

"QM" DESIGNER'S GUIDE
AMERICAN "PERC-RITE"[®]
SECONDARY TREATED DRIP SYSTEMS

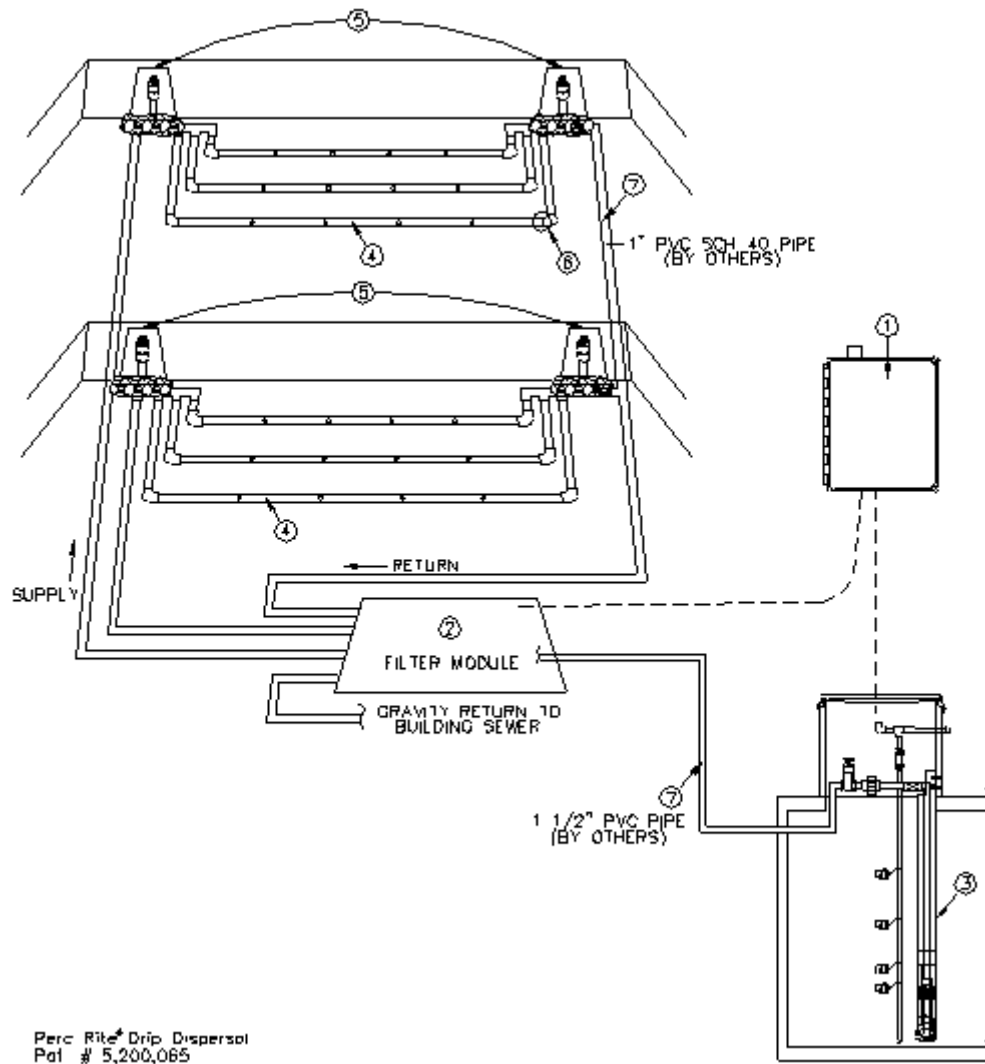
1 ZONE or 2 ZONE -- SIMPLEX
PATENT NO. 5,200,065 & 5,984,574B

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This "QM" (Quality Monitoring) Series *Perc-Rite[®] Drip System Designer's Guide* is for the non-engineer designer. *Preconditioning Treatment requirements for Perc-Rite[®] Drip Systems* are minimum. The process will accommodate virtually any type of pretreatment process, septic tank (anaerobic), aerobic, lagoon, or any type of treatment facility. Only primary treatment (the removal of large settleable solids) of sewage is necessary for the operation of the system. Local soil and site conditions may require additional treatment for excessive organics, oil and grease or other contaminants.

Procedures have been developed to size, layout and design a *Perc-Rite[®] Drip* system using tables instead of performing calculations. The tables have conditions that allow the designer considerable flexibility to layout systems in a variety of siting conditions without being required to do engineering calculations to determine design suitability. When advanced system design is required, outside the limitations of this design procedure, the designer must reference the design manual located on our web site and complete a detailed calculation sheet to determine suitability. Reference our web site at "americanonsite.com".

The "QM" *Perc-Rite[®] Drip System* is a unique fluid handling system for dispersal of effluent wastewater in soil systems. The system incorporates filtration, time and level controlled application and ultra low rate drip distribution. In conditions where aerobic dispersal, such as "Low Pressure Distribution", of septic effluent is required or where land application with the use of conventional soil absorption fields are not acceptable, this system offers a unique method for subsurface distribution of the waste water effluent.



