

RECEIVED
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ENGINEERING REPORT

for

Wassaic Firehouse SDS

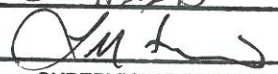
Subsurface Sewage Disposal System

APPLICANT : Wassaic Fire Company
27 Firehouse Road
PO Box 287
Wassaic NY 12592

LOCATION: 27 Firehouse
Wassaic NY
Town of Amenia
Dutchess County
Tax Map #: 132000-7165-01-093923

PROJECT No.: 18-020

DATE: August 10, 2020
Revised 2/6/2021

DUTCHESS COUNTY DEPARTMENT OF HEALTH	
APPROVED	
DATE:	04/21/2021
PROJECT:	NASSAIC FIREHOUSE OWTS SDS + PUMP T AMENIA 2 SHEETS + ENG. REP.
	 P.E.
	SUPERVISING PUBLIC HEALTH ENGINEER

PREPARED BY:

RENNIA ENGINEERING DESIGN, PLLC

CIVIL ■ ENVIRONMENTAL ■ STRUCTURAL

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Wassaic Firehouse SDS Subsurface Sewage Disposal System Summary Design Report:

Date: August 10, 2020
Revised 2/6/2021

Parcel Data:

Tax Map #: 132000-7165-01-093923
Owner: Wassaic Fire Co.
Municipality: Town of Amenia
County: Dutchess
State: New York

Project Background:

The applicant is proposing to expand the existing fire house sewage disposal system to accommodate 30 firefighters for occasional training gatherings and up to 50 people for celebrating and fund-raising events. A replacement sewage disposal system has been designed to serve the expanded fire station. As seen below in the flow summary tables, the peak flow would occur during the events. 500 gallons per day was used to represent a peak flow scenario.

Basis of Design:

Building Type: Residential

Design Flow Rate: Use 500 GPD (Larger flow rate)

Training Scenario

Description	Quantity	Demand(GPD/PER)	Flow (GPD)
Firefighters	30	15	450
Total Flow (GPD)			450

Banquet Scenario

Description	Quantity	Demand(GPD/PER)	Flow (GPD)
Banquet Attendees	50	10	500
Total Flow (GPD)			500

**Wassaic Firehouse SDS
Subsurface Sewage Disposal System
Summary Design Report:**

System (Primary):

Septic Tank Requirements:

Septic Tank: **500 x 1.5 gpd = 750 gpd Per NYSDEC Table D-2
USE: 1,500 gal. Tank**

Soil Information:

Stabilized Perc Rate: 10 min/inch.
Application Rate: 0.9 gal/day/sf
Depth to Rock: N/A
Depth to Water: 36" (TP- 2)

Sewage Disposal System Requirements:

System Type: Gravelless Absorption Trenches
Absorption area required: 500 GPD/0.9 (GPD per S.F.) = 555.6 S.F.
Gravelless Reduced Area: 555.6 S.F. x 0.75 = 416.7 S.F.
(Req.) Length for Trenches: 416.7 S.F. / 2 ft = 208.3 LF
No. of Laterals: 5
Min. Lateral Length: 208.3 ft / 5 = 41.67 ft. USE: 44 L.F.
Trench Width: 2 ft.
Trench Spacing: 6 ft. O/C.
Trench Depth: 18" – 24"
Fill Depth: 5' - 6' Based on 100 Year Flood Elev.
Dosing Required: Yes (Elevation Change)
Required Dose Volume: 110 gal.
Nearest Well: Upgradient: >200 ft.; Downgradient:>200 ft.

Pump Requirements (Primary):

Pump Station Primary (1,000 GAL.):

Static Elevation Head: 9'
Force Main Length: 301' (296' plus 5' in tank)
Force Main Size: 2"
Total Equivalent length due to fittings plus force main: 403.5'
USE: Goulds WE03L
TDH @ 34 gpm = 19'

**Wassaic Firehouse SDS
Subsurface Sewage Disposal System
Summary Design Report:**

System (Reserve):

Sewage Disposal System Requirements:

System Type: Gravelless Absorption Trenches
Absorption area required: $500 \text{ GPD} / 0.9 \text{ (GPD per S.F.)} = 555.6 \text{ S.F.}$
Gravelless Reduced Area: $555.6 \text{ S.F.} \times 0.75 = 416.7 \text{ S.F.}$
(Req.) Length for Trenches: $416.7 \text{ S.F.} / 2 \text{ ft} = 208.3 \text{ LF}$
No. of Laterals: 5
Min. Lateral Length: $208.3 \text{ ft} / 5 = 41.67 \text{ ft. USE: } 44 \text{ L.F.}$
Trench Width: 2 ft.
Trench Spacing: 6 ft. O/C.
Trench Depth: 18" – 24"
Fill Depth: 5' - 6' Based on 100 Year Flood Elev.
Dosing Required: Yes (Elevation Change)
Required Dose Volume: 115 gal.
Nearest Well: Upgradient: >200 ft.; Downgradient: >200 ft.

Pump Requirements (Expansion):

Pump Station Expansion (1,000 GAL.):

Static Elevation Head: 9'
Force Main Length: 262'
Force Main Size: 2"
Total Equivalent length due to fittings plus force main: 364.5'
USE: Goulds WE03L
TDH @ 35 gpm = 19'

**Wassaic Firehouse SDS
Subsurface Sewage Disposal System
Summary Design Report:**

Pump Station Control Panel shall be equipped with the following:

- Alternating Duplex Control
- Lead/Lag Capability
- Float activated control
- Audio and Visual alarms

Attachments:

1. Soil Test Results
2. System Pump Calculations
3. System Dosing Calculations
4. Goulds WE03L Pump Product Information
5. Floats Product Information
6. Control Panel Product Information
7. Buoyancy Calculations

DEEP TEST RESULTS
 DUTCHESS COUNTY HEALTH DEPARTMENT

Name of property: Wassaic Fire House SDS (T)(V)(G) Amenia Date: 7/16/2020

TAX GRID #

132000	7	1	6	5	0	1	0	9	3	9	2	3
--------	---	---	---	---	---	---	---	---	---	---	---	---

Owner of property: Wassaic Fire Co. Engineer: Richard A. Rennia, Jr., P.E.

Person directing test: Ryan C. Thomas P.E. DCHD Rep: James Upright, P.E., P.G.

HOLE #	LOT #	TOTAL DEPTH	ROCK DEPTH	WATER DEPTH	MOTTLING DEPTH	SOIL DESCRIPTION
1		62"	N/A	43"	N/A	0-4" Topsoil
						4" - 24" Gravelly Loam
						24"-62" Bank Run Gravel
2		44"	N/A	36"	N/A	0-5" Topsoil
						5" - 24" Gravelly Loam
						24" - 44" Bank Run Gravel

General remarks (terrain; weather; springs, streams, etc.) :

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DUTCHESS COUNTY DEPARTMENT OF HEALTH

PERCOLATION TEST DATA

Name: Wassaic Fire House SDS

(T)(~~V~~)(~~C~~) Amenia

Date: 7/17/2020

TAX GRID #

132000	7	1	6	5	0	1	0	9	3	9	2	3
--------	---	---	---	---	---	---	---	---	---	---	---	---

By: Kevin L. Guo DCHD Inspector:

Lot No.	Test Hole No.	Test Hole Depth	Soil Type	Soaked	TEST RUNS					
					*	1	2	3	4	5
	1	24"	Bank Run Gravel	YES	Finish	11:06	11:15	11:22		
					Start	11:01	11:08	11:15		
					Time	5 min	7 min	7 min		
	2	24"	Bank Run Gravel	YES	Finish	11:07	11:20	11:32		
					Start	10:58	11:10	11:22		
					Time	9 min	10 min	10 min		
					Finish					
					Start					
					Time					
					Finish					
					Start					
					Time					
					Finish					
					Start					
					Time					
					Finish					
					Start					
					Time					
					Finish					
					Start					
					Time					

I, Richard A. Rennia, Jr., P.E., the undersigned, certify that these percolation tests were done by myself or or under my direction according to the standard procedure. The data and results presented are true and correct.

