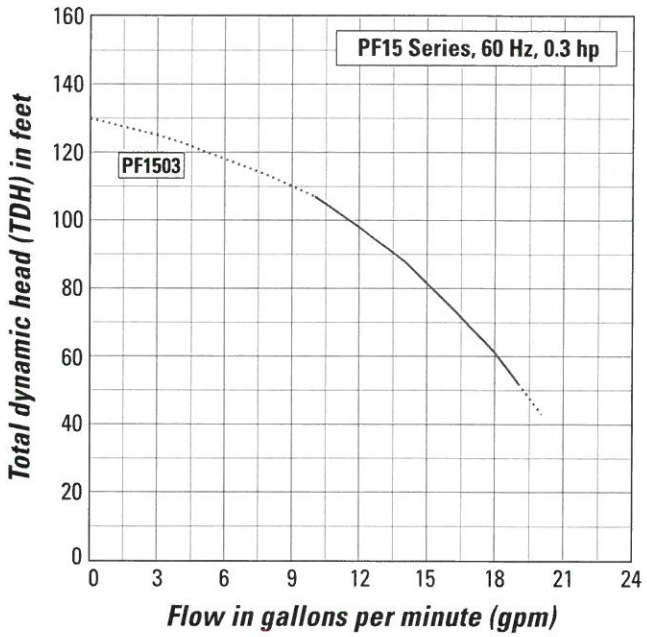
Discharge	Glass-filled polypropylene or stainless steel
Discharge bearing	Engineered thermoplastic (PEEK)
Diffusers	Glass-filled PPO (Noryl GFN3)
Impellers	Celcon® acetal copolymer on 10-, 20, and 30-gpm models; 50-gpm impellers are Noryl GFN3
Intake screen	Polypropylene
Suction connection	Stainless steel
Drive shaft	7/16 inch hexagonal stainless steel, 300 series
Coupling	Sintered stainless steel, 300 series
Shell	Stainless steel, 300 series
Motor	Franklin motor exterior constructed of stainless steel. Motor filled with deionized water and propylene glycol for constant lubrication. Hermetically sealed motor housing ensures moisture-free windings. All thrust absorbed by Kingsbury-type thrust bearing. Rated for continuous duty. Single-phase motors and 200 and 230 V 3-phase motors equipped with surge arrestors for added security. Single-phase motors through 1.5 hp (1.11 kW) have built-in thermal overload protection, which trips at 203-221˚ F (95-105˚ C).

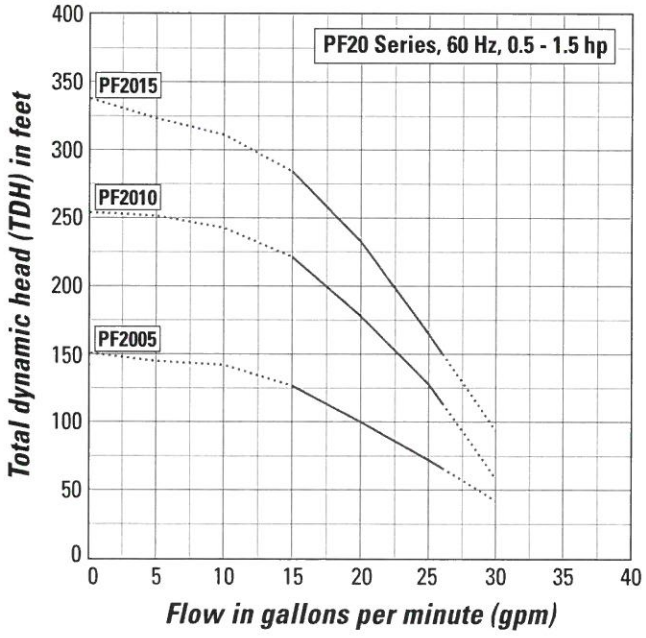
Using a Pump Curve

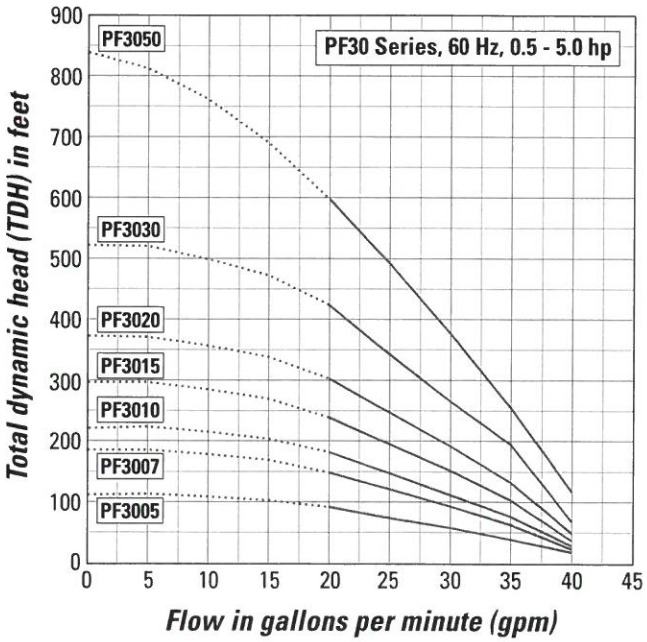
A *pump curve* helps you determine the best pump for your system. Pump curves show the relationship between flow and pressure (total dynamic head, or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their nominal flow rate. These graphs show optimal pump operation ranges with a solid line and show flow rates outside of these ranges with a dashed line. For the most accurate pump specification, use Orenco's PumpSelect™ software.