Perc-Rite® Drip Dispersal
 Pat # 5,200,065

Perc-Rite® Drip Systems create virtually *No Site Disturbance* during installation of the field distribution lines and cause very little soil disturbance. The effluent discharge volume from each emitter hole is very small. The installation of the system has very little site impact even in established lawns or park areas. After installation there are virtually no visible indications that the installation site is being used for dispersal purposes. This system is especially suited for landscaped or wooded areas near buildings, trailer parks, apartment complexes or residential subdivisions.

"QM" SYSTEM COMPONENTS

1. The "QM" Series **PERC-RITE® DRIP SYSTEM CONTROLLER** is a "state of the art" control panel, activated by level sensing devices (standard float switches) located in a dosing tank downstream from the pretreatment process or processes. When activated by the rising level of effluent in the dosing tank, the controller will enable the disposal cycle. The system controller on a time clock basis will pump the effluent through the filter module and then to final drip dispersal.
2. **FILTER UNIT** - Disc filter(s), automatic control valves and solenoid activated diaphragm valves are assembled in an insert unit with a remote flow meter or optional heater in a separate enclosure. Insert unit is provided with a labeled wire harness for easy connection to the control panel.
3. **PUMP SYSTEM** - The pump, Cool Guide™ and float switches for level indication are provided for installation into the pump tank. The pump is a 12-gpm turbine pump and will be suitable for most residential installation. Reference *lift and run table* for pumping limits.
4. **DRIPPER TUBING** - The dripper tubing is pressure compensating dripper line for wastewater. The tubing delivers a nominal 0.65 gallons per hour (+/- 5% flow rate from 7 to 60 psi). The tubing functions as a turbulent flow emitter between 0 and 7 psi, ensuring that the nominal design flow is not exceeded at system start-up. The tubing is polyethylene with a 120-psi pressure rating.
5. **TOP FEED MANIFOLD SYSTEM** - The Top Feed Manifolds are located at the highest point in the drip zone and are provided with air release valves to prevent drain down of upper laterals in the zone to lower laterals in the zone, thus preventing saturation of the lower laterals after the pump shuts off. The system provides for the fastest possible pressurization of the zone and the most efficient method of providing drain down control. If the site is flat, Top Feed Manifolds may not be required.
Patent No. 5,984,574B.
6. **DRIP FIELD MATERIALS** - All special drip fittings and equipment are supplied by American Manufacturing Company, Inc. including the tubing insert fittings, connectors, flex tube and non-schedule 40 PVC standard fittings.
7. **MULTI-ZONE SEQUENCING VALVE (OPTIONAL)** - In the event more than one zone of tubing is required a sequencing valve may be used to alternate between zones. The valve is a multi-port device, which is located at the highest point in the dispersal area and requires no electrical activation. An alternate option is a two-zone control unit with electrical activation.
8. **FLOW FLUSH KIT** - The automatic "forward field flush" valve and system "flow meter" are located in remote valve box when the insert filtration unit in the pump tank riser is used. Insulating the box is suggested. A thermostatically controlled heater is an available option.
9. **STANDARD FIELD MATERIALS** - All tanks, wire, standard pipe and fittings are provided by the contractor at the local site. The 1" supply and return pipes, the 1/2" pipe for installation between the top feed manifold system and the laterals and other misc. PVC pipe are to be purchased locally.

DESIGN PROCEDURES

1. DEMAND ANALYSIS - Local codes determine the amount of wastewater to design for. Many codes have a safety factor or peak flow factor in the prescribed design flow. Others are based on more of an average usage. In either event, the designer must determine what the peak (design) flow is. The "QM" Series *Perc-Rite® Drip System* will disperse the average flow through out each day unless the "Peak " float is enabled at which time the system will disperse effluent at an accelerated design daily flow rate. Record the peak design flow on *line 1* of the worksheet.
2. SITE AND SOILS EVALUATION - Soil evaluation is required on each site and the procedures used are not included in this manual. However, the results of the evaluation are used. The designer must determine from the information provided by the evaluator the "Design loading rate". The design-loading rate may be expressed as the "area" or as the linear feet of tubing required. The delineated area for installation and the installation depth needs to be determined. Long and narrow runs along contour are best. Be sure to adhere to applicable State and local codes. The *Soil Loading Rate Table* provided should be used as a guidance tool only. The professional judgment of the evaluator and designer should determine the wastewater application rate for any specific site. Record the selected loading rate on *line 2* of the worksheet. The total linear feet of tubing required is *line 1* divided by *line 2*. Record the total linear feet of tubing required on *line 3* of the worksheet.
3. DELINEATE AREA - On a site plan or a site sketch, the designer should layout the area of installation on contour. The width along contour should be determined and this distance will determine the necessary down slope distance in order to allocate sufficient total area. The distance down slope will dictate the number of runs that can be installed in the dispersal site. Make sure enough runs can be installed for the total wastewater capacity and the amount of tubing required. Site conditions determine the run separation. Runs can vary from 1' to 3' separation but are more frequently from 1-1/2' to 2' on center.
4. SELECT ZONE DETAIL - Once the area and number of possible runs is determined, a standard zone detail is selected based on the width across contour and the number of runs that are needed and can be installed. See the *Zone Detail Table*. Determine how wide the system can be based on the delineated area on the plan. Then determine how many linear feet of tubing is needed. Match the number of runs across contour that can be installed. From the table select the zone detail for the site. Record the selected zone detail on *line 4*. Record the total linear feet provided on *line 5*. Record the total linear feet per zone provided on *line 6*. Record the dose gpm and FF gpm provided on *line 7*. See the *Zone Detail Table* and *Dosing & FF Flow Table*.
5. LAYOUT SITE - On a site plan or site sketch show the route for the supply and return pipes. Measure and show the distance the supply and return pipes travel. On a site plan or site sketch show the layout of the tanks, filter module and the control panel. Determine the length of supply line run and record on *line 8*, determine the lift to the field and record on *line 9*.
6. DETERMINE SUITABILITY - Reference the *Lift and Distance Table* to determine by the length of run to the farthest field and the number of laterals, if the layout is suitable for 1' supply and return lines. If the selected zone detail is included in the zone table and the lift is in excess of the required for the length of run in the pump table, record a Yes in *line 10* of the worksheet.