Dated: 8/10/20

Signature: 
 License No. (P.E.)(L.S.) NYPE: 082459

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PUMP SIZING CALCULATIONS

TDH CALCULATIONS FOR SYSTEM CURVE

HAZEN AND WILLIAMS [hf = 0.002083 * L * (100/C)^{1.85} * gpm^{1.85}/d^{4.8655}]

Static Head in Feet = Measured/Estimated

old Plastic pipe; C = 120

new Plastic pipe; C = 140

BOX 1. - System Curve

Q (gpm)	C	Dia. (in.)	L (feet)	hstat (feet)	hf (feet)	TDH
0	140	2	403.50	9.00	0.00	9.00
10					1.10	10.10
20					3.95	12.95
30					8.36	17.36
40					14.23	23.23
50					21.51	30.51
60					30.14	39.14
70					40.08	49.08
80					51.32	60.32
90					63.81	72.81

**Wassaic Fire House SDS
Pump System
For 100% Expansion**

BOX 2.

EQUIVALENT LENGTH ESTIMATE			
Element	2" Fig. Eq. Length	Number	Eq. Length
Length	301.00	1.00	301.00
Reg. 90 deg	5.50	3.00	16.50
Reg. 45 deg	2.50	0.00	0.00
T (Diversión)	12.00	1.00	12.00
Coupling (Disconnect)	2.00	1.00	2.00
Check Valve	17.00	1.00	17.00
Ball Valve (fully open)	55.00	1.00	55.00
Gate Valve (fully open)	1.20	0.00	0.00
TOTAL EQ. LENGTH			403.50

BOX 3 - Pump Rate & Float settings

Anticipated pump rate	34 gpm
Velocity (V)	3.47 fps
Treatment design flow	500 gpd
Drainback volume per dose	48 gal.
Dosing Interval (pump rest time)	2.64 hrs.
Number of doses	4.5 d ⁻¹
Drainback volume per day	219 gpd
Approx. volume per dose	158.16 gal.
Pump run time per dose	4.65 min.
Pump run time per dose	279.11 sec.
Tank volume (gal. per inch) ESTIMATE	22.44 gal. in. ⁻¹
Draw down per dose*	7.0 in.
*Prior to drainback	

Loss through drainback hole while pump is active is assumed to be negligible

Goulds WE03L @ 19 TDH

Facility design flow

16 gal./100 feet for 2" Force Main

Assumes 1 operating day = 12hr.

(Treatment plus Drainback)

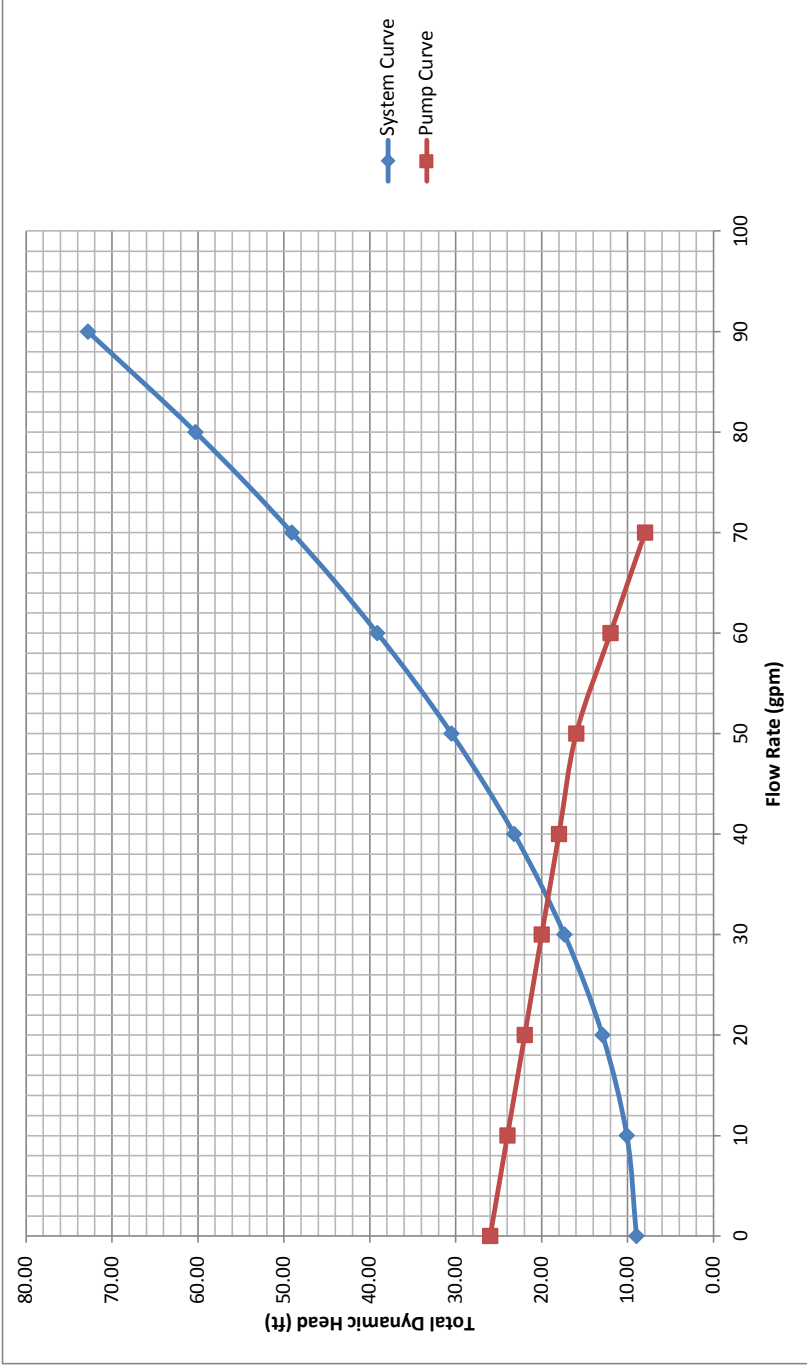
From pump tank dimensions

Separation between on/off float

BOX 4 - Tank Data

1,000 gal. Pump Chamber:	
Required Dose:	110 gal.
1 vert foot of dosing tank:	269.28 gal.
1 vert inch of dosing tank:	22.44 gal.
Req'd Storage: 1 Day (2 Pumps Prov.)	500 gal.
Minimum Depth of Tank Below Inlet:	47.3 Inch

PUMP SIZING CALCULATIONS



PUMP SIZING CALCULATIONS

TDH CALCULATIONS FOR SYSTEM CURVE

HAZEN AND WILLIAMS [hf = 0.002083 * L * (100/C)^{1.85} * gpm^{1.85}/d^{4.8655}]

Static Head in Feet = Measured/Estimated

old Plastic pipe; C = 120

new Plastic pipe; C = 140

BOX 1. - System Curve

Q (gpm)	C	Dia. (in.)	L (feet)	hstat (feet)	hf (feet)	TDH
0	140	2	364.50	9.00	0.00	9.00
10					0.99	9.99
20					3.57	12.57
30					7.55	16.55
40					12.86	21.86
50					19.43	28.43
60					27.23	36.23
70					36.21	45.21
80					46.36	55.36
90					57.64	66.64

**Wassaic Fire House SDS
Pump System
For 100% Expansion**

BOX 2.

EQUIVALENT LENGTH ESTIMATE			
Element	2" Fig. Eq. Length	Number	Eq. Length
Length	262.00	1.00	262.00
Reg. 90 deg	5.50	3.00	16.50
Reg. 45 deg	2.50	0.00	0.00
T (Diversion)	12.00	1.00	12.00
Coupling (Disconnect)	2.00	1.00	2.00
Check Valve	17.00	1.00	17.00
Ball Valve (fully open)	55.00	1.00	55.00
Gate Valve (fully open)	1.20	0.00	0.00
TOTAL EQ. LENGTH			364.50

BOX 3 - Pump Rate & Float settings

Anticipated pump rate	35 gpm
Velocity (V)	3.58 fps
Treatment design flow	500 gpd
Drainback volume per dose	42 gal.
Dosing Interval (pump rest time)	2.76 hrs.
Number of doses	4.3 d ⁻¹
Drainback volume per day	182 gpd
Approx. volume per dose	156.92 gal.
Pump run time per dose	4.48 min.
Pump run time per dose	269.01 sec.
Tank volume (gal. per inch) ESTIMATE	22.44 gal. in. ⁻¹
Draw down per dose*	7.0 in.
*Prior to drainback	

Loss through drainback hole while pump is active is assumed to be negligible

Goulds WE03L @ 19 TDH

Facility design flow

16 gal./100 feet for 2" Force Main

Assumes 1 operating day = 12hr.