Pump Curves

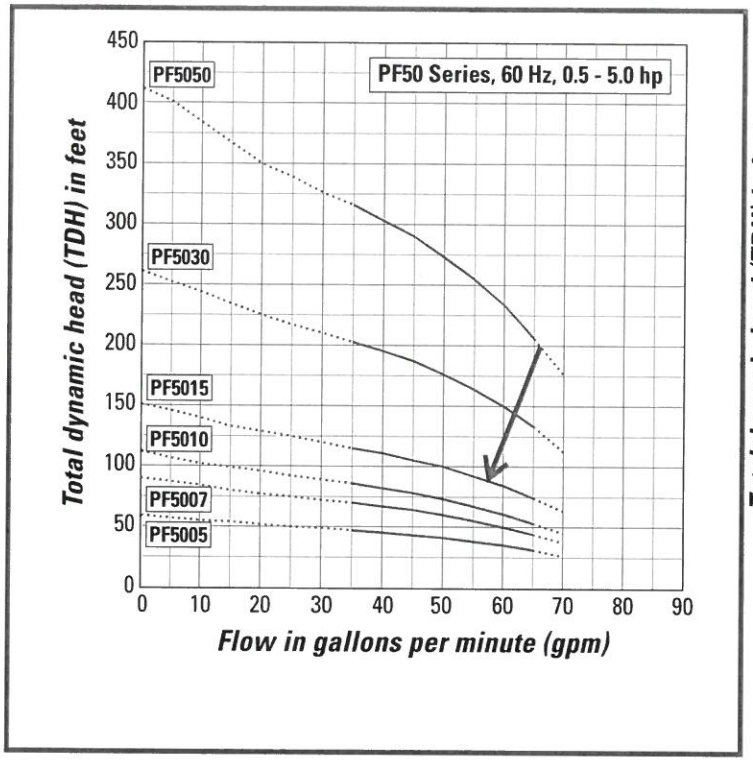


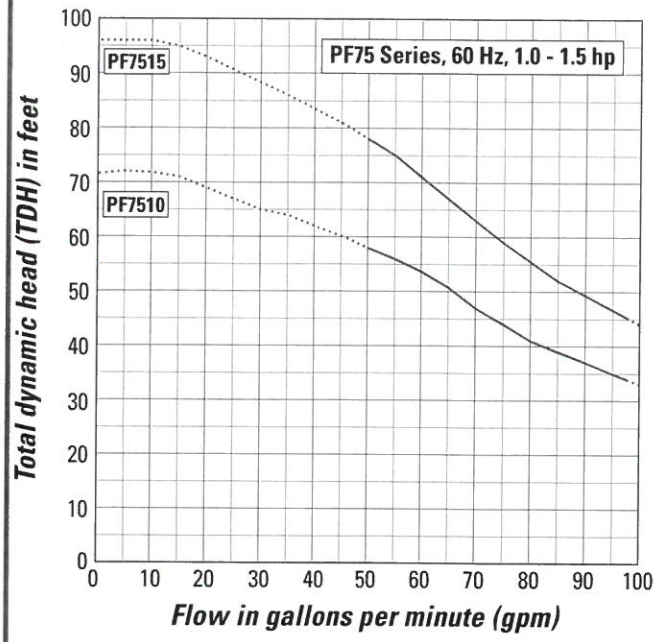






Pump Curves, cont.

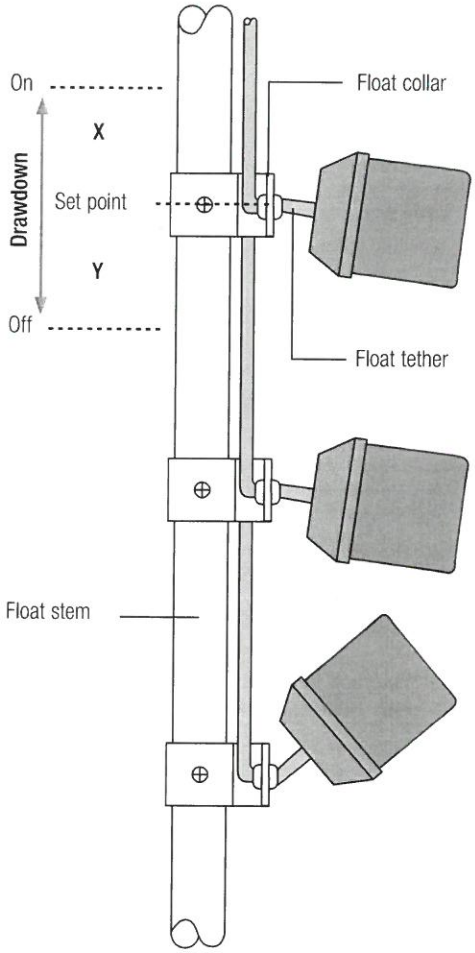




Float Switch Assemblies

Applications

Float switches are used to signal liquid level positions for alarm and pump control applications. Orenco float switch assemblies can be mounted in pump vaults, effluent screens, pump basins, and risers.



The "On" and "Off" positions describe normally open floats. For normally closed floats, the functions are reversed.

Materials of Construction

Float housing	Impact-resistant, noncorrosive PVC plastic for use in liquids up to 140˚ F (60˚ C)
Float cord, P and N models	Flexible 2-conductor (UL, CSA) SJOOW; Super Vu-Tron® Supreme, yellow
Float cord, All other models	Flexible 2-conductor (UL, CSA) SJOW; water-resistant (CPE); neoprene coating
Float collar	ABS

General

All models listed are UL listed and CSA certified for use in water or sewage. Non-mercury float switches (models B, C, N, and P) are used where components containing mercury are prohibited.

Float switches are typically ordered in assemblies that include one or more switches mounted on a 1-inch PVC float stem. ABS float collars are used to provide secure mounting that is easily adjustable.

Normally-open "P" float switches have a blue cap for easy identification; normally-closed "N" float switches have a red cap. "P" and "N" model float switches use Super Vu-Tron® electrical cords for superior chemical and water resistance.

Standard Models

B, C, G, N, P

MF [4] [P] - [63] [FS] - [20]

Cord length option:
Blank = 10 ft (3 m), standard
20 = 20 ft (6 m)
30 = 30 ft (9 m)
50 = 50 ft (15 m)

Application:
FS = field set
FTL = elbow-style (base-inlet filters only)
PB = pump basin
V = pump vault (standard float settings)
STEP = Standard float settings for STEP
STEPRO = Standard float settings for STEP with redundant off
SVCOM = Standard float settings for VCOM simplex

Float stem length:
Blank = no float stem (floats and collars only)
19, 21, 27, 33, 37, 39, 45, 51, 57, 63 = stem length, in.
5, 11 = stem length, in. (for elbow-style float brackets)

Float switch models (listed in order from the top of the float stem down):
B, C, G, N, P

Number of float switches (when using multiples of the same float switch model):
Blank = no multiples of the same float switch model

Float switch assembly

Product Code Diagram

When ordering float switch assemblies, remember to list float switches from the top of the float stem down. An "MFPBN-" nomenclature indicates one "P" switch at the top of the stem, one "B" in the middle of the stem, and one "N" switch at the bottom of the stem; an "MF2PN-" indicates "P" switches at the top and middle of the stem, and one "N" switch at the bottom of the stem.