"QM" PERC-RITE® WORKSHEET - Dispersal system design worksheet for residential systems.

JOB NAME: _____

JOB NUMBER: _____

	Y N () () () ()	Are supply and return pipes 1"? Is the lift from the pump to the Filter Unit < 8' and the distance < 30' with 1-1/2" pipe?
1	_____ gpd	Quantity of wastewater to disperse.
2	_____ gpd/LF	Tubing loading rate required to treat and disperse wastewater. Reference Soil Loading Rate Table . (Area Rate X 2)
3	_____ LF Tubing	Required total linear feet of tubing to treat and disperse wastewater. (line #1 / line #2 = line #3)
4	_____ Zone Detail	Standard Zone detail description indicating number of zones, laterals, and runs per zone.
5	_____ LF Total	Total linear feet of tubing provided to disperse wastewater. Total number of runs times the length of run along contour. Reference Zone Detail Table .
6	_____ LF/Zone	Total linear feet per zone. (line #5 / Number of Zones)
7	_____ gpm dose	Dosing flow rate. See "Dosing & FF Flow Table."
	_____ gpm FF	Field flush (FF) flow rate. See Dosing & FF flow table .
8	_____ Supply LF	Length of run between hydraulic unit and farthest zone.
9	_____ Lift Ft.	Vertical lift from off level in the pump chamber and highest zone elevation.
10	Will zone flush? Y N () ()	Reference Lift and Distance Table for pump capacity determined by the length of run to the farthest field and the number of laterals. For 1" supply and return only.

