

MODEL IFS

MODEL TYPE

- ☐ 1 = SPLX TIMED DOSE (includes option 8AC standard) \$824.00
- ☒ 2 = SPLX DEMAND DOSE (includes option 8AC standard) \$852.00

ALARM PACKAGE

- ☒ 1 = alarm package (includes test/normal/silence switch, fuse, red light & horn) Base

ENCLOSURE RATING

- ☒ W = NEMA 4X Base

STARTING DEVICE

- ☐ 1 = 120/208/240 VAC Base
- ☒ 9 = 120 VAC Base

PUMP FULL LOAD AMPS

- ☐ 0 = 0-7 FLA Base
- ☒ 1 = 7-15 FLA Base
- ☐ 2 = 15-20 FLA \$80.00

PUMP DISCONNECTS

- ☐ 0 = no pump disconnect Base
- ☒ 4 = circuit breaker
- 120 VAC (must select starting device option 9) \$35.00
- 120/208/240 VAC (must select starting device option 1) \$70.00

SWITCH APPLICATIONS

- ☒ H = floats (Timed dose = timer enable and alarm / Demand dose = stop, start, and alarm) (select 17 option) Base
- ☐ X = no floats
- timed dose -\$50.00
- demand dose -\$75.00
- ☐ C = C-Level™ sensor (must select 24 or 29 option)
- (select option 3E and/or 4A & 4D for high water alarm and/or redundant off floats)
- timed dose -\$50.00
- demand dose -\$75.00

Note: Pump down applications only.

Industry practices suggest that a secondary device, such as a float switch, be used for redundant activation of the high level alarm and pump shut off.

OPTIONS Listed below

CODE	DESCRIPTION	LIST PRICE
☐ 1J	Duo alarm inputs	\$25.00
☐ 3A	Alarm flasher	\$50.00
☐ 3B	Manual alarm reset	\$90.00
☐ 3E	High water alarm float (must select 17 option)	\$25.00
(Available only when Switch Applications = C)		
☒ 4A	Redundant off (select option 4D if floats are required)	
	Demand Dose	\$55.00
	Timed Dose	\$0.00
☒ 4D	Redundant off float	
	(must select 4A option) (must select 17 option)	\$25.00
☐ 6A	Auxiliary alarm contacts, form C	\$40.00
☒ 8AC	Display board includes: ETM counter, events (cycles) counter, alarm counter, and override counter (timed dose only). (Included as standard.)	\$0.00
☒ 10E	Lockable latch - NEMA 4X	\$40.00
☐ 10F	Lightning arrestor (must select pump circuit breaker, control and alarm power combined)	\$230.00
☐ 10K	Anti-condensation heater	\$100.00
☐ 10P	Panel Mounting Post (Factory Installed. Includes Duplex Install. Kit) (Enclosure upsized to 10"x8"x6". Max 14"x12"x6").	\$110.00
☐ 11C	NEMA 1 alarm panel (must select option 6A)	\$80.00

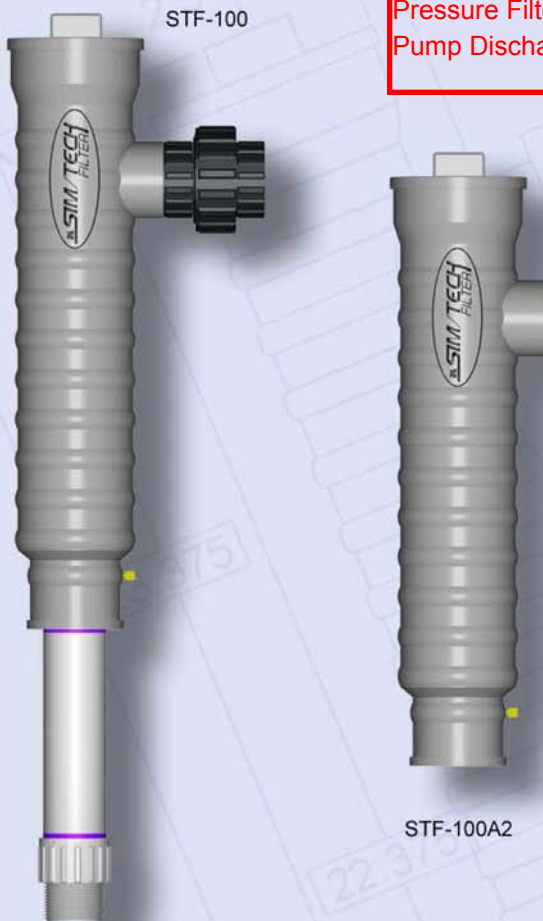
CODE	DESCRIPTION	LIST PRICE
☐ 11D	NEMA 4X alarm panel	
	(must select option 6A)	\$250.00
☒ 15A	Control / Alarm circuit breaker	\$85.00
☐ 16A	10' cord in lieu of 20' (per float)	\$2.00
☐ 16B	15' cord in lieu of 20' (per float)	\$1.00
☐ 16C	30' cord in lieu of 20' (per float)	\$5.00
☐ 16D	40' cord in lieu of 20' (per float)	\$15.00
☐ 17C	Sensor Float® / internally weighted ▲ (per float)	\$5.00
☐ 17D	Sensor Float® / externally weighted ▲ (per float)	\$7.00
☒ 17G	MilliAmpMaster™ / pipe clamp ● (per float)	\$0.00
☐ 17H	MilliAmpMaster™ / externally weighted ● (per float)	\$7.00
☐ 17J	Sensor Float® / pipe clamp ▲ (per float)	\$0.00
☐ 18A	Timer override float	
	(timed dose float panel only)	\$25.00
☐ 24E	C-Level™ CL40 sensor with 4' vent tube & 20' cord	\$280.00
☐ 24F	C-Level™ CL40 sensor with 4' vent tube & 40' cord	\$310.00
☐ 24G	C-Level™ CL40 sensor with 8' vent tube & 20' cord	\$285.00
☐ 24H	C-Level™ CL40 sensor with 8' vent tube & 40' cord	\$315.00
☐ 24X	No C-Level™ CL40 sensor	\$0.00
☐ 29A	C-Level™ CL100 sensor w/10' vent tube & 20' cord	\$290.00
☐ 29B	C-Level™ CL100 sensor w/10' vent tube & 40' cord	\$320.00
☐ 29X	No C-Level™ CL100 sensor	\$0.00
● Mechanically-activated ▲ Mercury-activated		

Total Options
TOTAL LIST PRICE

If additional features are required, call the factory for a quote on an Engineered Custom control panel.

SAMPLE

MODEL	IFS	1	1	W	9	1	4	H	8AC	10E	17G	IFS1	See Price List
Model Type												1	Base
Alarm Package												W	Base
Enclosure Rating												9	Base
Starting Device												1	Base
Pump Full Load Amps												4	\$35.00
Pump Disconnects												H	Base
Switch Application												8AC	\$0.00
Options: Display, Lockable Latch,												10E	\$40.00
SJE MilliAmpMaster™/pipe clamp												17G	\$0.00
TOTAL LIST PRICE												\$XXX.XX	