Signal- and Motor-Rated Float Switch Matrix

Float	State[1]	Type	IR[2]	Volts	Amps	hp	Tether	X	Y	Drawdown[3]
Signal-rated mechanical floats[4] (for control switch applications)										
P Model[a]	Normally open	Mechanical	Yes	n/a	n/a	n/a	2.00 in.	1.50 in.	0.50 in.	2.00 in.
N Model[a]	Normally closed	Mechanical	Yes	n/a	n/a	n/a	2.00 in.	1.50 in.	0.50 in.	2.00 in.
Motor-rated floats[4] (for pump switch applications)										
B Model	Normally open	Mechanical	No	120V	13A	1/2 hp	2.00 in.[b]	2.50 in.	1.50 in.	4.00 in.
				240V	13A	1 hp	3.00 in.	3.00 in.	1.50 in.	4.50 in.
							4.00 in.	3.25 in.	1.50 in.	4.75 in.
C Model	Normally open	Mechanical	No	120V	13A	1/2 hp	2.00 in.	3.00 in.	2.50 in.	5.50 in.
				240V	15A	2 hp	3.00 in.[b]	3.50 in.	3.00 in.	6.50 in.
							4.00 in.	4.00 in.	3.50 in.	7.50 in.
							5.00 in.	4.50 in.	4.00 in.	8.50 in.
							6.00 in.	5.25 in.	4.25 in.	9.50 in.
G Model	Normally open	Mercury	Yes	120V	15A	3/4 hp	2.00 in.	1.50 in.	3.00 in.	4.50 in.
				240V	15A	2 hp	3.00 in.[b]	1.75 in.	3.00 in.	4.75 in.
							4.00 in.	2.00 in.	3.50 in.	5.50 in.

a. Suitable for use with VCOM and MVP.

b. Standard tether length

Notes

[1] ***State: normally open or normally closed***

The default state of a float — normally open or normally closed — refers to the contact positions in the float when the float is resting (down). Float switches have an internal contact. The terms "normally open" (N/O) and "normally closed" (N/C) refer to the state of the float switch contact in the down position. A normally open float switch has an open contact (off) in the down position and a normally closed float switch has a closed contact (on) in the down position. Different panel functions require different types of float switches. Most applications require float switches that are normally open. One notable exception is the redundant off and low-level alarm function that requires a normally closed float switch, except with MVP and VCOM panels.

[2] ***IR (intrinsically safe relay)***

Approved for use with intrinsically safe, Class I, Division 1 applications, where reliable float switch operation with very low current is required.

[3] ***Drawdown***

Drawdown (in inches) refers to the difference in liquid level between a float switch's activation and deactivation points. Drawdown can be altered by adjusting the tether length of the float switch cord. When selecting float switches, keep in mind that any float switch that can directly start and stop a pump (one that has no motor contactor in the control panel) should have a drawdown capability, to avoid rapid cycling of the pump.

[4] ***Signal-rated or motor-rated***

Every float has a maximum amount of current it can handle. Exceeding these limits may cause premature failure. Signal-rated or "control" floats are used to activate pump control panels and alarms. Only low-amperage signals pass through these float switches, hence the float switch is "signal-rated." All Orenco panels that use motor contactors can use signal-rated float switches. In some systems, a float switch is used to directly start and stop a pump. In this application, the current that is running the pump passes through the float switch as well, and the float switch must be "motor-rated." In most instances, a motor-rated float switch can be used as a signal float switch.

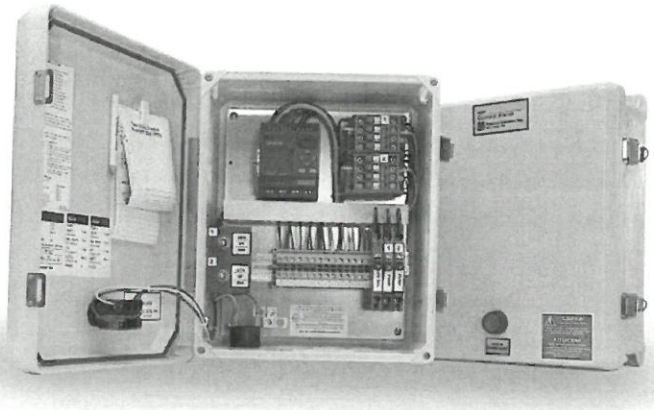
Orenco SYSTEMS **Technical Data Sheet** MVP-DAX2 DM SA

MVP-Duplex Control Panel

Applications

Orenco's MVP-Duplex control panel has a dual-mode feature, making it ideal for both timed- and demand-dosing in two-pump alternating systems. All MVPs include an easy-to-use, programmable logic unit that incorporates many timing and logic functions, such as multiple timing intervals to adjust for changing flow conditions and a built-in elapsed time meter and counter.