(Treatment plus Drainback)

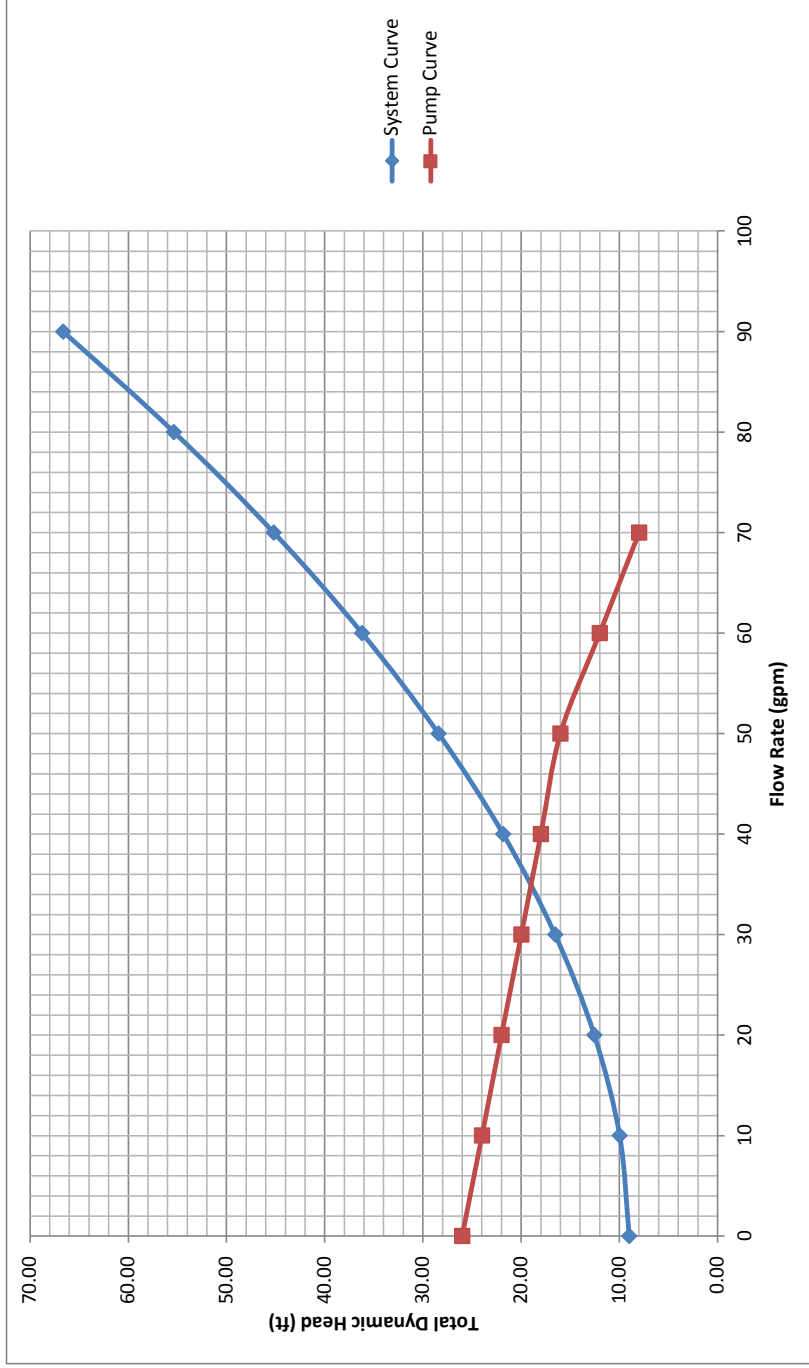
From pump tank dimensions

Separation between on/off float

BOX 4 - Tank Data

1,000 gal. Pump Chamber:	
Required Dose:	115 gal.
1 vert foot of dosing tank:	269.28 gal.
1 vert inch of dosing tank:	22.44 gal.
Req'd Storage: 1 Day (2 Pumps Prov.)	500 gal.
Minimum Depth of Tank Below Inlet:	47.3 Inch

PUMP SIZING CALCULATIONS





FEATURES

Impeller: Cast iron, semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.

Casing: Cast iron volute type for maximum efficiency. 2" NPT discharge.

Mechanical Seal: Silicon Carbide vs. Silicon Carbide sealing faces. Stainless steel metal parts, BUNA-N elastomers.

Shaft: Corrosion-resistant, stainless steel. Threaded design. Locknut on all models to guard against component damage on accidental reverse rotation.

Fasteners: 300 series stainless steel.

Capable of running dry without damage to components.

Designed for continuous operation when fully submerged.

EXTENDED WARRANTY AVAILABLE FOR RESIDENTIAL APPLICATIONS.

WE Series Model 3885

SUBMERSIBLE EFFLUENT PUMPS



APPLICATIONS

Specifically designed for the following uses:

- Homes, Farms, Trailer Courts, Motels, Schools, Hospitals, Industry, Effluent Systems

SPECIFICATIONS

Pump

- Solids handling capabilities: $\frac{3}{4}$ " maximum
- Discharge size: 2" NPT
- Capacities: up to 140 GPM
- Total heads: up to 128 feet TDH
- Temperature: 104°F (40°C) continuous, 140°F (60°C) intermittent.
- See order numbers on reverse side for specific HP, voltage, phase and RPM's available.

MOTORS

- Fully submerged in high-grade turbine oil for lubrication and efficient heat transfer.
- Class B insulation on $\frac{1}{3}$ - 1½ HP models.
- Class F insulation on 2 HP models.

Single phase (60 Hz):

- Capacitor start motors for maximum starting torque.
- Built-in overload with automatic reset.

- SJTOW or STOW severe duty oil and water resistant power cords.
- $\frac{1}{3}$ - 1 HP models have NEMA three prong grounding plugs.
- 1½ HP and larger units have bare lead cord ends.

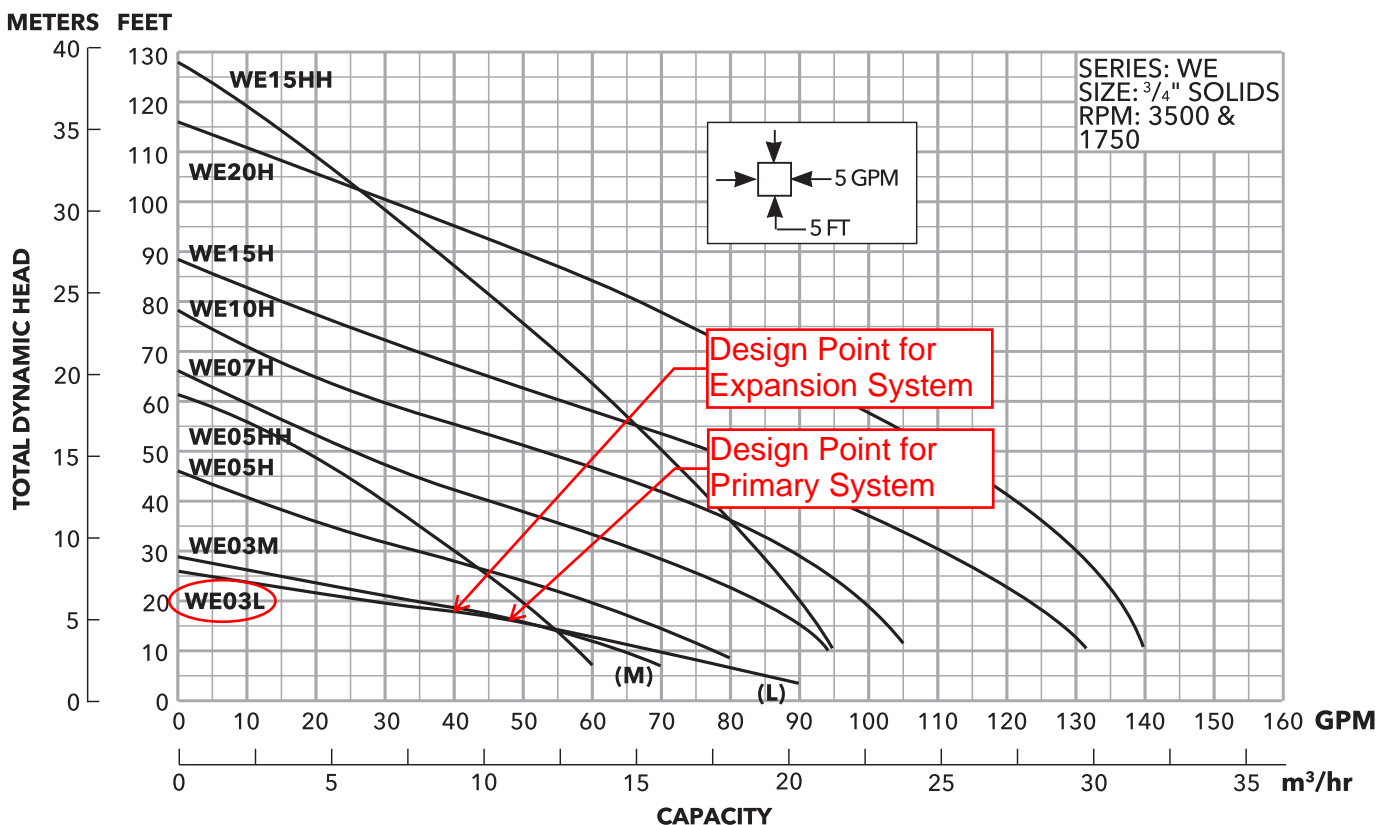
Three phase (60 Hz):