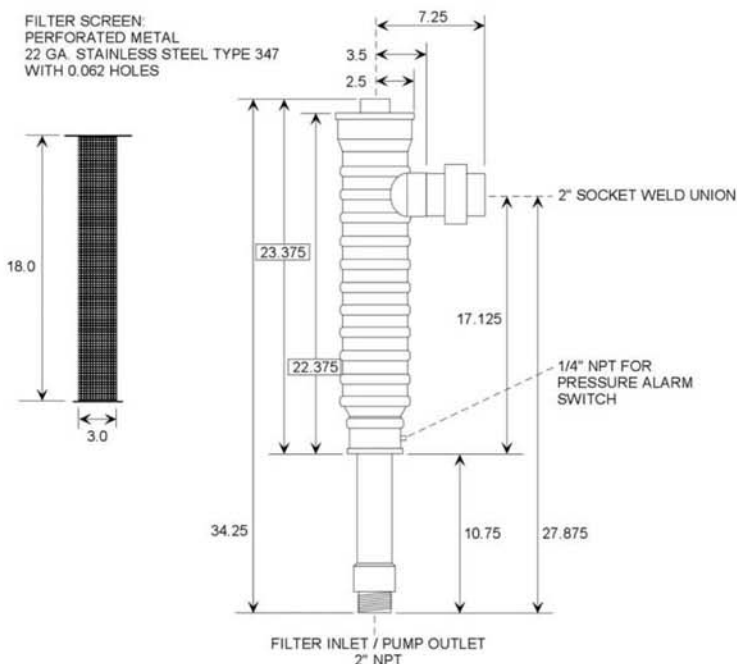


Pressure Filter for
Pump Discharge

FEATURES

- ❖ Low maintenance
- ❖ Easy to install and service
- ❖ Economical
- ❖ Extends life of drain field
- ❖ Improves effluent quality
- ❖ The last line of defense before the laterals
- ❖ Vortex scrubbing action helps keep filter clean providing maximum maintenance intervals
- ❖ Uses a S.S. filter screen with .062 diameter holes
- ❖ Provides a 69.52 sq. in. or 41% open area which allows the filter to pass 83.8 GPM at 1 PSI
- ❖ Assures quality effluent with lower TSS levels, keeping pressurized systems functioning at 100% efficiency
- ❖ Low head loss .5002 ft. or .21 PSI
- ❖ Flow rate with clean screen 120,672 GPD @ 1 PSI
- ❖ Flow rate with 95% plugged screen 114,912 GPD @ 1.8 PSI
- ❖ Job ready with 2" schedule 80 union and tailpiece attached (STF-100)
- ❖ Field assemble does not include union or tailpiece (STF-100A2)
- ❖ Use optional filter socks to filter smaller particles

FILTER SCREEN:
PERFORATED METAL
22 GA. STAINLESS STEEL TYPE 347
WITH 0.062 HOLES



Order part No. STF-100
STF-100A2

CAD detail drawing available in DXF format

RELATED PRODUCTS

Locate on pump discharge.

U.S. Patent # 5, 885, 452
Canada Patent # 2, 237, 751

STF-104-600M page 14
STF-104-150190M page 14
STF-104TN page 14
STF-101 page 14
STF-101A page 14
STF-107 page 14
STF-102 page 14
STF-FC page 14
STF-150 page 14
STF-103B page 14
STF-105 page 14

**Design, Installation
and Maintenance**

of the

**T & J Panel
Wastewater Treatment System**



A Better Quality Effluent

**Environmental Health Specialists
Septic Tank Installers**

Although this manual is sectioned for specific user groups, we at T & J Panel suggest you familiarize yourself with the complete manual.

11th Edition

ENVIRONMENTAL HEALTH SPECIALISTS

System Design

In the early days of the T & J Panel system, when it was still considered an experimental system, the primary reason for permitting the Panel System was because of insufficient space for a conventional system. In the Sewage Regulations [10NCAC 10A.1956 (3) (a) (ii)][15ANCAC 18E .0905], the Panel System should be considered when: a quality effluent may be needed, space is limited, usable soil is limited, or there are indications that at some future time space may be needed for other development. When there is a trend for added development such as additions to homes, pools or other special landscaping development, the T & J Panel System may prevent insufficient space later. As the Environmental Health Specialist who is designing a system, and you can foresee such a trend of continued development, the Panel System may be an option the homeowner would like to utilize.

As noted in the regulations a PPBPS (Prefabricated Permeable Block Panel System) is permitted where soils are suitable, provisionally suitable, or reclassified provisionally suitable; however, only one half of the area needed for a conventional system is required. This is one reason the Panel System can help you use the best soils available on the lot. The minimum soil depth required for **horizontally installed Panel Systems is 26-inches**, whereas the minimum soil depth required for **vertically installed Panel Systems is 34-inches** (minimum depth requires 4”-6” of suitable soil cover). The system can be gravity fed, pumped to a pressure manifold and gravity fed into the lines, or pumped to Low Pressure Panel lines. Most of the concepts for a Panel System layout are the same as for a conventional system; the biggest difference being the aerial area needed and the quality of effluent being introduced into the ground.

The T & J Panel system can be installed as either gravity, pump to gravity, pump to pressure manifold, or low pressure pipe distribution system. When designing a pressure system, the principles of low pressure distribution are as described in the LPP manual. There is further discussion on pressure systems in the installer section of this manual.

Conversion

A three-bedroom house with a 0.4 gpd application rate. (The first three steps are the same as for the conventional system.)

- 1) 120 gallons per bedroom X 3 bedrooms = 360 gallons per day design flow rate.
- 2) 360 gallons' flow rate / 0.4 application rate = 900 sq. ft. of conventional trench bottom.
- 3) 900 sq. ft. / 3 ft. wide trench = 300 linear feet of conventional system.

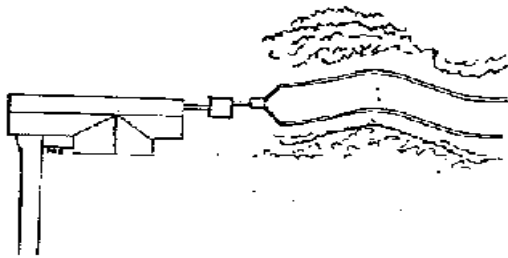
This conventional layout requires 2700 sq. ft. of area on the lot with another equal area of repair space for a total of 5400 sq. ft. of suitable usable area. To calculate the size of the T & J Panel system, the above calculations must be made with an additional fourth step as described in [10NCAC 10A .1956 (3) (a) (ii) (B)] for a PPBPS, (the T & J Panel system).

- 4) 300 linear feet of conventional system X 0.5 for a horizontally or vertically installed 16-inch Panel System = 150 linear feet of T & J Panel System.

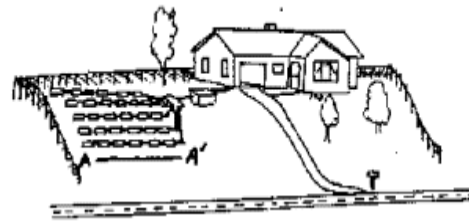
A Panel System requires only a 1200 sq. ft. area on the lot for the system with an equal area for repair, a total of 2400 sq. ft. With the Panel System, the installation and repair can go into the same area as the initial area required for a conventional gravel trench system.

Window Effect

To prevent hydraulic overload in the soil aerial space should always be a consideration for any system. However, it is especially notable with the Panel System as with any system that reduces the size of the aerial area drain field. The following is a simplistic example of this concept.



MOST DESIRABLE

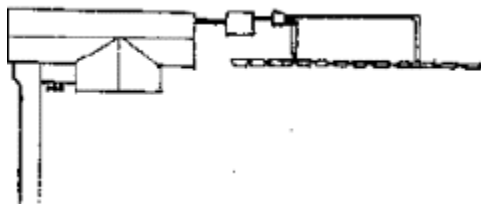


LESS DESIRABLE

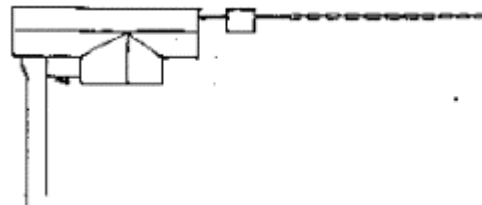
While both systems have the same linear footage of trench, the second diagram is a less desirable design. The effluent must pass through the area A-A' which can cause a strain on that area and even a failure because of hydraulic overloading.