The programmable logic unit is the brain of the MVP-Duplex control panel



Orenco® MVP-DAX1DM control panel accommodates both timed- and demand-dosing applications

c UL us LISTED

Features/Unique Specifications

To specify this panel for your installation, require the following:

- Programmable for timed- or demand-dosing applications
- Built-in elapsed time meter and counters
- Digital timed-dose function accurate within 1%
- Multiple timer settings for optimum dosing during normal and peak flow conditions
- Pump alternation continues during override conditions
- Built-in programming keys for field-adjustable timer settings without a portable computer
- Ability to use EEPROM card to change panel functions
- High- and low-level alarm conditions differentiated by steady or blinking LED light
- Silenced alarms automatically reactivated after 12 hours if condition is not corrected
- Standard 120 VAC output for remote alarm activation
- Timed delays on float inputs to prevent chattering
- Ability to use one model of float for all functions
- Visual indicators of float positions
- Redundant-off function as standard
- UL 508 listing in US and Canada

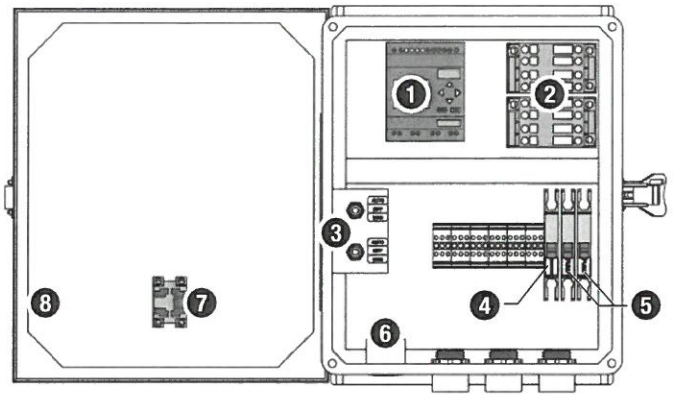
Standard Models

MVP-DAX1DM, MVP-DAX2DM

Product Code Diagram

MVP-DAX [2] [ ] **DM** [SA]

- MVP-DAX: MVP control panel
- 2: Duplex alternating panel series
- Pump voltage:
  - 1 = 120 VAC
  - 2 = 120 or 240 VAC
- Intrinsically safe relays:
  - Blank = standard, no IR relays
  - IR = Intrinsically safe relays
- DM: Dual mode (timed- and demand-dose)
- Additional options (should appear in the following order):
  - CS = current sensor
  - HT = heater
  - PRL = pump run light
  - PL = power light
  - SA = surge arrestor



Orenco® MVP-DAX1DM 120 V panel

Standard Components

Feature	Specification(s)
1. Programmable Logic Unit	120 VAC programmable logic unit with built-in LCD screen and programming keys. Provides control functions and timing for panel operation.
2. Motor-Start Contactors	120 VAC: 16 FLA, 1 hp (0.75 kW), 60 hz; 2.5 million cycles at FLA (10 million at 50% of FLA) 240 VAC: 16 FLA, 3 hp (2.24 kW), 60 hz; 2.5 million cycles at FLA (10 million at 50% of FLA)
3. Toggle Switches	Single-pole, double-throw HOA switch. 20 A, 1hp (0.75 kW).
4. Controls Circuit Breaker	10 A, OFF/ON switch. Single-pole 120 V*. DIN rail mounting with thermal magnetic tripping characteristics.
5. Pump Circuit Breakers	20 A, OFF/ON switches. Single-pole 120 V or double-pole 240 V. DIN rail mounting with thermal magnetic tripping characteristics.
6. Audible Alarm	95 dB at 24 in. (610 mm), warble-tone sound.
7. Visual Alarm	7/8-in. (22-mm) diameter red lens, "Push-to-silence." UL Type 4X rated, 1 W LED light, 120 VAC.
8. Panel Enclosure	Measures 11.5 in. high × 9.5 in. wide × 5.4 in. deep (290 × 240 × 135 mm). UL Type 4X rated. Constructed of UV-resistant fiberglass; hinges and latch are stainless steel. Conduit couplings provided.
Dual-Mode Operation	Programmable for timed- and demand-dosing.
MVP-DAX1DM Panel Ratings	120 VAC, 1 hp (0.75 kW), 16 A, single phase, 60 hz.
MVP-DAX2DM Panel Ratings	240 VAC, 3 hp (2.24 kW), 16 A, single phase, 60 hz.

Optional Components

Feature	Specification(s)	Product Code Adder
Intrinsically Safe Control Relays	120 VAC. Listed per UL 698A, for Class 1 Div. 1, Groups A, B, C, D hazardous locations. Larger enclosure required.	IR
Current Sensor	120 VAC. Go/no-go operation. Pump fail indicator light on panel. Manual reset switch.	CS
Heater	Anti-condensation heater. Self-adjusting: radiates additional wattage as temperature drops.	HT
Pump Run Lights	7/8-in. (22-mm) diameter green lens. UL Type 4X rated, 1 W LED light, 120 VAC.	PRL
Power Light	7/8-in. (22-mm) diameter green lens. UL Type 4X rated, 1 W LED light, 120 VAC.	PL
Surge Arrestor	120 V. Status light on unit. Protects incoming power supply from electrical surges.	SA

* *240 VAC units available for int'l markets*

** *120 VAC output for remote alarms comes standard.*

External Splice Box

Applications

The Orenco® External Splice Box attaches outside the access riser of an underground tank. It is engineered specifically for water and wastewater treatment systems and is especially suited for use in locations prone to high groundwater and other wet conditions. Its separate conduit hubs, large volume, and optional dividers make it useful for maintaining isolation of high and low voltage wires where needed. It has four cord grips which accommodate power cords for floats and pumps of 0.170 - 0.470 inches (4.3 - 11.9 mm) in diameter. Unused cord grips can be plugged watertight with the supplied cord grip plugs. Each External Splice Box is provided with a hole-cutting template to simplify installation on the riser and a 4-inch (100-mm) diameter grommet for the riser penetration.