DESIGNER'S NAME

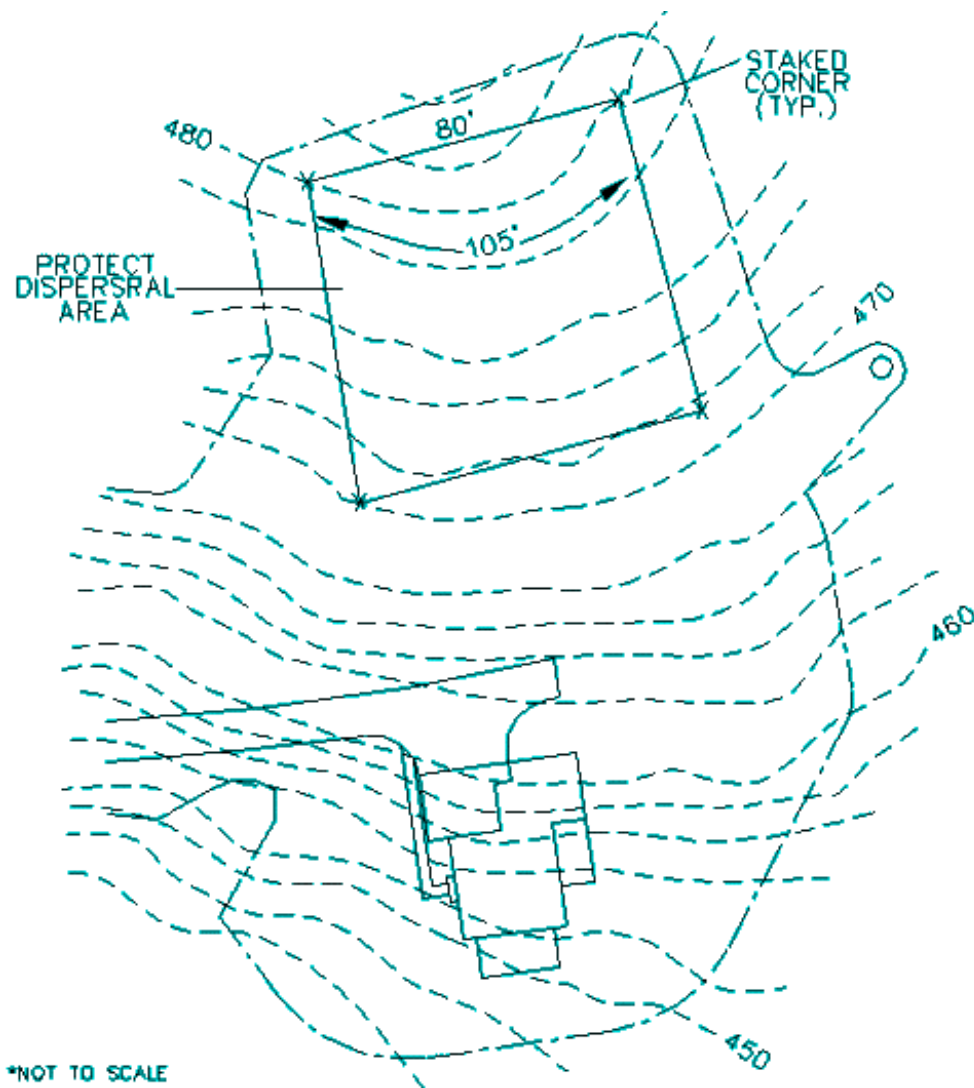
SIGNATURE

DATE

AREA DELINIATION

A complete site evaluation includes a surface characterization of topographic features and horizontal setbacks, a subsurface (soil) evaluation, and the accurate delineation of the soil adsorption area. This delineation is best performed by the site evaluator. The area should be marked and measured in the field to insure protection of the area and a representative final adsorption area design. Tools required would include a measuring tape to dimension the site, stakes to delineate the area, and a leveling device such as a builders level, locke level, or clinometer to determine contour.

Care should be exercised to insure accuracy on sites with limited area, and those that are topographically complex to minimize site skewing, account for topographic contour wrapping, and verification of available area. The header ditch(es) area should be as perpendicular to topographic contour as possible.



SOIL LOADING RATE TABLE

This is based on a standard tubing spacing between runs of 2 feet on center. Therefore a typical area-loading rate would be a number that is one half the linear feet loading rate number. For example, for a 1.2 gallons/L.ft./day rate would be equivalent to 0.6 gallons/ft²/day. Spacing may be changed for specific site conditions. For example: a tubing-loading rate of 0.4 is an area load of 0.2. By placing the tubing 1' on center, the resulting area loading would be at 0.4, or 1/2 of the area. This can only be done with proper site and soil evaluation.

Soil Textures	Soil Structure	Maximum Monthly Average BOD5 < 30mg/L	
		(gal./ft ² /day)	(gal./LF/day)
Course sand or courser	N/A	.3 - 1.6	.6 - 3.2
Loamy coarse sand	N/A	.25 - 1.4	.5 - 2.8
Sand	N/A	.25 - 1.2	.5 - 2.4
Loamy sand	Weak to strong	.25 - 1.4	.5 - 2.4
Fine sand	Massive	.15 - .7	.3 - 1.4
	Moderate to strong	.25 - .9	.1 - 1.8
	Massive or weak	.15 - 0.6	.3 - 1.2
Loamy fine sand	Moderate to strong	.2 - 0.9	.4 - 1.8
	Massive or weak	.15 - .6	.3 - 1.2
Very fine sand	N/A	.15 - .6	.3 - 1.2
Loamy very fine sand	N/A	.15 - .6	.3 - 1.2
Sandy loam	Moderate to strong	.15 - 1	.3 - 2
Loam	Weak, weak platy	.15 - .6	.3 - 1.2
	Massive	.1 - .5	.2 - 1
	Moderate to strong	.15 - .9	.3 - 1.8
	Weak, weak platy	.1 - .6	.2 - 1.2
Silt loam	Massive	.1 - .5	.2 - 1
	Moderate to strong	.15 - .8	.3 - 1.6
	Weak, weak platy	.1 - .3	.2 - .6
Sandy clay loam	Massive	.1 - .2	.2 - .4
	Moderate to strong	.15 - .6	.3 - 1.2
	Weak, weak platy	.1 - .3	.2 - .6
Clay loam	Weak, weak platy	.1 - .3	.2 - .6
Silty clay loam	Weak, weak platy	.1 - .3	.2 - .6
	Moderate to strong	.1 - .6	.2 - 1.2
	Weak, weak platy	.1 - .3	.2 - .6
Sandy clay	Massive	0	0
	Moderate to strong	.1 - .6	.2 - 1.2
	Moderate to strong	.1 - .3	.2 - .6
Clay	Massive to weak	0	0
	Moderate to strong	.1 - .3	.2 - .6
Silty clay	Massive to weak	0	0
	Moderate to strong	.1 - .3	.2 - .6
	Massive to weak	0	0

Site suitability, loading rate, and installation depth determination must be assigned based on thorough site/soil evaluation. The characterization of a soil based receiver site involves a systematic evaluation by trained individuals. Conditions to consider consist of a variety of topographic and soil conditions such as landscape position, slope, soil depth, depth to water table, depth to restriction, soil consistence, clay mineralogy, compaction, density, and site geometry and uniformity.

Drip dispersal lends itself to shallow installation. Typical depths are from 6-18". Separation to limitations should always be maximized while maintaining a consistent depth on contour in a permeable horizon. Refer to state and local regulatory requirements for appropriate site suitability guidance.

ZONE DETAIL NUMBERING SYSTEM

Each zone is designated by a "Z" indicating it is a Zone Detail Designation followed by three groups of numbers, the first is the number of zones, the second is the number of laterals per zone, the third is the runs per lateral.