Distribution

Another extreme would be the use of a long single trench fed from only one end. In the incorrect example, the aerial space is good and the chance of hydraulic overloading is greatly reduced. However, down line distribution in the panel line will not give optimum treatment.



CORRECT



INCORRECT

In the correct example we see that the trench has been fed from multiple points. Because the panel lines are put in as level as possible, never exceeding $\frac{1}{4}$ inch of drain line fall in 10 feet of run, they feed both ways equally. T & J Panel recommends that no gravity line exceed 50 feet unless it is fed from multiple points. In both of these examples we are specifying the Panel System, but the logic applies to the conventional system as well.

Calculating Panels per Trench

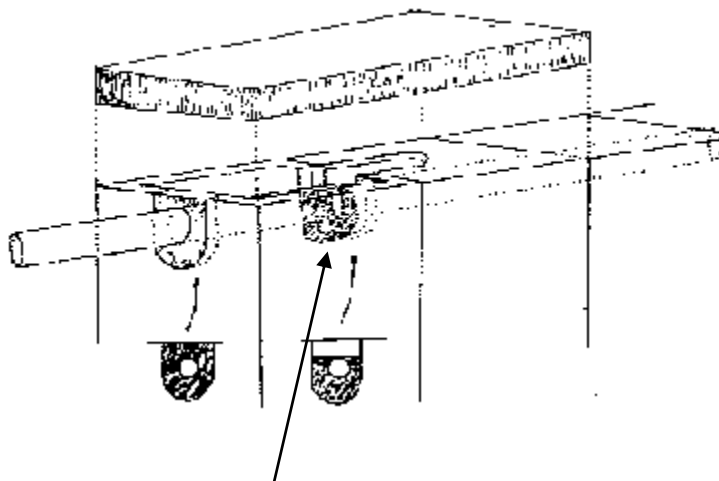
To calculate the number of panels needed for a 150-foot line, multiply 150' X 12" = 1800", then divide by 52" which is 46 inches for the panel and 6 inches for the space between the panels in the trench. $1800" / 52" = 34.6$ panels; therefore, you would call for 35 panels. (A material order chart is included in the installer section of this manual.) If there is to be more than one trench, the sizing of the lines should be as equal as possible with as close to the same number of panels in each trench as is practical.

Backfill

Backfill sand shall be a clean washed medium sand that is naturally occurring and falls within the gradation of ASTM C-33 specification. This specification is one that is used in the ready mix industry and is readily available in all areas (also known as 2-S sand) The second type of sand that you will need is a clean particle sand to coat the bottom of each panel's top chamber with a bed of sand one-inch-deep (see pages 13 and 14 for Horizontal Installation). This sand is a medium grade of sand blasting sand. With traditional installation, each fifty-pound bag should cover five panels (See pages 13 and 14 for Horizontal Installation). Backfill sand calculations should be taken from the material sheet.

Foam Sealant / Tar Seals

The drawings below illustrate the outer and inner seal. Note that while the outer seal is a complete seal, the inner seal is only up to the top of the connecting pipe. This is to allow for over flow of the effluent at peak use periods into the lower air chambers. At this point the air chamber becomes an additional storage chamber for the effluent. These seals can be inspected by lifting the caps at the ends of the panels while inspecting the system installation. GE Foam Sealer is an approved alternative to tar for these seals. Care should be used not to glue the caps down with the use of GE Foam Sealer. When using GE Foam Sealer on gravity flow systems, special care should be used on the inner seals of the panel not to over fill or under fill this seal.



OUTER and INNER SEALS (This **inner** seal, if sealed off completely, will void the overflow reservoir)

Trench Preparation

Trench grade should be established so that backfill cover will be four to six inches over the tops of the panels. (Note, on severe slopes, system depth should be adjusted to protect against breakout of effluent.) In soils containing clay, the trench side walls and bottom should be raked to bring slicked over areas back as near to original structure as possible. A light dusting of lime on the sidewalls and bottom will help the system to go back to its original structure. (At grade installation systems are required to bring in 4-6" of topsoil suited for vegetative growth)

Final Inspection

The following list of key points are things that an inspector should look for when issuing a completion permit:

- 1) Is the depth of the panels within guidelines?
- 2) Are drain lines level or less than ¼ inch fall in ten feet?
- 3) Have seals been properly constructed?
- 4) Was the proper sand used in the trench backfill?
- 5) If in soils where clay is present, were the sides, walls and bottom raked and limed?

(For Pumped Systems)

- 6) Have pump size, head pressure and dose cycle been properly sized and set?
- 7) Record field data on operations permit.
(Set dose cycle for 3.6 gallons per panel.)
- 8) Were panels installed horizontally or vertically, according to the permit?

INSTALLER

The Panel Block System

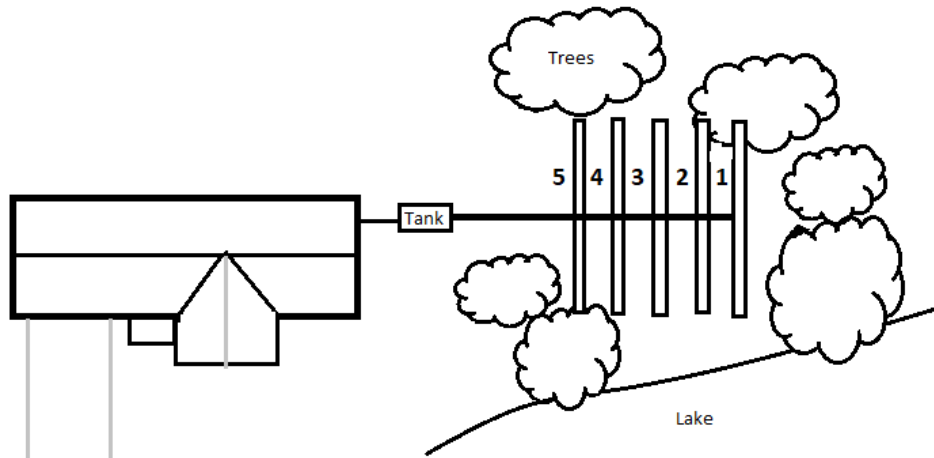
Generally, on level open land, a Panel System can be installed in about the same time as a conventional system; however, traditionally Panel Systems have been installed where space and topography have restricted use of a conventional system. For this reason, Panel System installations have required more time. Many installers enjoy the change of working with panels, not handling gravel, and the satisfaction of knowing a better quality system has been installed.

Ordering Materials

On pages 7 & 8 you will find a materials chart and an order sheet for the T & J Panel System. The distributor in your area will lead you through these sheets when ordering or pricing the system. Please be sure to let your distributor know what installation method you are utilizing, this will affect the amount of materials needed for the system. For information on the distributor located closest to you call **704-924-8600** or fax **704-924-8681**. After ordering, your panels will be shipped to the job site banded together on pallets.

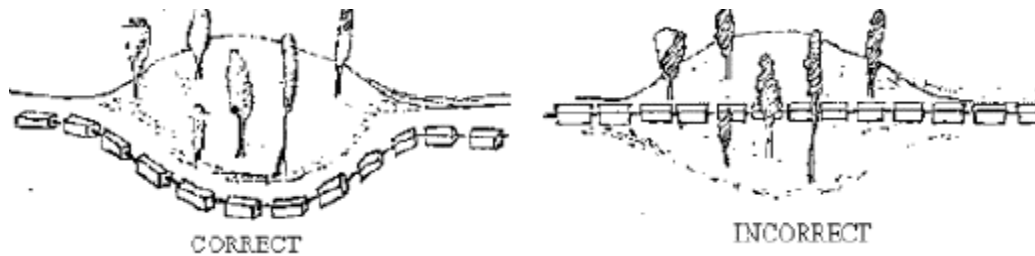
Installation Tips

Installation for multiple line systems should begin in the most confining area and be worked to the more open areas.