- Class 10 overload protection must be provided in separately ordered starter unit.
- STOW power cords all have bare lead cord ends.
- Designed for Continuous Operation: Pump ratings are within the motor manufacturer's recommended working limits, can be operated continuously without damage when fully submerged.
- Bearings: Upper and lower heavy duty ball bearing construction.
- Power Cable: Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. Standard cord is 20'. Optional lengths are available.
- O-ring: Assures positive sealing against contaminants and oil leakage.

AGENCY LISTINGS



Tested to UL 778 and CSA 22.2 108 Standards
By Canadian Standards Association File #LR38549



MODELS

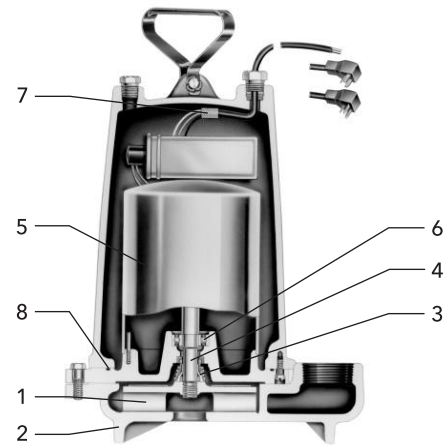
Order Number	HP	Phase	Volts	RPM	Impeller Diameter (in.)	Maximum Amps	Locked Rotor Amps	KVA Code	Full Load Efficiency %	Resistance		Power Cable Size	Weight (lbs.)			
										Start	Line-Line					
WE0311L	0.33	1	115	1750	5.38	10.7	30.0	M	54	11.9	1.7	16/3	56			
WE0318L			208			6.8	19.5	K	51	9.1	4.2					
WE0312L			230			4.9	14.1	L	53	14.5	8.0					
WE0311M			115			10.7	30.0	M	54	11.9	1.7					
WE0318M			208			6.8	19.5	K	51	9.1	4.2					
WE0312M			230			4.9	14.1	L	53	14.5	8.0					
WE0511H	0.5		115	3450	3.56	14.5	46.0	M	54	7.5	1.0	14/3	60			
WE0518H			208			8.1	31.0	K	68	9.7	2.4	16/3				
WE0512H			230			7.3	34.5	M	53	9.6	4.0	16/3				
WE0538H		3	200			4.9	22.6	R	68	NA	3.8	14/4				
WE0532H			230			3.3	18.8	R	70	NA	5.8					
WE0534H			460			1.7	9.4	R	70	NA	23.2					
WE0537H		575	1.4		7.5	R	62	NA	35.3	14/4						
WE0511HH		1			115	3.88		14.5	46.0	M	54	7.5		1.0	14/3	
WE0518HH					208			8.1	31.0	K	68	9.7		2.4	16/3	
WE0512HH					230			7.3	34.5	M	53	9.6		4.0	16/3	
WE0538HH			3		200			4.9	22.6	R	68	NA		3.8	14/4	
WE0532HH					230			3.6	18.8	R	70	NA		5.8		
WE0534HH					460			1.8	9.4	R	70	NA		23.2		
WE0537HH		575	1.5		7.5	R	62	NA	35.3	14/4						
WE0718H		0.75	1		208	4.06		11.0	31.0	K	68	9.7		2.4	14/3	70
WE0712H					230			10.0	27.5	J	65	12.2		2.7	14/3	
WE0738H			3		200			6.2	20.6	L	64	NA		5.7	14/4	
WE0732H					230			5.4	15.7	K	68	NA		8.6		
WE0734H	460			2.7	7.9			K	68	NA	34.2					
WE0737H	575			2.2	9.9			L	78	NA	26.5					
WE1018H	1	1	208	4.44		14.0	59.0	K	68	9.3	1.1	14/3	80			
WE1012H			230			12.5	36.2	J	69	10.3	2.1	14/3				
WE1038H		3	200			8.1	37.6	M	77	NA	2.7	14/4				
WE1032H			230			7.0	24.1	L	79	NA	4.1					
WE1034H			460			3.5	12.1	L	79	NA	16.2					
WE1037H			575			2.8	9.9	L	78	NA	26.5					
WE1518H	1.5	1	208	4.56		17.5	59.0	K	68	9.3	1.1	14/3	80			
WE1512H			230			15.7	50.0	H	68	11.3	1.6	14/3				
WE1538H		3	200			10.6	40.6	K	79	NA	1.9	14/4				
WE1532H			230			9.2	31.7	K	78	NA	2.9					
WE1534H			460			4.6	15.9	K	78	NA	11.4					
WE1537H			575			3.7	13.1	K	75	NA	16.9					
WE1518HH		1		208	5.50		17.5	59.0	K	68	9.3	1.1		14/3		
WE1512HH				230			15.7	50.0	H	68	11.3	1.6		14/3		
WE1538HH			3	200			10.6	40.6	K	79	NA	1.9		14/4		
WE1532HH				230			9.2	31.7	K	78	NA	2.9				
WE1534HH				460			4.6	15.9	K	78	NA	11.4				
WE1537HH				575			3.7	13.1	K	75	NA	16.9				
WE2012H	2	1	230	5.38		18.0	49.6	F	78	3.2	1.2	14/3	83			
WE2038H			200			12.0	42.4	K	78	NA	1.7	14/4				
WE2032H		3	230			11.6	42.4	K	78	NA	1.7	14/4				
WE2034H			460			5.8	21.2	K	78	NA	6.6					
WE2037H			575			4.7	16.3	L	78	NA	10.5					

PERFORMANCE RATINGS (gallons per minute)

Order No.	WE-03L	WE-03M	WE-05H	WE-07H	WE-10H	WE-15H	WE-05HH	WE-15HH	WE-20H
HP	1/3	1/3	1/2	3/4	1	1 1/2	1/2	1 1/2	2
RPM	1750	1750	3500	3500	3500	3500	3500	3500	3500
5	86	-	-	-	-	-	-	-	-
10	70	63	78	94	-	-	58	95	-
15	52	52	70	90	103	128	53	93	138
20	27	35	60	83	98	123	49	90	136
25	5	15	48	76	94	117	45	87	133
30	-	-	35	67	88	110	40	83	130
35	-	-	22	57	82	103	35	80	126
40	-	-	-	45	74	95	30	77	121
45	-	-	-	35	64	86	25	74	116
50	-	-	-	25	53	77	-	70	110
55	-	-	-	-	40	67	-	66	103
60	-	-	-	-	30	56	-	63	96
65	-	-	-	-	20	45	-	58	89
70	-	-	-	-	-	35	-	55	81
75	-	-	-	-	-	25	-	51	74
80	-	-	-	-	-	-	-	47	66
90	-	-	-	-	-	-	-	37	49
100	-	-	-	-	-	-	-	28	30