$Z = \text{Zone}$	$\# \text{ Zones}$	$\# \text{ Laterals}$	$\# \text{ Runs/Lat}$
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EXAMPLE 1

Z	3	3	3
$Z = \text{Zone}$	$\# \text{ Zones}$	$\# \text{ Laterals}$	$\# \text{ Runs/Lat}$

This example shows a three-zone detail with three laterals per zone and three runs per lateral.

ZONE DETAIL SELECTION PROCEDURE

Reference the site plan layout to determine the width across contour of the delineated area. From the site and soils evaluation determine the total amount of tubing required. The area divided by two is the total linear feet of tubing required. The total linear feet of tubing required. The total linear feet of tubing required. The total linear feet of tubing divided by the length across contour equals the minimum number of runs. The total number of linear feet of tubing and runs will typically be more than the minimum since the preferred layout for flushing the supply and return lines will typically result in more than the minimum tubing.

Increasing the number of runs in order to install a standard zone configuration is encouraged. This provides additional safety to the tubing interface loading rate. Use the following step by step procedure to select a zone detail.

1. Determine width across contour.
2. Determine number of runs that can be installed in area.
3. Select a standard zone detail from under the column for contour with which has enough tubing to satisfy total tubing requirements.
4. In the event more runs are needed to yield enough tubing for the site, the tubing may be placed closer than 2' on center (under certain conditions).

EXAMPLE 2

Contour width = 125 Feet

Tubing required = 2400 Linear Feet

From the table the linear feet of tubing provided in 100 foot runs will be between 600 LF and 800 LF. Therefore select 8 runs for 800 LF. The zone detail could be:

Z	1	4	2
$Z = \text{Zone}$	$\# \text{ Zones}$	$\# \text{ Laterals}$	$\# \text{ Runs/Lat}$

Finally confirm that the number of runs can be installed into the delineated area.

PERC-RITE® -- "QM" SERIES STANDARD ZONE DETAIL TABLE

RUN LGTH #RUN	50'	75'	100'	125'	150'	200'	225'	250'	300'	
	ZD LF	ZD LF	ZD LF	ZD LF	ZD LF	ZD LF	ZD LF	ZD LF	ZD LF	
2						Z121 400	Z121 450	Z121 500	Z121 600	
3					Z131 450	Z131 600	Z131 675	Z131 750	Z131 900	
4			Z122 400 Z141 400	Z122 500 Z141 500	Z122 600 Z141 600	Z141 800 Z221 800	Z141 900 Z221 900	Z141 1000 Z221 1000	Z221 1200	
5			Z151 500	Z151 625	Z151 750					
6		Z123 450 Z132 450	Z123 600 Z132 600	Z132 750	Z132 900 Z231 900	Z231 1200	Z231 1350	Z231 1500	Z231 1800	
7										
8	Z124 400 Z142 400	Z124 600 Z142 600	Z142 800 Z222 800 Z241 800	Z142 1000 Z222 1000 Z241 1000	Z222 1200 Z241 1200	Z241 1600	Z241 1800	Z241 2000		
9	Z133 450	Z133 675	Z133 900							
10	Z125 500 Z152 500	Z152 750	Z251 1000	Z251 1250	Z251 1500					
11										
12	Z126 600 Z134 600 Z143 600	Z134 900 Z143 900 Z223 900 Z232 900	Z223 1200 Z232 1200	Z232 1500	Z232 1800					
13										
14										
15	Z135 750 Z153 750									
16	Z144 800 Z224 800 Z242 800	Z224 1200 Z242 1200	Z242 1600	Z242 2000	QM DOSING & FF FLOW TABLE (GPM)					
17										
18	Z136 900 Z233 900	Z233 1350	Z233 1800				2	3	4	5
19					400	2.2	5.4	7	8.6	10.2
20	Z145 1000 Z225 1000 Z252 1000	Z252 1500			450	2.4	5.6	7.2	8.8	10.4
22					500	2.7	5.9	7.5	9.1	10.7
24	Z226 1200 Z234 1200 Z243 1200	Z234 1800 Z243 1800			550	3	6.2	7.8	9.4	11
26					600	3.3	6.5	8.1	9.7	11.3
28					625	3.4	6.6	8.2	9.8	11.4
30	Z235 1500 Z253 1500				650	3.5	6.7	8.3	9.9	11.5
32	Z244 1600				675	3.7	6.9	8.5	10.1	11.7
34					700	3.8	7	8.6	10.2	11.8
36	Z236 1800				750	4.1	7.3	8.9	10.5	12.1
38					800	4.3	7.5	9.1	10.7	12.3
40	Z245 2000				850	4.6	7.8	9.4	11	12.6
					900	4.9	8.1	9.7	11.3	12.9
					950	5.1	8.3	9.9	11.5	13.1
					1000	5.4	8.6	10.2	11.8	13.4

LIFT & DISTANCE TABLE QUALIFICATIONS

1. The vertical lift is the elevation difference between the "Off Level Float" and the highest point in any drip zone.
2. The supply/return line column is the distance from the filter to the farthest drip zone.
3. The diameter of the pipe from the pump tank to the optional filter unit is 1-1/2" minimum.
4. All zone supply and return pipes are 1".
5. The flush return pipe from the filter box to the pretreatment tank is 1-1/2" gravity.
6. The maximum distance from the pump tank to the optional filter valve box is 30' and the vertical lift from the pump chamber to the optional filter valve box is 8'.
7. These tables may be used with the standard zone detail configuration only. A calculation sheet (not included herein) must be filled out for any other configuration.
8. Top feed manifolds must be used when any discernible slope is encountered.
9. Remote zone valves are needed when pumping downhill from the filter.
10. Return pressure assembly is needed when pumping uphill from the optional valve box.