General

To specify the Orenco External Splice Box for your installation, require the following:

- Watertight for prolonged submergence per UL listing (Type 6P)
- Attachment external to access riser to allow inspection with no need to open the riser lid
- Volume of 100 in.^{3} (1639 cm^3) for easy wiring access and to accommodate multiple wiring configurations
- Bottom entry, so conduit or direct-bury cable always remains below minimum burial depth
- Molded of UL (f1) rated plastic, resistant to cold and UV exposure, suitable for external applications
- Optional divider plates available for isolating high and low voltage wires from separate conduits or direct-bury cable

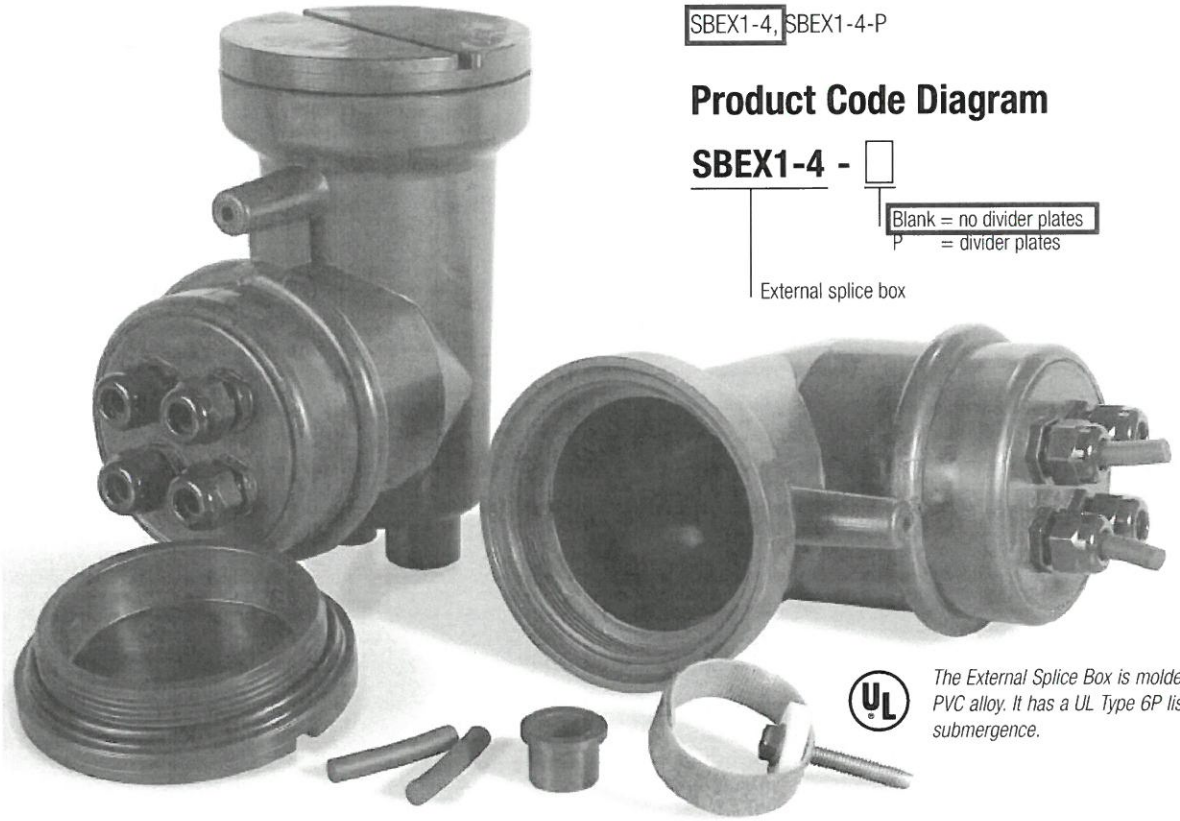
Standard Models

SBEX1-4, SBEX1-4-P

Product Code Diagram

SBEX1-4 - ☐

- ☐ = Blank = no divider plates; P = divider plates
- SBEX1-4 = External splice box



The External Splice Box is molded of a UL (f1) rated PVC alloy. It has a UL Type 6P listing for prolonged submergence.

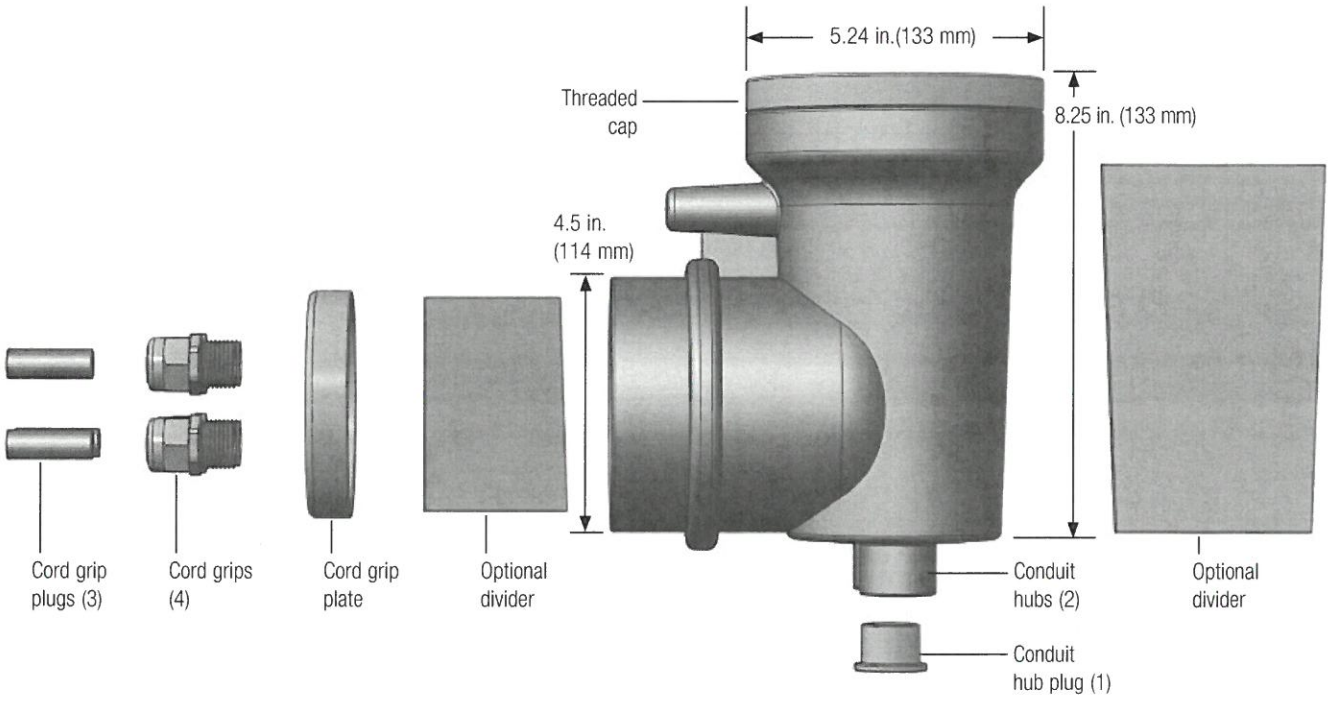
Physical Specifications

Volume	100 in.3 (1639 cm^3)
Cord grips	4 per SBEX
Cord grip plugs	3 per SBEX
Cord diameters accommodated	0.170- 0.470 in. (4.3 - 11.9 mm)
Conduit hubs	2
Conduit hub plug	1
Conduit sizes accommodated	¾ in., 1 in. (with coupling), ½ in. (with fitting or bell end)
Dia. of hole into riser	5 in. (127 mm), hole-cutting template included