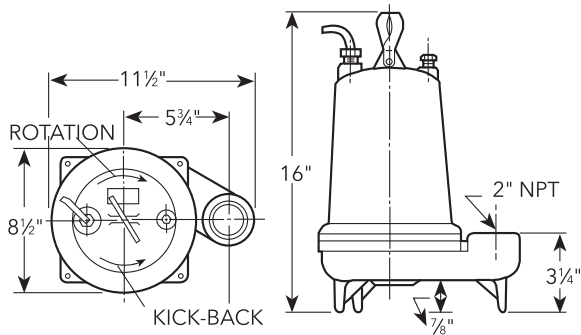
COMPONENTS

Item No.	Description
1	Impeller
2	Casing
3	Mechanical Seal
4	Motor Shaft
5	Motor
6	Ball Bearings
7	Power Cable
8	Casing O-Ring



DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)



xylem
Let's Solve Water

Xylem Inc.
2881 East Bayard Street Ext., Suite A
Seneca Falls, NY 13148
Phone: (866) 325-4210
Fax: (888) 322-5877
www.gouldswatertechnology.com

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© 2016 Xylem Inc. B3885 R2 September 2016

INSTALLER FRIENDLY SERIES® - IFS Single Phase Duplex (Demand/TD)

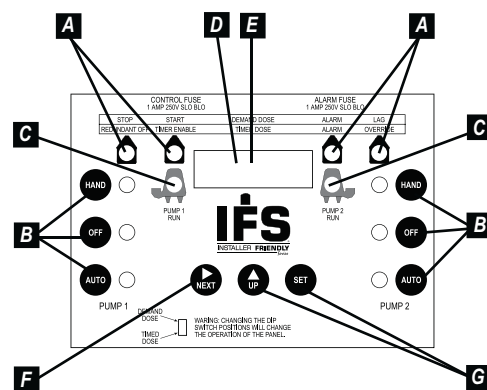
CONTROL PANELS

Single phase, duplex demand dose or timed dose, float or C-Level™ sensor controlled system for pump control and system monitoring.

The IFS duplex control panel is designed to control two (alternating) 120, 208, 240 + single phase pumps in water and sewage installations. The panel features an easy-to-use touch pad with display on the inner door for programming and system monitoring. The alternating action equalizes pump wear. In addition to the alternating pump control, this system provides override control should either pump fail.

The panel configuration can be easily converted in the field to either a timed dose or demand dose.

The optional C-Level™ sensor is a pressure transducer that senses the liquid level in the tank and sends a signal to the IFS panel. Pump activation levels can be adjusted using the panel touch pad. C-Level™ CL40 sensor operating range is 3-39.9 inches (7.6-101.3 cm). C-Level™ CL100 operating range is 3-99.5 inches (7.6-252.7 cm).



TOUCH PAD FEATURES

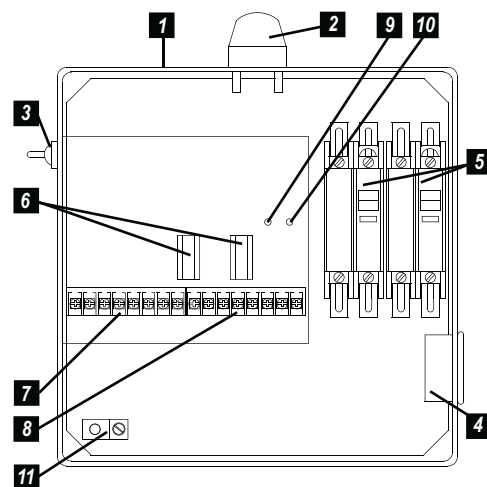
- A. **Level Status Indicators** illuminate when floats or set points are activated. Alarm will activate if a float operates out of sequence.
- B. **HOA (Hand-Off-Automatic) Buttons** control pump mode with indication. Hand mode defaults to Automatic when stop level or redundant off level is reached.
- C. **Pump Run Indicators** will illuminate when pumps are called to run.
- D. **Lead/Lag Selector** toggles pump operation (alternate 1-2 and 2-1).
- E. **LED Display** shows system information including: level in inches or centimeters (C-Level™ only), mode, pumps elapsed time (hh:mm), events (cycles), alarm counter, float error count, timed dose override counter (timed dose only), and ON/OFF times (timed dose only).
- F. **NEXT Push Button** toggles display
- G. **Demand and SET Push Buttons** set pump ON/OFF times (timed dose only) and activation levels (C-Level™ only).

PANEL COMPONENTS

1. **Enclosure base** measures 10 X 10 X 6 inches (25.4 X 25.4 X 15.24 cm). NEMA 4X (ultraviolet stabilized thermoplastic with removable mounting feet for outdoor or indoor use). **Note:** Options, voltage, and amp range selected may change enclosure size and component layout.
2. **Red Alarm Beacon** provides 360° visual check of alarm condition.
3. **Exterior Alarm Test/Normal/Silence Switch** allows horn and light to be tested and horn to be silenced in an alarm condition. Alarm automatically resets once alarm condition is cleared.
4. **Alarm Horn** provides audio warning of alarm condition (83 to 85 decibel rating).
5. **Circuit Breakers** (optional) provide pump disconnect and branch circuit protection.
6. **Power Relays** control pump by switching electrical lines. Definite purpose contactors used when pump full load amps are above 15.
7. **Float Connection Terminal Block**
8. **Incoming Control/Alarm Power & Pump Terminal Block**
9. **Control Power Indicator/Fuse** indicator light illuminates if control power is present in panel. Alarm activates if control fuse is blown.
10. **Alarm Power Indicator/Fuse** indicator light illuminates if alarm power is present in panel.

<1. **Ground Lug**

NOTE: Schematic/Wiring Diagram and Pump Specification Label are located inside the panel on enclosure cover



Model Shown IFS31W114X8AC

Reg. Cdn Pat. & TM Of4
C-Level™ Sensor US Patent 8,336,385. Other patents pending.

FEATURES

- Entire control system is UL Listed to meet and/or exceed industry safety standards
- Dual safety certification for the United States and Canada
- Standard package includes:
Demand Dose - three 20' SJE MilliAmpMaster™ control switches
Timed Dose - two 20' SJE MilliAmpMaster™ control switches
- Complete with step-by-step installation instructions
- Three-year limited warranty



PO Box 1708, Detroit Lakes, MN 56502
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www.sjerhombus.com

SEE BACKSIDE FOR COMPLETE LISTING OF AVAILABLE OPTIONS.
SEE PRICE BOOK FOR LIST PRICE.



MODEL IFS

- MODEL TYPE**
 3 = DPLX TIMED DOSE (includes option 8AC standard)
 4 = DPLX DEMAND DOSE (includes option 8AC standard)
- ALARM PACKAGE**
 K = alarm package (includes test/normal/silence switch, fuse, red light & horn)
- ENCLOSURE RATING**
 S yIGJr 4X
- K&ARTING DEVICE**
 K = 120/208/240 Vƒ-
 F = 120 Vƒ-
- %D\$% FULL LOAD AMPS**
 J = 0-7 FLA
 K = 7-15 FLA
 2 = 15-20 FLA
- %D\$% DISCONNECTS**
 J = no pump disconnect
 4 = circuit breaker(s)
 - 120 VAC (must select starting device option 9)
 - 120/208/240 VAC (must select starting device option 1)
- SWITCH APPLICATIONS**
 J y floats (Timed dose = timer enable and alarm / Demand dose = stop, start, and lag/alarm) (select 17 option)
 H y no floats
 - timed dose
 - demand dose
 J = 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
 - demand dose

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.