OPTIONAL - RETURN PRESSURE ASSEMBLY FOR ZONE RETURN CONTROL VALVE.

In the event the drip zones are over a discernible vertical elevation above the hydraulic unit, install a "return pressure assembly". The assembly is to be used to prevent the return line from draining after or during ease dose. Remove the zone return connection and reinstall a short 1" nipple in the return valve. Install assembly as shown to the right. The hydraulic tubing providing pressure for the rest of the unit must be plugged and the new tubing from the assembly connected to the pressure side of the solenoid.

QM UNIT - 12 GPM, 1000 L.F. / ZONE MAX. Maximum Static Lift ("Off Level Float" to Drip Field)

	Supply/ Return Line (feet)	2-Lat 300'	3-Lat 300'	4-Lat 250'	5-Lat 150'
2					
3	100	100	83	78	86
4	150	98	80	73	80
5	200	96	76	68	74
6	250	94	72	62	68
7	300	92	69	57	63
8	350	90	65	52	57
9	400	88	62	46	51
10	450	86	58	41	45
11	500	84	54	36	39
12	550	82	51	30	
13	600	80	57	25	
14	650	78	44	20	
15	700	76	40	15	
16	750	74	36	9	
17	800	72	33	Note: Use Table 1 unless using HydroSeq Valve	
18	850	70	29		
19	900	68	26		
20	950	66	22		
21	1000	64	18		

	Supply/ Return Line (feet)	2-Lat 300'	3-Lat 300'	4-Lat 250'	5-Lat 150'
2					
3	100	61	61	61	61
4	150	58	58	58	58
5	200	56	56	56	56
6	250	53	53	53	53
7	300	50	50	50	50
8	350	47	47	47	47
9	400	44	44	44	44
10	450	42	42	36	42
11	500	39	39	31	39
12	550	36	36	25	
13	600	33	33	20	
14	650	30	30	15	
15	700	28	28	10	
16	750	25	25	4	
17	800	22	22	Note: Use Table 2 when using HydroSeq Valve	
18	850	19	19		
19	900	16	16		
20	950	14	14		
21	1000	11	11		

RUN TIME TABLES

The run timetables are calculated for achieving the best distribution of the **average daily flow** in gallons per day the system is designed for. Selecting the run time is the last design step that is performed and is based on the number of zones and the number of laterals per zone. The run time selected should result in even distribution and minimizing drain down events. The run time is calculated to provide from **3 to 7 times the volume of drip tubing** plus the top feed manifolds. Therefore, the number of doses per day per zone will vary in order to maintain optimum dispersal.

American Manufacturing - "QM" Series 1-Zone					
Laterals/Zone:		2-Lat	3-Lat	4-Lat	5-Lat
Lateral Length:		300'	300'	250'	150'
Design	Avg.	GPM: 3.25	4.875	5.417	4.063
GPD	GPD	Min./Dose	Min./Dose	Min./Dose	Min./Dose
300	180	7.48	5.84	6.73	6.84
320	192	8.1	6.33	7.29	7.43
340	204	8.71	6.82	7.84	8.02
360	216	9.33	5.84	8.4	8.61
380	228	9.95	6.25	8.95	9.2
400	240	8.8	6.66	9.5	9.79
420	252	9.33	7.07	10.06	8.31
440	264	9.86	7.48	8.17	8.8
450	270	10.12	7.69	8.4	9.05
460	276	8.87	7.89	8.62	9.3
480	288	9.33	8.3	9.06	9.79
500	300	9.79	8.71	9.5	8.52
520	312	10.25	9.12	9.95	8.94
540	324	10.71	9.53	10.39	9.37
560	336	11.18	9.94	8.76	9.79
580	348	11.64	10.35	9.13	8.68
600	360	12.1	9	9.5	9.05
620	372	12.56	9.36	9.87	9.42
640	384	13.02	9.71	10.24	9.79
660	396	13.48	10.06	8.87	10.16
680	408	13.95	10.41	9.19	10.53
700	420	14.41	10.76	9.5	10.9
720	432	14.87	11.11	9.82	11.27
750	450	15.56	11.64	10.29	11.82
Total LF in Zone		600	900	1000	750