Materials of Construction

Splice box	PVC alloy
Cord grips	Nylon
Cord grip plugs	EPDM rubber
O-rings	Buna rubber
Conduit hub plug	PVC per ASTM D-1784
4-in. (100-mm) grommet*	EPDM rubber

** Grommet not shown in illustration below*

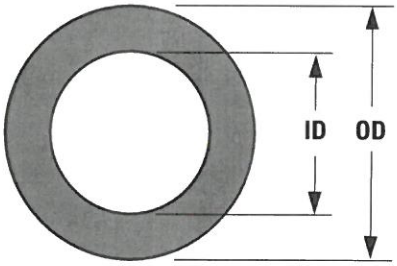


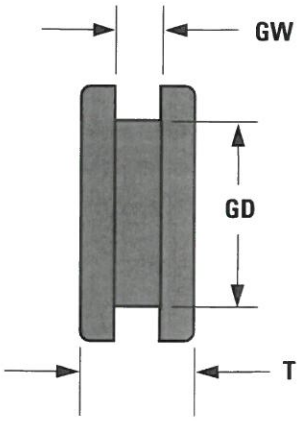
Pipe Grommets

Orenco Systems® Incorporated
800-348-9843
+1 541-459-4449

Applications

Orenco® Pipe Grommets are used to provide a seal to prevent the passage of liquids through pipe ports.





General

Orenco Pipe Grommets are constructed of corrosion-resistant rubber to provide long-lasting seals. Grommets conform to standard IPS sizes. Not all models conform exactly to the depiction shown.

Standard Models

G05L, G075L, G1L, G125L, G150L, G2L, G3L, G4L, G6L

Nomenclature

G 2 L

- G: Grommet
- 2: Grommet diameter:
  - 05 = ½-in. (15-mm)
  - 075 = ¾-in. (20-mm)
  - 1 = 1-in. (25-mm)
  - 125 = 1¼-in. (32-mm)
  - 150 = 1½-in. (40-mm)
  - 2 = 2-in. (50-mm)
  - 3 = 3-in. (80-mm)
  - 4 = 4-in. (100-mm)
  - 6 = 6-in. (150-mm)
- L: Grommet not installed

Materials of Construction:

Grommet:	EPDM synthetic rubber in accordance with MIL-STD-417, 60 durometer.

Specifications

Model	G05L	G075L	G1L	G125L	G150L	G2L	G3L	G4L	G6L
OD (inches)	1 1/4	1 1/2	1 7/8	2 1/8	2 1/2	3 7/8	5	6	8 1/8
ID (inches)	3/4	1	1 1/4	1 1/2	1 3/4	2 1/8	3 1/4	4 3/16	6 11/16
GD (inches)	1	1 1/4	1 5/8	1 3/4	2 1/8	2 11/16	3 13/16	4 15/16	7 5/8
GW (inches)	3/16	3/16	1/4	1/4	1/4	5/16	5/16	1/4	1/4
T (inches)	1/2	7/16	9/16	5/8	5/8	15/16	15/16	7/8	13/16
Holesaw Size (inches)	1	1 1/4	1 9/16	1 3/4	2 1/8	2 3/4	3 7/8	5	7

Discharge Assemblies

Orenco Systems Incorporated
800-348-9843

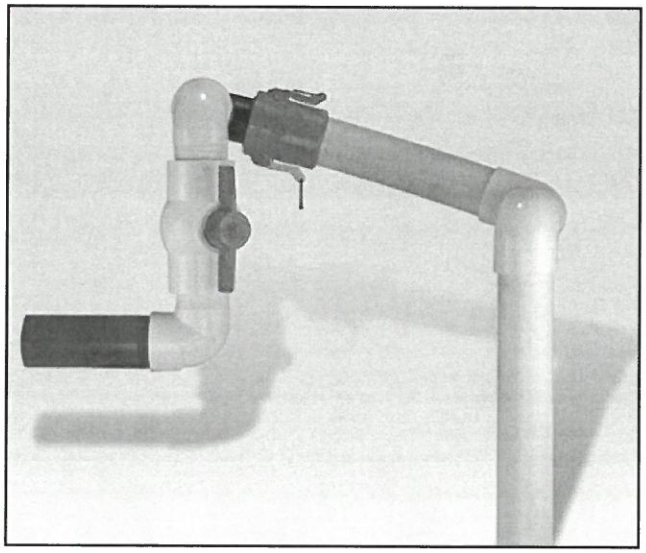
Applications

Orenco Discharge Assemblies are used to convey effluent from a pump to the exterior of a riser or pump basin. They come in the following configurations:

- High head, for use with submersible turbine pumps
- Low head, for use with common effluent pumps
- Drainback, for use with shallowly buried tanks and transport lines in cold climates

Two additional applications are available:

- The cold weather kit coupled with a high-head discharge assembly is intended for use with deeply buried tanks and transport lines in cold weather
- The external flex extension is recommended for installations where tank settling may occur to avoid line breakage during settling.



High head style shown with optional quick-disconnect

General

Orenco Discharge Assemblies are corrosion-resistant and adjustable for a proper fit. Discharge assemblies are composed of PVC valves and flexible hose that simplify installation and maintenance. The flexible hose damps vibrations from the pump and allows for easy installation. Cam-style quick-disconnect fittings are available on all configurations. All parts are either solvent welded or threaded and sealed with Teflon® paste.

Teflon® is a registered trademark of DuPont.