Above is an example of a multiple line installation. As you can see, the installation should begin with the line marked 1 and proceed to 2, 3 then 4. This procedure will greatly ease material handling and backfilling. (Note, sections of the drain lines should be left uncovered to allow for inspection of lines when area is confined and return access to lines is limited.)

On the following page are two examples of drain lines on sloping lots. The second drawing shows the drain line going through a slope making the center of the line deeper in the ground. This is not a desirable situation. The first drawing shows the drain line going around the slope keeping the trench depth and cover uniform for the entire length of the line. On slopes, care should be given to avoid cutting away valuable topsoil in an effort to make straight lines. The panel line should be installed on grade with the contour of the natural slope. Panel lines can be curved to almost any degree.



Digging the Trench for Vertical Installation

Start by shooting the grade and marking the contour. For a 16-inch vertically installed panel, add 28 inches to the shallowest or lowest grade that the trench must cross to obtain the trench bottom grade. Dig the trench at the elevation derived, checking the grade frequently. The trench should be a minimum of 2 feet wide. With the trench open, all sidewalls and bottom shall be raked to bring smeared areas back to their original structure before a light dusting of lime is applied. Place a 6-inch layer of backfill sand in the trench and level to grade, placing a 1x4 or 1x6 inch board flat on the top of the 6-inch layer of sand. Once more, check the grade of the trench by shooting the top of the board. Once the grade boards have been set, the panels may be set into the trench by hand or by using the backhoe. Each panel weights about 155 pounds and placement by hand goes quickly. The panels should be placed about 6 inches apart in the trench to obtain equal spacing. Place 10 pounds of clean particle sand (medium sand blasting sand) in the top chamber of each panel to form a bed of sand about one-inch-thick. Place half the sand in one end of the panel and the other half of sand in the other end of the panel. The effluent entering the panel will level the sand for you. GE Foam Sealer or tar seal rope should be placed in the bottom of the U outs to form seals around the pipe as shown in earlier drawings. Once the GE Foam Sealer or tar seal rope is in place, a 24-inch section of 2 inch PR160 pipe is cut to span from the upper middle top chamber of the first panel to the upper middle chamber of the next panel. The tar seal rope that is used should be of tar or butyl that is soft and pliable to obtain a watertight seal. Now that the connection and sealing is complete, a block cap is placed on each end of the panel covering all openings. (These will be delivered with the panels.) The cap block may well serve as an inspection port at some future date. The trench is ready to be backfilled to the top of the panel with the same backfill sand used in the trench bottom. With the sand to the top of the panel, trenches should be left for the sanitarian to inspect. Soil cover should be added after the final inspection. (At grade installation systems are required to bring in 4-6" of topsoil suited for vegetative growth)

Most Panel Systems are currently used due to space considerations and caution should be taken to preserve suitable soil structure and site conditions.

Materials Chart for Vertical Installation

- Materials needed per panel:
- One can of GE Foam Sealer per five panels
or
 - Three feet of half inch tar seal rope per panel
 - Two feet of 2 inch PR160 pipe per panel, or same linear feet as line layout of pressure system of 1 ¼ inch pipe. Add pipe for tie in of lines to tank and house.
 - 50 pounds of particle sand (medium sand blasting sand) per five panels
 - Same linear feet of 1x4 or 1x6 as line length
 - Bag of powder lime when in clay soil

Vertical Installation

Panel and C-33 Sand fill for a 2-foot-wide trench. Add 50% more for a 3-foot-wide trench.

50 LF – 12 panels 8¼ tons sand	130 LF – 30 panels 21½ tons sand
60 LF – 14 panels 10 tons sand	140 LF – 32 panels 23 tons sand
70 LF – 16 panels 11½ tons sand	150 LF – 35 panels 25 tons sand
80 LF – 18 panels 13¼ tons sand	160 LF – 37 panels 26½ tons sand
90 LF – 21 panels 15 tons sand	170 LF – 39 panels 28 tons sand
100 LF – 23 panels 16½ tons sand	180 LF – 42 panels 30 tons sand
110 LF – 25 panels 18¼ tons sand	190 LF – 44 panels 31½ tons sand
120 LF – 28 panels 20 tons sand	200 LF – 46 panels 33 tons sand

T & J Panel Material Worksheet

Homeowner _____ County _____

Address _____

System Description _____

_____ T & J Panels _____ Inch (caps N/C) _____

_____ 2" Pipe _____

_____ 1 1/4" Pipe _____

_____ Fittings for Pipe _____

_____ Tar Seal Rope (3' / Panel) _____

_____ GE Foam Sealer (5 Panels / can) _____

_____ Medium Sand Blasting Sand (50 lb / 5 panels) _____

_____ Pallets (Non-returnable) _____

_____ Screened Creek Sand (C33) _____

_____ 1x4 or 1x6 Boards _____

_____ Powder Lime _____

_____ Septic Tank _____ Gallon _____

_____ Pump Tank _____ Gallon _____

_____ 4" PVC Pipe Schedule 40 _____

_____ Distribution Box _____

_____ Manifold _____ Taps _____ Size _____

_____ Install Training _____

_____ _____

Sub-total _____

Delivery Charge _____

Tax _____

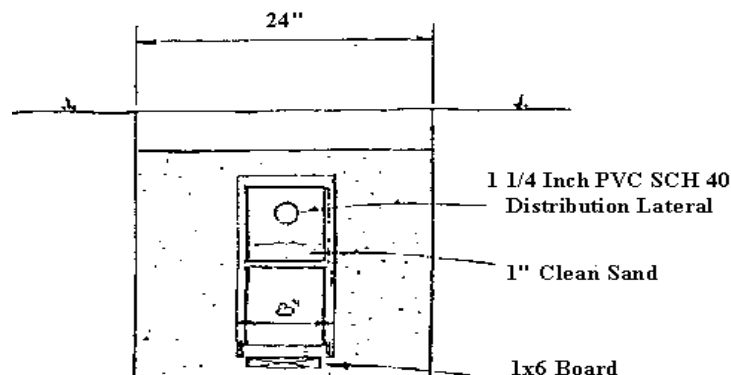
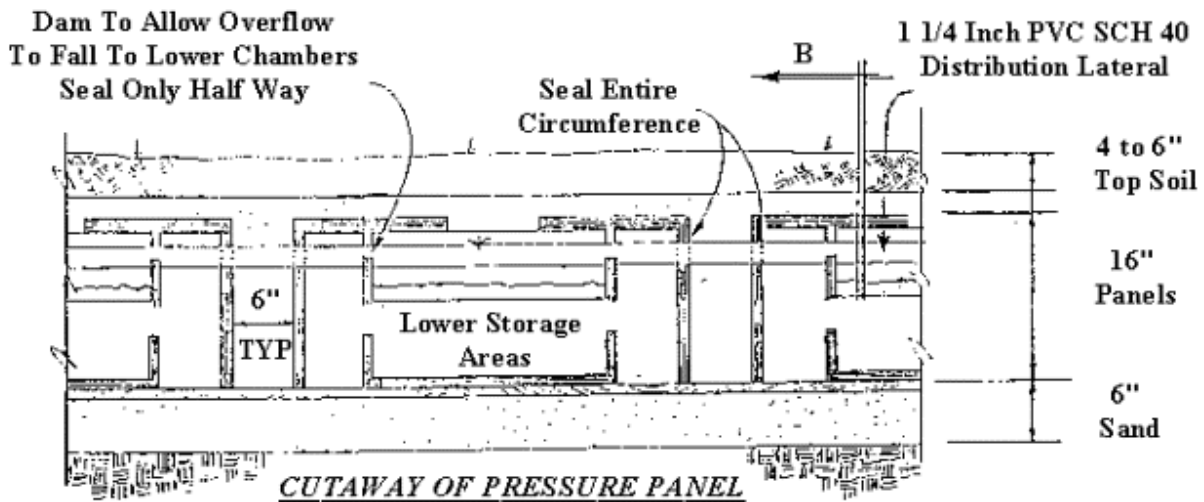
Total _____

Panels with Pressure Distribution under Vertical Installation

The LP Panel uses technology similar to that of Low Pressure Pipe (LPP) Systems. The tables and distribution design described in the LPP manual is applicable to the pressure Panel System. The system should be used with two to four feet of head. In many respects, a LP Panel is similar to a LPP with the holes discharging into the panels.