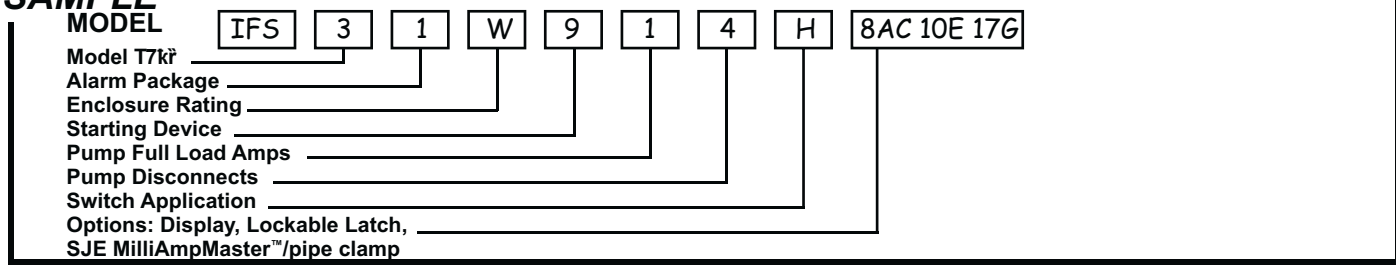
OPTIONS Listed below

- | CODE | DESCRIPTION |
|-------------------------------------|---|
| <input type="checkbox"/> | KW Duo alarm inputs |
| <input type="checkbox"/> | 3A Alarm flasher |
| <input type="checkbox"/> | 3B Manual alarm reset |
| <input type="checkbox"/> | 3E High water alarm float (must select 17 option)
<i>(Available only when Switch Applications = C)</i> |
| <input type="checkbox"/> | 4A Redundant of 4 (select option 4D if floats are required)
- Demand Dose
- Timed Dose |
| <input type="checkbox"/> | 4D Redundant off float
<i>(must select 4A option) (must select 17 option)</i> |
| <input type="checkbox"/> | 6A Auxiliary alarm contacts, form C |
| <input checked="" type="checkbox"/> | 8AC Display board includes: ETM counter, events (cycles) counter, alarm counter, and override counter (timed dose only). <i>(Included as standard.)</i> |
| <input type="checkbox"/> | KJ Lockable latch - NEMA 4X |
| <input type="checkbox"/> | 10F Lightning arrestor (must select pump circuit breakers, control and alarm power combined) |
| <input type="checkbox"/> | KJw Anti-condensation heater |
| <input type="checkbox"/> | KK- ICGJr 1 alarm panel (must select option 6A) |
| <input type="checkbox"/> | KKO ICGJr 4X alarm panel (must select option 6A) |
| <input type="checkbox"/> | KGJr Control / Alarm circuit breaker |

- | CODE | DESCRIPTION |
|--------------------------|--|
| <input type="checkbox"/> | 16A 10' cord in lieu of 20' (per float) |
| <input type="checkbox"/> | 16B 15' cord in lieu of 20' (per float) |
| <input type="checkbox"/> | 16C 30' cord in lieu of 20' (per float) |
| <input type="checkbox"/> | 16D 40' cord in lieu of 20' (per float) |
| <input type="checkbox"/> | 17C Sensor Float® / internally weighted ▲ (per float) |
| <input type="checkbox"/> | 17D Sensor Float® / externally weighted ▲ (per float) |
| <input type="checkbox"/> | 17G MilliAmpMaster™ / pipe clamp ● (per float) |
| <input type="checkbox"/> | 17H MilliAmpMaster™ / externally weighted ● (per float) |
| <input type="checkbox"/> | 17J Sensor Float® / pipe clamp ▲ (per float) |
| <input type="checkbox"/> | 18A Timer override float
(timed dose float panel only) |
| <input type="checkbox"/> | 19F Fourth float to separate alarm function from lag
(demand dose float panel only) |
| <input type="checkbox"/> | 24E C-Level™ CL40 sensor with 4' vent tube & 20' cord |
| <input type="checkbox"/> | 24F C-Level™ CL40 sensor with 4' vent tube & 40' cord |
| <input type="checkbox"/> | 24G C-Level™ CL40 sensor with 8' vent tube & 20' cord |
| <input type="checkbox"/> | 24H C-Level™ CL40 sensor with 8' vent tube & 40' cord |
| <input type="checkbox"/> | 24X No C-Level™ CL40 sensor |
| <input type="checkbox"/> | 29A C-Level™ CL100 sensor w/10' vent tube & 20' cord |
| <input type="checkbox"/> | 29B C-Level™ CL100 sensor w/10' vent tube & 40' cord |
| <input type="checkbox"/> | 29X No C-Level™ CL100 sensor |
- Mechanically-activated ▲ Mercury-activated

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

SAMPLE



Specification for Installer Friendly Series® Single Phase Control Panel

1. Must be available in either simplex or duplex models.
2. Incoming pump power shall be single-phase, 60 Hz, 120/208/240 volts AC.
3. Incoming control/alarm power shall be single-phase, 60 Hz, 120 volts AC.
4. Easy to use touch pad for programming pump control.
5. The control panel is to have models available that interface with float input and models available that interface with transducer input.
6. Float-operated models shall incorporate three (3), or four (4), normally open, mercury or mechanically-activated control switches with pipe clamps. Inputs shall be labeled in the panel as stop, lead, lag/alarm, and alarm for demand dose and redundant off, timer enable, high alarm, and timer override (timed dose models). Floats shall be SJE-Rhombus control switches or approved equal.
7. Transducer-operated models shall incorporate SJE-Rhombus C-Level™ sensor.
8. The control panel is to have a means to be configured in the field to operate as either a time dose or demand dose panel.
9. The control panel is to be equipped with separately fused alarm and control circuits.
10. The control panel is to be equipped with float status indicators, pump run indicators, Hand – Off – Auto status indicators, and power on indicators.
11. Panel must log the following data: Pump run time, cycle counts, alarm counts, float out of sequence counts, and timer override counts (time dose only).
12. Alarm must activate if floats operate out of sequence (float model) or if transducer circuit opens (C-Level™ sensor model).

SJE MILLIAMPMASTER™ Control Switch

Mechanically-activated control switch designed to activate low current control panels and alarms.

This wide-angle or narrow-angle control switch offers reliable low current control for AC and DC applications in potable water, wastewater, and sewage. The internal switching mechanism has sealed gold cross-point contacts for reliable low current operation. Common applications include PLC (programmable logic controller) panels, IS panels with intrinsically safe barriers, low current solar applications, and other low current control panels and alarms applications.

The wide-angle version activates/deactivates approximately 4" (10.16 cm) above and below horizontal with a 3.5" (9 cm) tether. The narrow angle version activates/deactivates at approximately 1.5" (3.81 cm) above and below horizontal with a 3.5" (9 cm) tether. It is not sensitive to rotation.

Normally Open Model (high level)

The control switch turns on (closes) when the switch tips **above** horizontal signaling a high level, and turns off (opens) when the switch drops below horizontal.

Normally Closed Model (low level)

The control switch turns on (closes) when the switch drops **below** horizontal signaling a low level, and turns off (opens) when the switch tips above horizontal.



FEATURES

- Passed NSF Standard 61 protocol by an approved Water Quality Association laboratory.
- Low current, non-arching applications down to 0.160 mA at 125 VAC.
- Mechanically-activated, snap action contacts.
- High impact, corrosion resistant polypropylene float housing.
- Not sensitive to rotation.
- Blue colored cap for easy identification of SJE MilliAmpMaster™ control switch.
- UL Listed for use in non-potable water and sewage.
- -Rt Certified.
- Five-year limited warranty.



MEMBER

Member of
Hydraulic
INSTITUTE

Water
Quality
ASSOCIATION

SPECIFICATIONS

CABLE: flexible 18 gauge, 2 conductor (UL,CSA) SJOW, water-resistant (CPE)

FLOAT: 2.74 inch diameter x 4.83 inch long (7.0 cm x 12.3 cm), high-impact, corrosion resistant, polypropylene housing for use in sewage and water up to 140°F (60°C)

MAXIMUM WATER DEPTH: 30 feet (9 meters), 13 PSI (90kPa)

ELECTRICAL:

125 VAC

Maximum Electrical Load:
0.1 amps

Minimum Electrical Load:
0.160 milliamps

30 VDC

Maximum Electrical Load:
0.1 amps

Minimum Electrical Load:
0.160 milliamps

5 VDC

Minimum Electrical Load:
1 milliamps

OPTIONS

This switch is available:

- for normally open (high level) applications or normally closed (low level) applications.
- with narrow or wide-angle pumping ranges.
- in standard cable lengths of 10, 15, 20, or 30 feet and 3, 5, 6, or 10 meters (longer lengths available).
- with two mounting options that allow for flexibility in installation:

Mounting Clamp: for applications where the switch can be attached to a discharge pipe or similar mounting device.

Externally Weighted: for applications where the switch can be suspended from above.

SJE Rhombus®

PO Box 1708, Detroit Lakes, MN 56502

1-888-DIAL-SJE • 1-218-847-1317

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email: customer.service@sjerhombus.com

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SEE BACKSIDE FOR ORDERING INFORMATION.

FLOAT ACCESSORIES

Cable Clamp Assembly, Float Brackets, Pipe Mounting Bracket,
Cable Weights, ETM w/ Piggy-Back Plug, Vertical Reed Switch, Anchor and Chain

CABLE WEIGHT

Provides an accurate pivot point for suspended float switches.