Standard Models

HV100, HV125, HV150, HV200

Nomenclatures

B S PR X

HV 200 □-□

Configuration:
Blank = field cut (high-head style)
H = high-head style pump
L = low-head style pump
DB = drainback (always field cut)

Options:
B = ball valve
C = check valve
FC = flow controller (1" diameter only)
AS = antisiphon
X = external flex hose
Q = quick disconnect
S = true-union ball check valve*
PR = high pressure

Discharge diameter:
100 = 1"
125 = 1-1/4"
150 = 1-1/2"
200 = 2"

Pump discharge assembly

**Available for 1-1/2" discharge only*

HV CW □□□-KIT-□□□*

Drain hole:
Blank = 1/8" drain holein elbow
NDH = No drain hole

Kit

Discharge diameter:
100 = 1"
125 = 1-1/4"
150 = 1-1/2"
200 = 2"

Cold weather application

Pump discharge assembly

** Always ordered with high head discharge assembly*

HVX □□□-□□□

Discharge connection (inches):
Blank = same as discharge diameter
100 = 1"
125 = 1-1/4"
150 = 1-1/2"
200 = 2"

Discharge diameter (inches):
100 = 1"
125 = 1-1/4"
150 = 1-1/2"
200 = 2"

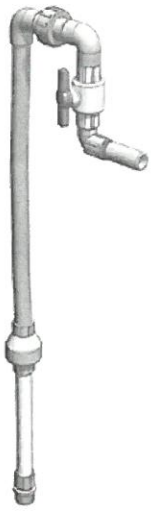
Flex extension

Pump discharge assembly

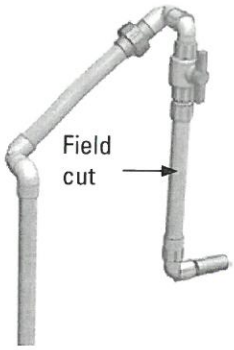
Discharge Assemblies (continued)

High head style

Drainback style



Low head style



High head style with cold weather kit installed

Cold weather kit

External flex extension

Component Working Pressure Ratings

True union ball check valve	200 psi (14 bar) at 73° F (23° C)
All other valves	150 psi (10 bar) at 73° F (23° C)
Unions	150 psi (10 bar) at 73° F (23° C)

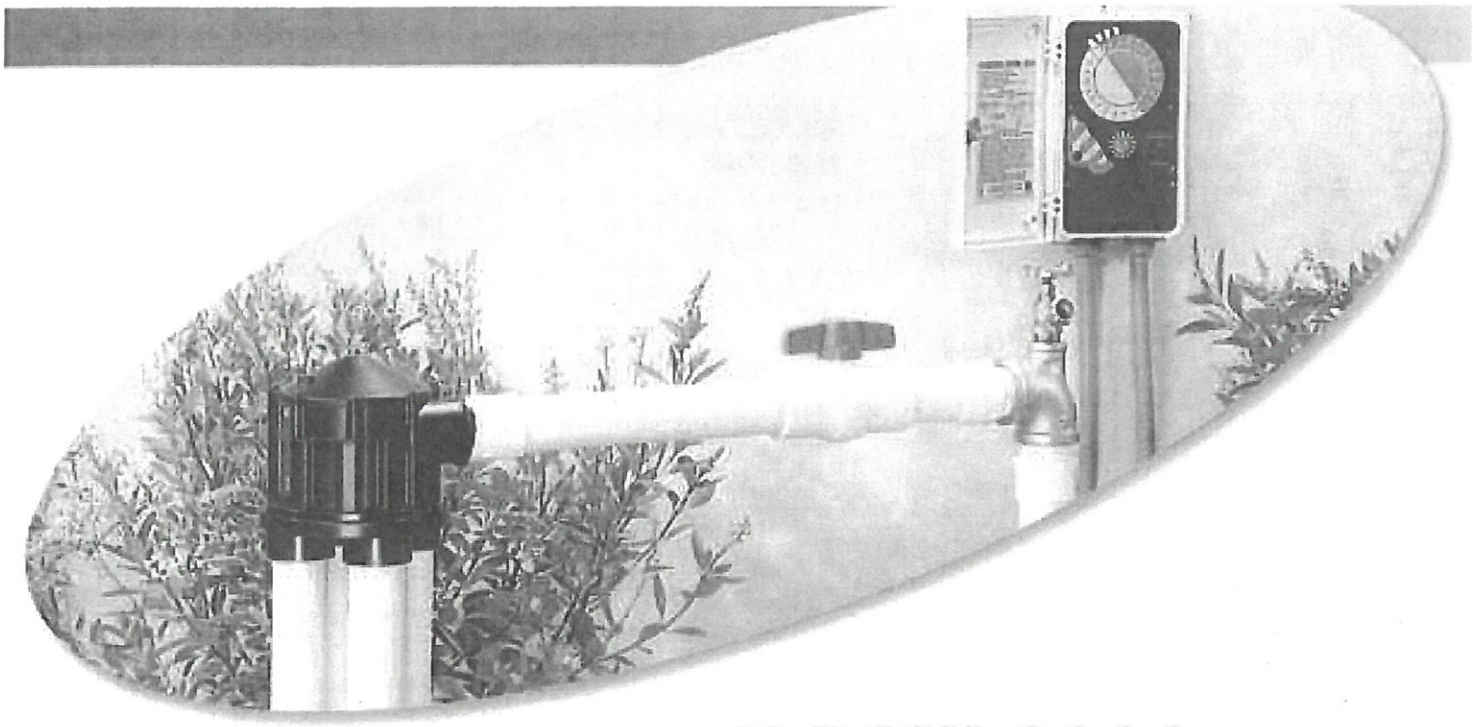
Materials of Construction

Component	Material
Anti-siphon valve	Schedule 40 PVC
Ball valve	Schedule 40 PVC
Check valve	Schedule 40 PVC
Pipe and fittings	Schedule 40 PVC
Flexible hose	PVC
External flex hose	PVC
Flow control disc	Schedule 80 PVC
Gate valve	Schedule 80 PVC
Unions	Schedule 80 PVC
High-pressure flex hose	Special elastomer compound