The dosing cycle for the Panel System is designed to pump enough effluent to fill the top chambers of all the panels in the system. The top chamber of a 16-inch panel holds 3.6 gallons. When the system has 34 panels and all holes are the same size, you would multiply 34 X 3.6 to get 122 gallons per dose cycle. The holes are drilled in the distribution pipe at the 10 and the 2 o'clock position. These are then placed so that the effluent is pumped into the top chamber of the panel. If the hole sizing changes in the system, the pump cycle is set by the hole that is discharging the fastest.

All valves and turn-ups should be neatly capped, covered and labeled for future service. Pump tanks should be constructed as shown in the drawing on page 12 to allow for service and repairs.



Flow Chart of Various Orifices and Pressure Heads

FLOW CHART OF VARIOUS ORIFICES AND HEAD PRESSURES

Head Pressure ft.	Orifice Size									
	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"	9/32"	5/16"	11/32"	3/8"
	.094"	.125"	.156"	.188"	.219"	.250"	.281"	.313"	.344"	.375"
2.0	.15	.26	.41	.59	.80	1.04	1.32	1.63	1.97	2.34
2.1	.15	.27	.42	.60	.82	1.07	1.35	1.67	2.02	2.40
2.2	.15	.27	.43	.61	.84	1.09	1.38	1.71	2.07	2.46
2.3	.16	.28	.44	.63	.86	1.12	1.41	1.75	2.11	2.51
2.4	.16	.29	.46	.64	.87	1.14	1.44	1.78	2.16	2.57
2.5	.16	.29	.46	.66	.89	1.17	1.47	1.82	2.20	2.62
2.6	.17	.30	.46	.67	.91	1.19	1.5	1.86	2.25	2.67
2.7	.17	.30	.47	.68	.93	1.21	1.53	1.89	2.29	2.72
2.8	.17	.31	.48	.69	.94	1.23	1.56	1.93	2.33	2.77
2.9	.18	.31	.49	.71	.96	1.25	1.59	1.96	2.37	2.82
3.0	.18	.32	.50	.72	.98	1.28	1.62	1.99	2.41	2.87
3.1	.18	.32	.51	.73	.99	1.3	1.64	2.03	2.45	2.92
3.2	.19	.33	.51	.74	1.01	1.32	1.67	2.06	2.49	2.97
3.3	.19	.33	.52	.75	1.02	1.34	1.69	2.09	2.53	3.01
3.4	.19	.34	.53	.76	1.04	1.36	1.72	2.12	2.57	3.06
3.5	.19	.34	.54	.78	1.06	1.38	1.74	2.15	2.61	3.10
3.6	.20	.35	.55	.79	1.07	1.40	1.77	2.18	2.64	3.15
3.7	.20	.35	.55	.80	1.09	1.42	1.79	2.21	2.68	3.19
3.8	.20	.36	.56	.81	1.10	1.44	1.82	2.24	2.72	3.23
3.9	.20	.36	.57	.82	1.11	1.46	1.84	2.27	2.75	3.27
4.0	.21	.37	.58	.83	1.13	1.47	1.87	2.30	2.79	3.32

GPM

Here you will find a pressure head table to help in flow design of your LP Panel system. These numbers are a guide to help you in selecting the right flow for your system. We have found that in most systems the 5/32" and 3/16" hole at 2 to 4 feet of head pressure works the best in giving a pump cycle of more than 5 minutes and keeps the same maximum top chamber flow load as sited on the previous page.

PRESSURE MANIFOLD TAP FLOW

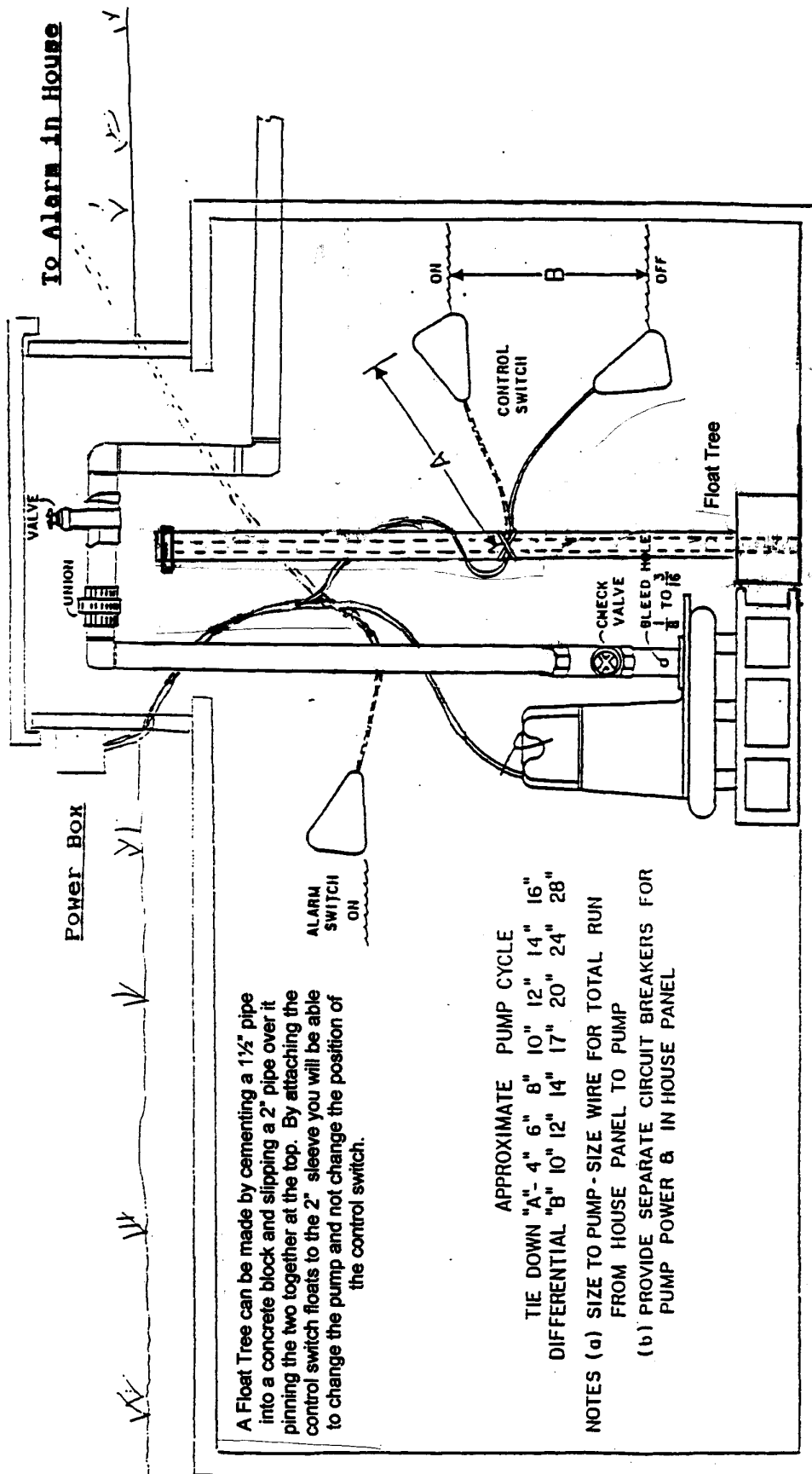
Head Pressure ft.	SCH 40		Tap Diameter	SCH 80	
	1/2"	3/4"		1/2"	3/4"
	0.622	0.824		0.546	0.742
2.0	7.11	12.50		5.48	10.10
2.1	7.29	12.80		5.62	10.40
2.2	7.46	13.10		5.75	10.60
2.3	7.63	13.40		5.88	10.90
2.4	7.79	13.70		6.00	11.10
2.5	7.95	14.00		6.13	11.30
2.6	8.11	14.20		6.25	11.50
2.7	8.26	14.50		6.37	11.80
2.8	8.62	14.80	Gallons	6.48	12.00
2.9	8.36	15.00	per minute	6.60	12.20
3.0	8.71	15.30		6.71	12.40
3.1	8.86	15.50		6.82	12.60
3.2	9.00	15.80		6.93	12.80
3.3	9.14	16.00		7.04	13.00
3.4	9.27	16.30		7.15	13.20
3.5	9.41	16.50		7.25	13.40
3.6	9.54	16.70		7.35	13.60
3.7	9.67	17.00		7.45	13.80
3.8	9.80	17.20		7.55	14.00
3.9	9.93	17.40		7.65	14.10
4.0	10.10	17.70		7.75	14.30