- Gripper teeth on clip and weight channel securely lock float cable into place
- Cable Weight can be adjusted without the use of tools



U.S. Patent 5,306,885

HOUSING: 1 pound, 12 ounce (0.8 kgs.), 2.8 inch diameter x 3.3 inch long (7.1 cm diameter x 8.4 cm), impact resistant, non-corrosive, PVC housing for use in liquids up to 140°F (60°C).

CLIP: injection molded acetal plastic

WIRE/CABLE ACCOMMODATED: SJOW, SJTW, 18/2, 18/3, 16/2, 16/3, 14/2 and 14/3

SHIP WEIGHT: 2 lbs. (.907 kgs)

Part Number	Description	List Price
1002230	Cable Weight	\$9.88

CABLE WEIGHT MINI

Provides an accurate pivot point for suspended float switches.

- One piece cable weight
- Turn and Lock for easy installation.



HOUSING: 9.6 ounces (0.27 kgs.), 2.5 inch diameter x 2.5 inch long (6.35 cm diameter x 6.35 cm), impact resistant, non-corrosive, PVC housing for use in liquids up to 140°F (60°C)

WIRE/CABLE ACCOMMODATED: SJOW, SJTW, 18/2, 18/3

Part Number	Description	List Price
1030356	Cable Weight Mini	\$7.65

ELAPSED TIME METER WITH PIGGY-BACK PLUG

Plugs into switched outlet or piggy-back switch of plugger control panel. Unit must be placed inside an enclosure.

- Screws and mounting adhesive included.



Part Number	Description	List Price
1022848	ETM w/120V piggy-back plug	\$92.89
1032834	ETM w/230V piggy-back plug	\$199.45

VERTICAL REED SWITCH

- Control differential: .375 inch (1 cm)
- Maximum angle from vertical: 5°
- Electrical: 250 mAmps, 12-125 VAC, 50/60 Hz
500 mAmps, 6-12 VDC, 50/60 Hz
- Housing and Float: 1.60 inch diameter x 6.7 inch long (4.06 cm X 17.01 cm), high impact, corrosion resistant PVC for use in sewage and non-potable water up to 120°F (50°C)



Part Number	Description	List Price
1011027	10ft VRS 120V Bulk	\$78.67
1016561	15ft VRS 120V Bulk	\$84.14

ANCHOR

- 10 lb. weight
- Yellow, vinyl coated, mushroom style



Part Number	Description	List Price
1018687	10 lb. Mushroom Anchor	\$46.81

CHAIN

- 1/8" thickness
- 316 grade stainless steel
- Available in one foot increments



Part Number	Description	List Price
1018823	1/8 inch Chain	\$9.04 per ft

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PRODUCTS CONTINUED ON NEXT PAGE.

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**Buoyancy Calculations
for
Wassaic Firehouse Replacement SDS**

A high water table is assumed for the site as there is a stream with water levels close to the existing grade around the existing buildings. The following information and calculation was used to verify that the empty tank will remain stable with no additional measures:

For the purpose of being conservative in the calculations the water level is assumed to be at the top of the tank.

For 1,500 gallon Septic Tank (Heavy Duty Type)

$$\text{Water Depth} = \text{Tank Depth} = 7.17'$$

$$\text{The tank dimensions are } 5.5' \times 11'$$

$$\text{Volume of Water Displaced} = 5.5' \times 11' \times 7.17' = 433.8 \text{ cu-ft}$$

$$\text{Unit Weight of Water} = 62.4 \text{ lbs / cu-ft}$$

$$\text{Weight of Water Displaced} = 62.4 \times 433.8 = 27,069 \text{ lbs}$$

$$\text{Depth of Soil on Tank} = 0.33 \text{ ft.}$$

$$\text{Assumed Unit Weight of Soil} = 110 \text{ lbs / cu-ft}$$

$$\text{Gross Weight of Soil} = 5' \times 10' \times 0.33' \times 110 \text{ lbs/cu-ft} = 1,815 \text{ lbs}$$

$$\text{Void Area of Risers} = 2 (3.14 \times 1.25^2 \times 0.33) \times 110 \text{ lbs/cu-ft} = 356.2 \text{ lbs}$$

$$\text{Net Weight of Soil} = 1,815 \text{ lbs} - 356.2 \text{ lbs} = \underline{1,458.8 \text{ lbs}}$$

$$\text{Weight of tank} = \underline{24,915 \text{ lbs}} \text{ (per manufacturer Fort Miller)}$$

$$\text{Concrete Slab} = ((6.5' \times 12') - (1.25^2 \times 3.14)) \times 0.67' \times 150 \text{ lbs/cu-ft} = \underline{7,345.5 \text{ lbs}}$$

$$\text{Total Tank Weight} = 1,458.8 \text{ lbs} + 24,915 \text{ lbs} + 7,345.5 \text{ lbs} = 33,719.3 \text{ lbs}$$

Total Weight > Weight of Water Displaced **PASS**

$$33,719.3 \text{ lbs} > 27,069 \text{ lbs} \text{ **PASS**}$$

$$\text{FS} = \underline{34,100.5} / 27,069 = 1.25 \checkmark$$

**Buoyancy Calculations
for
Wassaic Firehouse Replacement SDS**

For 1,000 gallon Pump Tank (Heavy Duty Type)

Water Depth = Tank Depth = 6'

The tank dimensions are 5' x 10'

Volume of Water Displaced = 5' x 10' x 6' = 300 cu-ft

Unit Weight of Water = 62.4 lbs / cu-ft

Weight of Water Displaced = 62.4 x 300 = 18,720 lbs

Depth of Soil on Tank = 1.0'

Assumed Unit Weight of Soil = 110 lbs / cu-ft

Gross Weight of Soil = 5' x 10' x 1.0' x 110 lbs/cu-ft = 5,500 lbs

Void Area of Risers = 2 (3.14 x 1.25² x 0.75) x 110 lbs/cu-ft = 809.5 lbs

Net Weight of Soil = 5,500 lbs – 809.5 lbs = 4,690.5 lbs

Weight of Tank = 11,720 lbs (Per manufacturer Fort Miller)

Concrete Slab on Tank = ((7' x 12') – (1.25² x 3.14 x 2)) x 0.67' x 150 lbs/cu-ft = 7,456.1 lbs

Total Weight of Tank, Soil, and Concrete Slab

$$= 11,720 \text{ lbs} + 4,690.5 \text{ lbs} + 7,456.1 \text{ lbs} = 23,866.6 \text{ lbs}$$