American Manufacturing - "QM" Series 2-Zone					
Laterals/Zone:		2-Lat	3-Lat	4-Lat	5-Lat
Lateral Length:		300'	300'	250'	150'
Design	Avg.	GPM: 3.25	4.875	5.417	4.063
GPD	GPD	Min./Dose	Min./Dose	Min./Dose	Min./Dose
300	180	7.48	7.69	6.73	5.36
320	192	8.1	8.3	7.29	5.85
340	204	8.71	8.92	7.84	6.34
360	216	9.33	5.84	8.4	6.84
380	228	9.95	6.25	8.95	7.33
400	240	10.56	6.66	5.81	7.82
420	252	11.18	7.07	6.18	8.31
440	264	11.79	7.48	6.55	8.8
450	270	12.1	7.69	6.73	9.05
460	276	12.41	7.89	6.92	9.3
480	288	9.33	8.3	7.29	9.79
500	300	9.79	8.71	7.66	7.2
520	312	10.25	9.12	8.03	7.57
540	324	10.71	9.53	8.4	7.94
560	336	11.18	9.94	8.76	8.31
580	348	11.64	10.35	9.13	8.68
600	360	12.1	7.69	9.5	9.05
620	372	12.56	7.99	9.87	9.42
640	384	13.02	8.3	10.24	9.79
660	396	13.48	8.61	7.56	10.16
680	408	13.95	8.92	7.84	10.52
700	420	14.41	9.22	8.12	10.9
720	432	14.87	9.53	8.4	11.27
750	450	15.56	9.99	8.81	11.82
Total LF in Zone		600	900	1000	750

STANDARD & PEAK REST TIMES TO BE SET AT SYSTEM START-UP

<u>ONE ZONE LEGEND:</u>		<u>REST TIMES</u>	
		Standard	Peak
		(min)	(min)
4	Doses/day/zone	360	216
5	Doses/day/zone	288	173
6	Doses/day/zone	240	144
7	Doses/day/zone	206	123
8	Doses/day/zone	180	108

<u>TWO ZONE LEGEND:</u>		<u>REST TIMES</u>	
		Standard	Peak
		(min)	(min)
2	Doses/day/zone	360	216
3	Doses/day/zone	240	144
4	Doses/day/zone	180	108
5	Doses/day/zone	144	86
6	Doses/day/zone	120	72

"QM" SERIES ELECTRICAL AND OPERATIONAL SPECIFICATIONS

CUST. NAME: _____
 ADDRESS: _____

JOB NAME: _____
 JOB NUMBER: _____
 ADDRESS: _____

PERMIT INFO: _____

DESIGNER NAME: _____
 ADDRESS: _____

SYSTEM INFORMATION

GPD _____
 MAX GPM _____
 NO. ZONES _____
 ZONE DETAIL NO. _____
 DOSES PER DAY _____

MODEL NUMBER

RUN TIME

- | | | |
|-------------------|-------|-------|
| 1. AMD151-S121 | _____ | _____ |
| 2. ARD121-S121 | _____ | _____ |
| 3. ARD122-S122 | _____ | _____ |
| 4. ABD121-S121 | _____ | _____ |
| 5. ABD122-S122 | _____ | _____ |
| 6. ARD121-S121SV2 | _____ | _____ |

Check the model number that has the number of zones per the zone detail. Record the run time from the Run Time Table.

ELECTRICAL CIRCUIT REQUIREMENTS

- | | |
|------------|-----------------------|
| 1. PUMP | 1/2 HP, 115V, 1 PHASE |
| 2. CONTROL | 15 AMP, 115V, 1 PHASE |
| 3. OTHER | _____ |

OPTIONS

- | | |
|--|-----------|
| Return Pressure Assembly | _____ (Y) |
| Use pressure assembly anytime the lift from filter unit to drip field exceeds 10 feet. | |
| Drain Down Assembly | _____ (Y) |
| Blower Cut-out | _____ (Y) |
| 24" Riser _____" long | _____ (Y) |
| 24" Lid | _____ (Y) |
| 30" Riser _____" long | _____ (Y) |
| 30" Lid | _____ (Y) |
| Heater 225w | _____ (Y) |
| Valve Box (insulated) | _____ (Y) |
| Tubing Rolls (500') | _____ |
| Tubing Rolls (1000') | _____ |

SPECIAL INSTRUCTIONS

(use back if necessary)