This chart will assist you in determining the proper tap sizes when you have to pump to a pressure manifold in a gravity system.

Pump Sizing

Below is a chart to aid in head selection due to friction loss in PVC pipe. In calculating friction, be sure to add 20% for loss in fittings. In the chart below, friction loss is per 100 feet of pipe. The head created by friction loss is added to the elevation head of lift from the bottom of the pump tank to the top of the highest turn-up.

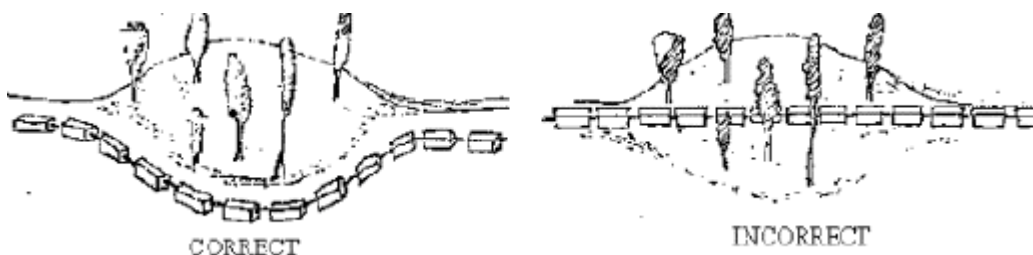
Flow GPM	Pipe Diameter					
	1"	1 1/4"	1 1/2"	2"	3"	4"
	Friction Loss (100ft)					
1	.07					
2	.28	.07				
3	.60	.16	.07			
4	1.01	.25	.12			
5	1.52	.39	.18			
6	2.14	.55	.25	.07		
7	2.89	.76	.36	.10		
8	3.63	.97	.46	.14		
9	4.57	1.21	.58	.17		
10	5.5	1.46	.70	.21		
11		1.77	.84	.25		
12		2.09	1.01	.30	.07	
13		2.42	1.17	.35	.08	
14		2.74	1.33	.39	.09	
15		3.06	1.45	.44	.10	
16		3.49	1.65	.50	.11	
17		3.93	1.86	.56	.12	
18		4.37	2.07	.62	.16	
19		4.81	2.28	.68	.23	
20		5.23	2.46	.74	.30	
25			3.75	1.10	.39	
30			5.22	1.54	.48	
35				2.05	.58	.07
40				2.62	.81	.09
45				3.27	1.08	.12
50				3.98	1.38	.16
60					1.73	.21
70					2.09	.28
80						.37
90						.46
100						.55



Shallow Soils Solution

***** Please Let Your Distributor Know If You Plan To Use Horizontal Installation*****

(This can change the amount of materials needed to complete your job)



Digging the Trench for Horizontal Installation

Start by shooting the grade and marking the contour. For a 16-inch panel, shallow application, add **20 inches** to the shallowest or lowest grade that the trench must cross to obtain the trench bottom grade. Dig the trench at the elevation derived, checking the grade frequently. The trench should be a minimum of **3-foot-wide** (9 feet on center). With the trench open, all sidewalls and bottom shall be raked to bring smeared areas back to their original structure before a light dusting of lime is applied. Place a **6-inch** layer of backfill sand in the trench and level to grade, then place a **1x6** inch board flat on the top of the 6-inch layer of sand. Once more check the grade of the trench by shooting the top of the board. Once the grade boards have been set, the panels may be set into the trench by hand or by using the backhoe. Each panel weighs about 155 pounds and placement by hand goes quickly. The panels should be placed about 6 inches apart in the trench to obtain equal spacing. Place 10 pounds of clean particle sand (medium sand blasting sand) in **each chamber** of each panel to form a bed of sand about one-inch thick. Place half the sand in one end of the panel and the other half of sand in the other end of the panel. The effluent entering the panel will level the sand for you. GE Foam Sealer or tar seal rope should be placed in the bottom of the U outs to form seals around the pipe as shown in earlier drawings. Once the GE Foam Sealer or tar seal rope is in place, a 24-inch section of 2 inch PR160 pipe is cut to span from inside of the two chambers to the next two chambers of the following panel. If tar seal rope is used, it should be of tar or butyl that is soft and pliable to obtain a watertight seal. Once the connection and sealing are complete, a block cap is placed on each end of the panel covering all openings. (These will be delivered with the panels.) The cap block may well serve as an inspection port at some future date. The trench is then ready to be backfilled to the top of the panel with the same backfill sand used in the trench bottom. With the sand to the top of the panel, trenches should be left for the sanitarian to inspect. **Soil cover should be added after the final inspection.** (At grade installation systems are required to bring in 4-6" of topsoil; suited for vegetative growth)

Most Panel Systems are currently used due to space considerations and caution should be taken to preserve suitable soil structure and site conditions.

***** Please Let Your Distributor Know If You Plan To Use Horizontal Installation*****

(This can change the amount of materials needed to complete your job)

Materials Chart for Horizontal Installation

- Materials needed per panel:
- **Five feet** of half inch tar seal rope per panel
 - **Two cans** of GE Foam Sealer per five panels
 - **Two pieces of two feet long 2-inch PR160 pipe** per panel, or two times the linear feet of line layout of pressure system of 1 ¼ inch pipe. Add pipe for tie in of lines to tank and house.
 - **100 pounds** of particle sand (medium sand blasting sand) per five panels
 - Same linear feet of **1x6** as line length
 - Bag of powder lime when in clay soil

Horizontal Installation

Panel and C-33 Sand fill for a **36-inch wide trench**.

50 LF – 12 panels 8¼ tons sand	130 LF – 30 panels 21½ tons sand
60 LF – 14 panels 10 tons sand	140 LF – 32 panels 23 tons sand
70 LF – 16 panels 11½ tons sand	150 LF – 35 panels 25 tons sand
80 LF – 18 panels 13¼ tons sand	160 LF – 37 panels 26½ tons sand
90 LF – 21 panels 15 tons sand	170 LF – 39 panels 28 tons sand
100 LF – 23 panels 16½ tons sand	180 LF – 42 panels 30 tons sand
110 LF – 25 panels 18¼ tons sand	190 LF – 44 panels 31½ tons sand
120 LF – 28 panels 20 tons sand	200 LF – 46 panels 33 tons sand

Panels with Pressure Distribution under Horizontal Installation

The LP Panel uses technology similar to that of Low Pressure Pipe (LPP) Systems. The tables and distribution design described in the LPP manual is applicable to the pressure Panel System. The system should be used with two to four feet of head. In many respects, a LP Panel is similar to a LPP with the holes discharging into the panels.