Total Weight > Weight of Water Displaced **PASS**

22,596.5 lbs > 18,720 lbs **PASS**

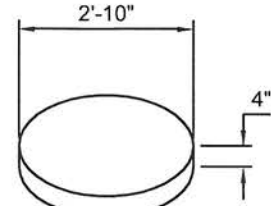
FS = 23,866.6 / 18,720 = 1.27 ✓



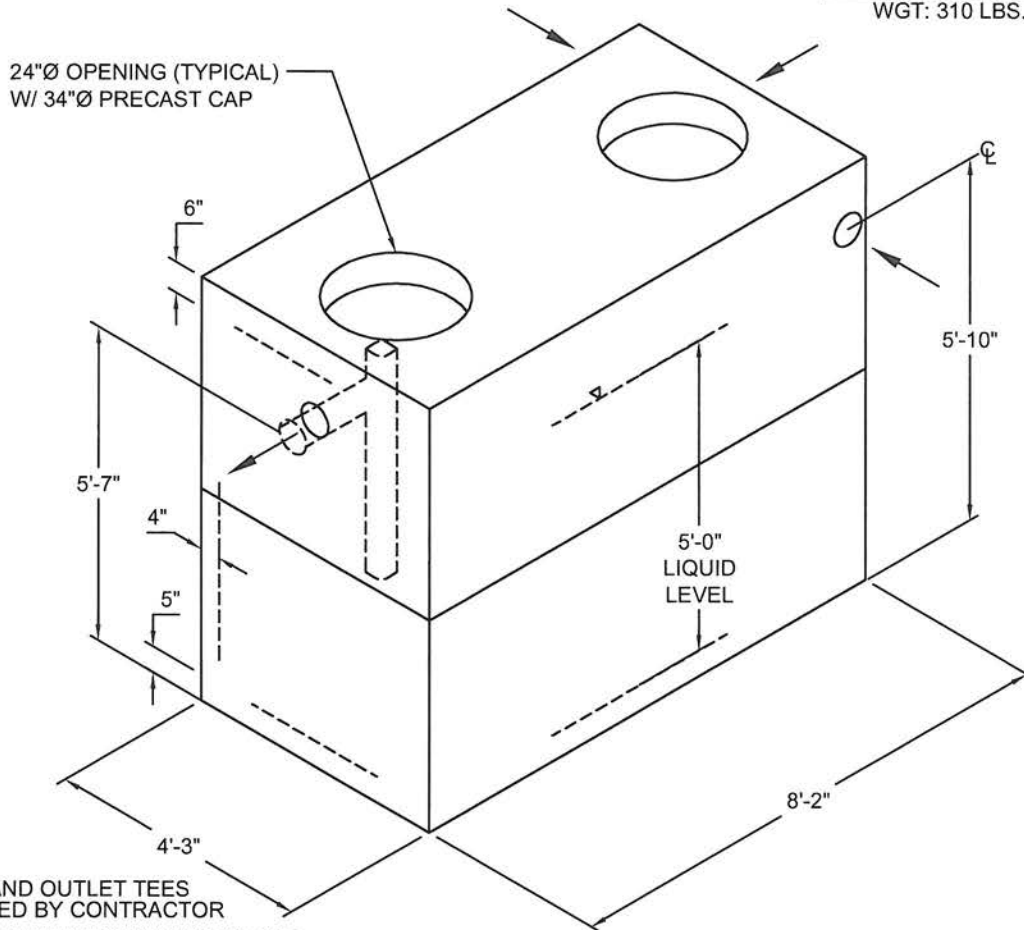
THE FORT MILLER CO., INC.
 PO BOX 98
 SCHUYLERVILLE, NY 12871
 PHONE: (518) 695-5000
 FAX: (518) 695-4970
 www.fortmiller.com

1000 GALLON HEAVY DUTY SEPTIC TANK

CONCRETE: 4000 PSI
 REINFORCEMENT: ASTM A615 - GRADE 60
 ENTRAINED AIR: 5.0% - 9.0%
 -MEETS ASTM C890-



PRECAST CAP, (2) REQ'D.
 WGT: 310 LBS.



NOTES:

- INLET AND OUTLET TEES SUPPLIED BY CONTRACTOR
- 4"Ø HIGH DENSITY POLYETHYLENE PIPE SEALS PROVIDED AT ALL PIPE CONNECTIONS SHOWN.
- THERE ARE INLET KNOCKOUTS ON THREE SIDES FOR 4"Ø PIPE.
- DESIGN CASE 3 (TRAFFIC)

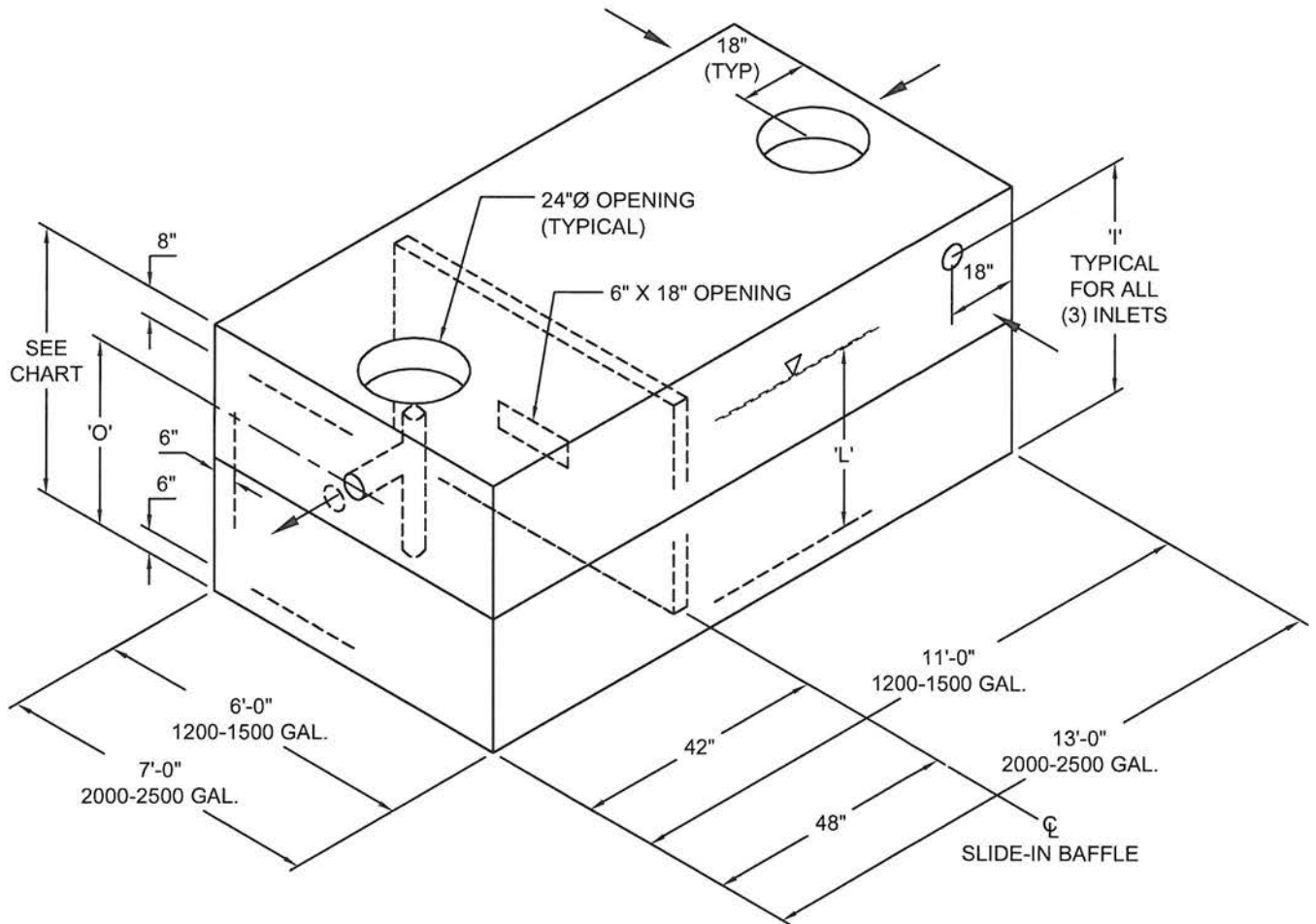
SIZE GALLONS	LIQUID LEVEL 'L'	INLET HEIGHT 'I'	OUTLET HEIGHT 'O'	OUTSIDE TANK HEIGHT	TANK WEIGHT, LBS		
					TOP SECTION	BOTTOM* SECTION	TOTAL WEIGHT
1000	5'-0"	5'-10"	5'-7"	6'-10"	6120	5600	11,720



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 PO BOX 98
 SCHUYLERVILLE, NY 12871
 PHONE: (518) 695-5000
 FAX: (518) 695-4970
 www.fortmiller.com

1200 to 2500 GALLON HEAVY DUTY SEPTIC TANK

CONCRETE: 4000 PSI
 REINFORCEMENT: ASTM A615 - GRADE 60
 ENTRAINED AIR: 5.0% - 9.0%
 -MEETS ASTM C890-



NOTES:

- INLET AND OUTLET TEES SUPPLIED BY CONTRACTOR
- INLET KNOCKOUTS PROVIDED FOR 6"Ø PIPE ON THREE SIDES.
- DESIGN CASE 3 (TRAFFIC)

SIZE GALLONS	OUTSIDE HEIGHT	LIQUID LEVEL 'L'	INLET HEIGHT 'I'	OUTLET HEIGHT 'O'	TANK WEIGHT, LBS			
					TOP SECTION	BOTTOM SECTION	BAFFLE WEIGHT	TOTAL WEIGHT
1200	5'-5"	3'-3"	4'-3"	4'-0"	10,000	11,740	960	22,700
1500	6'-3"	4'-1"	5'-1"	4'-10"	12,000	11,740	1175	24,915
2000	5'-11"	3'-9"	4'-9"	4'-6"	13,140	16,320	1300	30,760
2500	6'-11"	4'-9"	5'-9"	5'-6"	16,000	16,320	1605	33,925