AUTHORIZED SIGNATURE

_____ Date: _____
 () Owner () Agent

NOTE: ATTACHED SHOULD BE A ZONE DETAIL

AMERICAN USE ONLY

Sales Order Number _____
 File No. _____
 SBT Input BY _____

INSTALLATION INSTRUCTIONS

1. Prepare field location for installation. Verify contour and design. No wet weather installation. No activity on drainfield other than minimum to install system. Clearing of vegetation to be performed with minimal site disturbance. Do not park equipment or store materials on drainfield area.
2. Set pretreatment and pump tanks.
3. Dig header ditch for field manifold.
4. Install dripper tubing. Horizontal spacing between dripper lines shall be as specified and installation depth shall be as specified. Install on contour.
5. Install loops (flex tubing) and construct field supply / return manifolds. All PVC pipe and fittings shall be PVC SCH 40 type 1 rated for pressure applications. All glued joints shall be cleaned and primed with purple (dyed) PVC primer prior to being glued. All cutting of PVC pipe, flexible PVC and/or dripper tubing shall be accomplished with pipe cutters. Sawing of PVC pipe, flexible PVC and/or dripper tubing shall be followed by cleaning all shavings or sawing should not be allowed. All open PVC pipe, flexible PVC and/or dripper tubing in the work area shall have the ends covered with duct tape during construction to prevent construction debris from entering the pipe. Prior to gluing all glue joints shall be inspected for and cleared of construction debris.
6. Dig ditches for conveyance lines, pump supply line, and flush return line. Install. Connect supply / return lines with manifolds.
7. Place Central Unit and mount control panel. Connect conveyance, supply, and flush return lines to hydraulic unit.
8. Set switch tree in pump tank.
9. Install electrical (and phone line if applicable). Check power supply and power up unit.
10. Provide one-day volume of clean water for startup. Prior to startup of the drip disposal system the air release valves shall be removed and each zone in the system shall be flushed as follows: a) using an appropriate length of flexible PVC pipe with a male fitting attached to the air release connection to direct the flushing away from the construction area, b) flush the zone with a volume of water (clean water to be provided by contractor) equal to 1.5 times the volume of the pipes from the central unit to the air release valve, c) repeat this procedure for each zone (the flushing of the system is accomplished by manual override of the control panel by the manufacturer of engineer.) Once completed replace and glue air relief valves.

If existing septic tanks are to be used, they shall be pumped out by a commercial septic tank pumper, checked for leakage or other problems, and replaced if necessary. After the tank is emptied, the tank shall be rinsed, pumped, and refilled with clean water. Debris in septic tank shall be kept to a minimum since it could clog the disk filters during startup. Disk filters are not backflushed during startup and any clogging could cause incorrect rate of flow readings for the controller.

11. Pressure check all fittings and lines. Inspect field and loops. Find leaks and repair.
12. Check setup values against calculated values. Set run time for Central Unit.
13. Backfill once lines and fields are determined to have no leaks. Backfilling is to be controlled to prevent the damaging of pipes or fittings. Once completed, drainfield area should be graded to shed surface water with additional clean soil as necessary. Establish fescue or other turf cover, cut long (6-8").

OPERATION AND MAINTENANCE FOR PERC-RITE® DRIP SYSTEM

The **PERC-RITE® DRIP SYSTEM** has been developed to automatically monitor operational functions. The system is designed to be easily fixed after it breaks, in other words periodic monitoring can confirm good operating conditions but there are no maintenance procedures necessary until a mechanical component becomes in need of repair. Further, any malfunction or breakage of a mechanical component will result in a failure similar to any traditional system, a wet spot in the field, a backup or a high level alarm.

The **MONITORING FREQUENCY** should be no more than traditional systems. The most important component for the operational success is owner awareness. All onsite systems have a finite hydraulic capacity. Drip systems have no storage capacity in the soil system so storage or flow equalization must be provided in the pump tank. The owner must be aware system exists and the peak flow limitations for usage.

After a successful installation and startup the system should be inspected from one to three months after the owner takes occupancy to confirm operational compliance and to inform the owner of the operational characteristics of the system. The system should then go on a schedule of annual inspections to monitor usage and inspect system for wear in order to minimize emergency service requirements. Each system is provided with an owners manual. The local dealer has a more detailed installation and maintenance supplement manual. If more than septic pretreatment is provided, more frequent monitoring may be required. Provide monitoring frequency at the rate determined by the most sensitive component.

An **OPERATIONAL CHECKLIST** is provided in the dealer's supplement manual for determining satisfactory operation of the system. The following topics are covered:

1. Field Conditions
2. Inspection and cleaning of backwash filter
3. Check septic tank and pump tank condition
4. Check operation of pump, control and valves
5. Check zone dose rates
6. Evaluate and record meter for usage

STANDARD MODEL "QM" PERC-RITE® DRIP SYSTEMS

AMD151-S121 : 1 ZONE SIMPLEX MANUAL CLEAN INSERT & LCD CONTROL

ARD121-S121 : 1 ZONE QM IN RISER INSERT & LCD CONTROL

ARD121-S122 : 2 ZONE QM IN RISER INSERT W/ PLC CONTROL

ABD121-S121 : 1 ZONE QM SKID MOUNT W/ LCD CONTROL

ABD121-S122 : 2 ZONE QM SKID MOUNT W/ PLC PANEL

ARD121-S121SV2 : 2 ZONE QM INSERT W/ SEQUENCER & LCD CONTROL

AMERICAN MANUFACTURING LIMITED WARRANTY For one year (12 months) after the date of purchase, American Manufacturing Company, Inc. will repair or replace any product or portion thereof which proves to be defective due to materials or workmanship of American Manufacturing. We reserve the right to repair or replace defective materials at our discretion. This warranty does not cover the following conditions.

1. Defects or problems caused by improper installation or maintenance of materials.
2. Abuse, neglect or accidental damage of products.
3. Normal maintenance or upkeep of products.
4. Lightning, war, floods, or other acts beyond our control.
5. Misapplication of our products for their designed purpose, or misapplication according to local, state or national codes when in effect.

Defective or warranted materials must be returned to us or a place designated by American Manufacturing. All returns must be accompanied by a return authorization number supplied by American Manufacturing.

American Manufacturing will in now way be responsible for any losses or damages incurred by failure of equipment, parts or services. NOTE: Some states do not allow exclusion of damages so this may not apply to you. There are no other warranties written or implied.

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