The dosing cycle for the Panel System is designed to pump enough effluent to fill half of both chambers in all the panels in the system. Each chamber of a 16-inch panel holds 3.6 gallons. When the system has 34 panels and all holes are the same size, you would multiply 34 X 3.6 to get 122 gallons per dose cycle. The holes are drilled in the distribution pipe at the 10 and the 2 o'clock position alternating chambers in each panel. For example, you dose the first panel in the left chamber at 2 o'clock, the second panel will have the hole drilled at 10 o'clock in the right chamber, alternating back and forth going down the line. This prevents one side of the trench from being overloaded by effluent. If the hole sizing changes in the system, the pump cycle is set by the hole that is discharging the fastest.

All valves and turn-ups should be neatly capped, covered and labeled for future service. Pump tanks should be constructed as shown in the drawing on page 12 to allow for service and repairs.

Please feel free to contact a member of T & J Panel with any design, installation or maintenance questions of an LP Panel system.

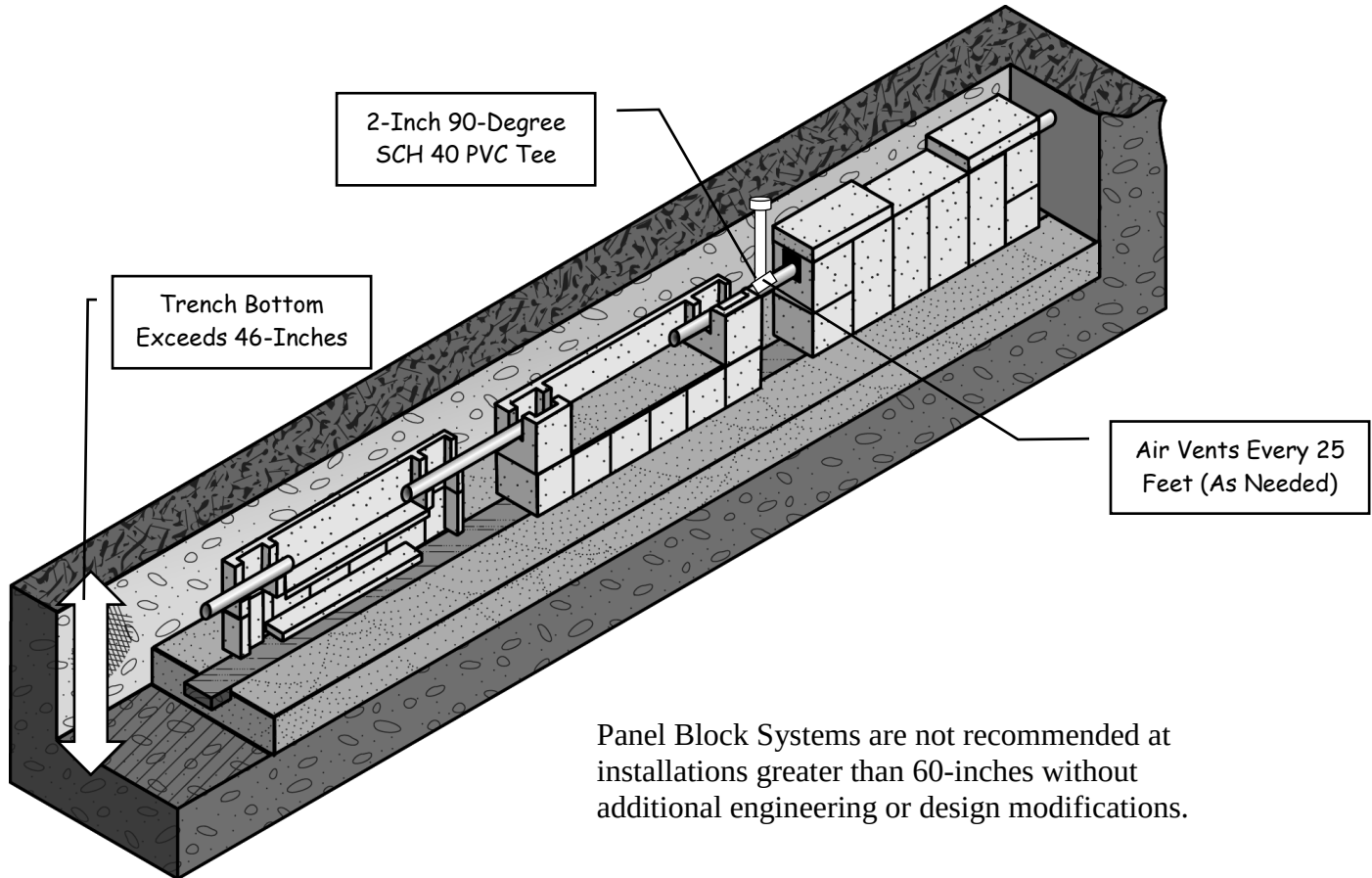
Flow Chart of Various Orifices and Pressure Heads refer to page 10

Pump Sizing refer to page 11

Deep Installation of Panel Block Systems

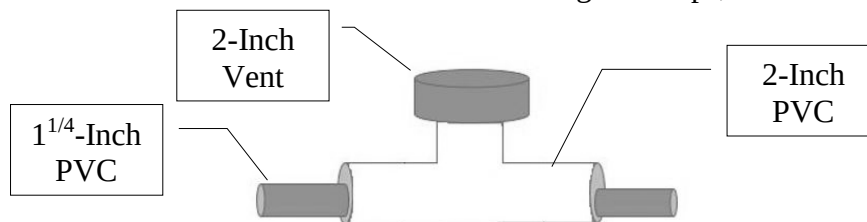
Utilize these specifications for ventilation when Trench Bottom *exceeds* 46-inches

In certain situations, there are more desirable soil conditions deeper in the soil profile. On these sites, Panel Systems can still be utilized, with proper ventilation to the system. Air vents are used with Panel Systems to allow the chambers within the Panel to receive the air needed for treatment.



Gravity Flow Installation: Cut the 24-inch long, 2-inch PVC pipe in half, then reconnect with a 2-inch 90-Degree SCH 40 Tee. Extend the 2-inch Tee up to ground surface to allow ventilation. Recommend utilizing vent caps, studor vents, or turndowns if needed.

LP Panel Installation (Low Pressure Pipe): Insert your 1^{1/4}-Inch into a 2-inch PVC “sleeve” that spans from one chamber of a panel to the next. Connect a 2-inch 90-Degree SCH 40 Tee to this “sleeve” halfway between one panel and the next. Extend the 2-inch Tee up to ground surface to allow ventilation. Recommend utilizing vent caps, studor vents, or turndowns if needed.