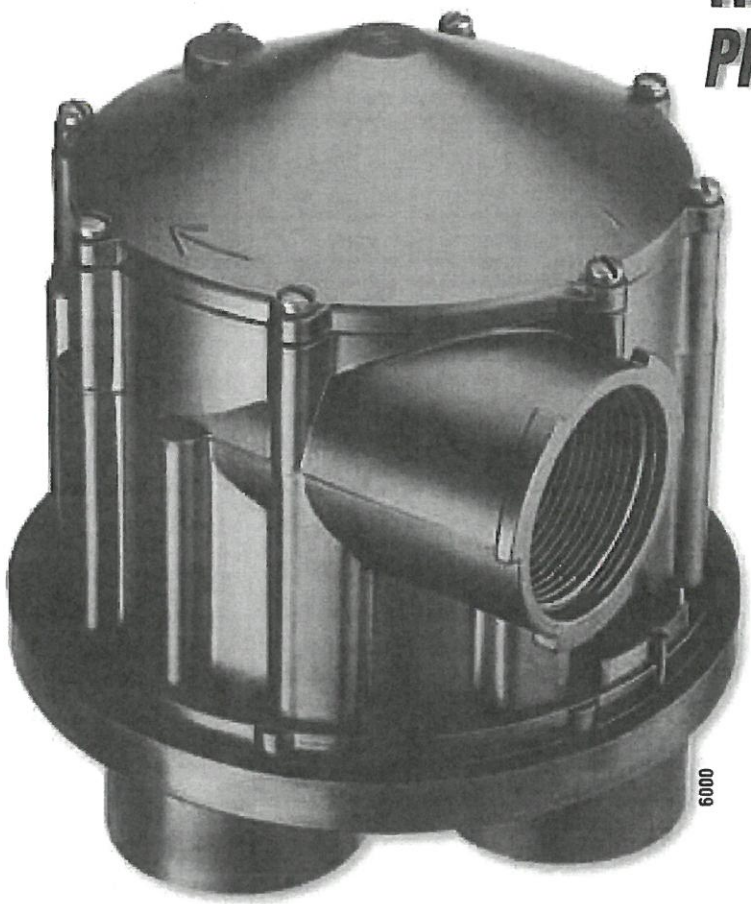
Hose Specifications

Thickness and working pressures at 73° F (23°C)

Flexible hoses	Size (U.S. Nominal)	Wall thickness	Working pressure	Bursting pressure
(standard and external)	1 in.	0.11 in. (2.8 mm)	100 psi (7 bar)	355 psi (24 bar)
	1.25 in.	0.13 in. (3.3 mm)	80 psi (6 bar)	250 psi (17 bar)
	1.5 in.	0.13 in. (3.3 mm)	65 psi (4 bar)	200 psi (14 bar)
	2 in.	0.16 in. (4.1 mm)	60 psi (4 bar)	175 psi (12 bar)
Flexible hoses	**Size (U.S. Nominal)**	**Wall thickness**	**Working pressure**	**Bursting pressure**
(high-pressure)	1 in.	0.235 in. (6.0 mm)	250 psi (17 bar)	N/A
	1.25 in.	0.24 in. (6.1 mm)	250 psi (17 bar)	N/A
	1.5 in.	0.24 in. (6.1 mm)	250 psi (17 bar)	N/A
	2 in.	0.22 in. (5.6 mm)	200 psi (14 bar)	N/A



K-RAIN 6000
DISTRIBUTING VALVES
THE NEXT GENERATION OF *PROFESSIONAL* PRODUCTS.



FEATURES/BENEFITS

- **2 Year Trade Warranty-** Factory support up to two years after purchase.
- **Metal Die-Cast Body-** Durable, long lasting, and capable of high pressure applications.
- **Available in 4 and 6 Outlet Models-** Can quickly and easily change from two to six watering zones.
- **Simplicity of Design-** Valves are easily maintained and serviced for long product life.
- **Operates at 15 GPM at Pressures of 25-150 PSI-** Ideal for pump-fed systems or high-flow city water systems.
- **Built-in Atmospheric Vacuum Breaker-** Releases any vacuum created between the pump and the valve on shut down.

K RAIN®

IRRIGATION SOLUTIONS WORLDWIDE™

K-RAIN MODEL 6000: DISTRIBUTING VALVE

The 6000 line of distributing valves offers exceptional reliability and durability even under the dirtiest water conditions.

With a metal die-cast body, the 6000 valves are capable of high pressure applications and are recommended to be used on pump fed systems or high-flow city water systems. The 6000 is also ideal for onsite wastewater and effluent water applications.

The 6000 valve is available in 4 or 6 outlet models that are cammed for 2 to 6 zone operation. With only one moving part (the stem and disc assembly), the valve is easily serviced and maintained.

The valve requires 15 GPM to operate and works at pressures from 25 to 150 PSI.

The distributing valve shall carry a two-year trade warranty against manufacturing defects.

HOW TO SPECIFY

MODELS

4 Outlet Models

6402	Cammed for 2 Zone Operation
6403	Cammed for 3 Zone Operation
6404	Cammed for 4 Zone Operation

6 Outlet Models

6605	Cammed for 5 Zone Operation
6606	Cammed for 6 Zone Operation

Other Options: Add to Part Number

RCW	Reclaimed Water Use

SPECIFICATIONS

- Construction:
  Valve Top/Housing: Die Cast Metal
  Valve Outlets: High Strength ABS Polymer
- Flow Range: 15-150 GPM
- Pressure Rating: 25 - 150 PSI
- Pressure Loss:

4 Outlet Valve

Flow (GPM)	20	40	60	80	100
PSI Loss	2.5	3.5	5.0	7.5	10.0

6 Outlet Valve

Flow (GPM)	20	40	60	80	100
PSI Loss	3.0	4.0	6.0	9.0	11.0

- Inlet: Threaded 1-1/2" NPT Connection
- Outlets: Slip and Glue Connections to 1-1/2" PVC Pipe
- Built-in Atmospheric Vacuum Breaker
- Dimensions: Height: 7"
  Width: 8"

K-RAIN
IRRIGATION SOLUTIONS WORLDWIDE™

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