T & J Panel Wastewater Treatment System Patent # 4013559

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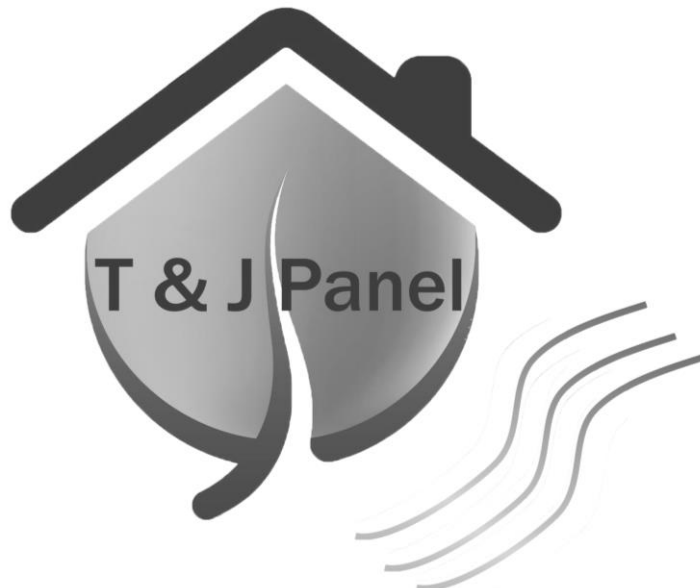
**On the web at: www.tjpanel.com
Or www.tjpanelsystem.com**

Office Contacts (Design, Installation, and Maintenance Questions)

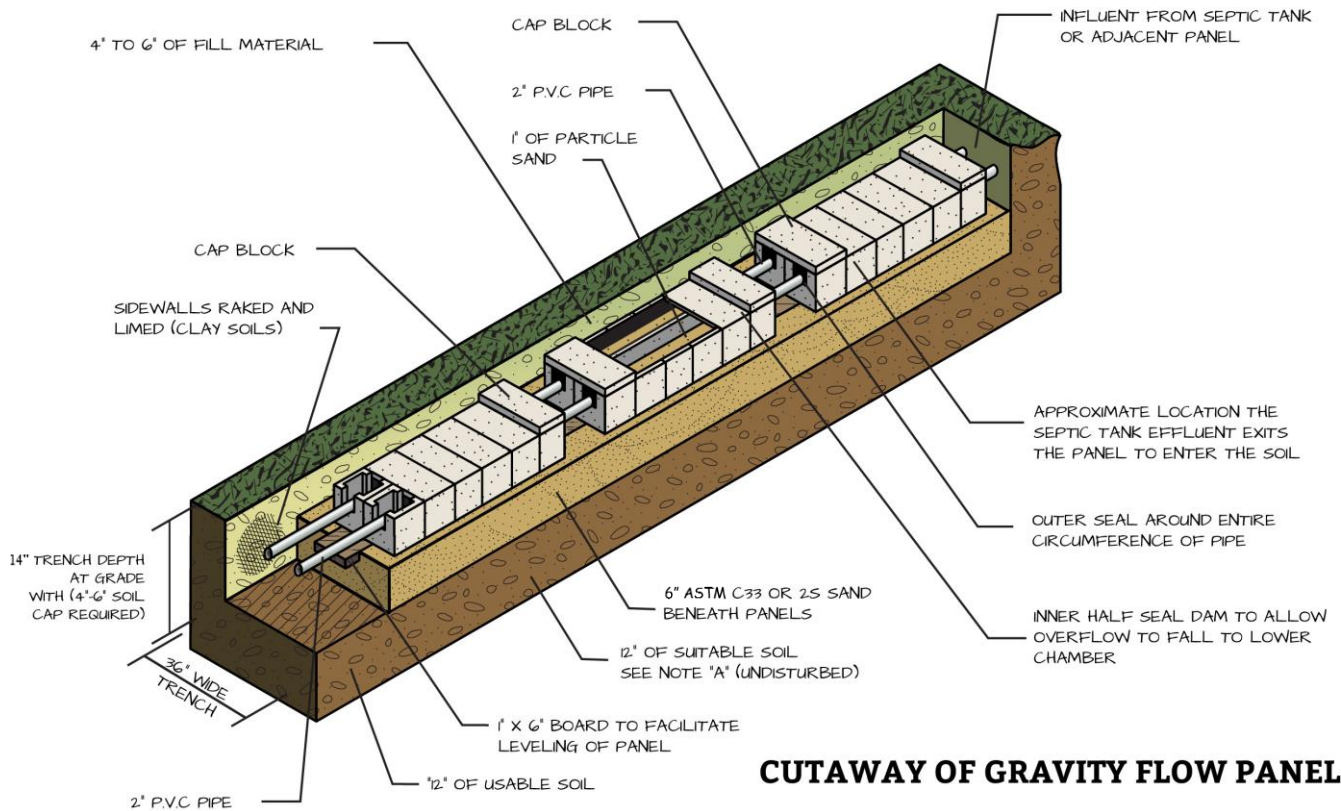
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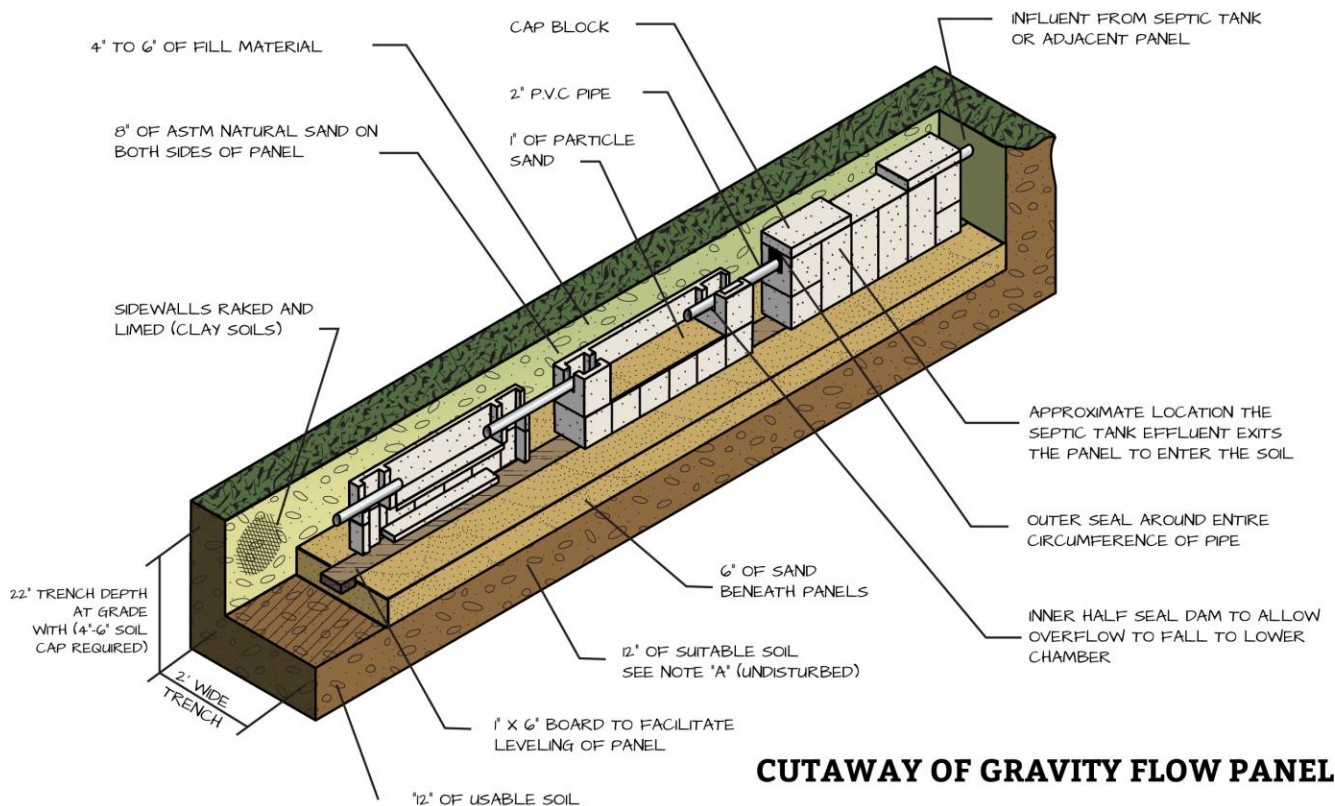


Isometric Drawing of a Segment of T & J Panel Horizontal Installation



CUTAWAY OF GRAVITY FLOW PANEL

Isometric Drawing of a Segment of T & J Panel Vertical Installation



CUTAWAY OF GRAVITY FLOW PANEL