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<b>Project Transmittal</b>			
Project Name:	Raw Sewage PS & Screen/Grit Structure – Jefferson, GA		
PO Number	499		
Date:	June 6, 2022		
To:	Chuck Butterfield		
Company:	CEC Engineering		
From:	Michael Busch		
	(346) 225-8033, michael.busch@anuainternational.com		
<b>Purpose of Transmittal</b>			
For your use		Resubmitted for reference	
Submitted for Approval	XXX		
Resubmitted for Approval			
<b>Qty</b>			
<b>Description</b>			
1	Submittal package for review, approval		

Note that material acquisition cannot take place, nor will fabrication begin, until Anua is notified in writing that the submittal package is approved. Delivery lead times will be determined at that time as well.



## Submittal Package

Projects: **Raw Sewage PS and Screen/Grit Structure**

Location: **Jefferson, GA**

System Type: **Two (2) Identical AiraHybrid® Biological Odor Control System**



# Submittal Package

## Revision Matrix

Revision	Date	Description
Original	6/6/2022	First Edition



# **Submittal Package**

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## 1. INTRODUCTION


The Anua AiraHybrid™ multi-stage odor control systems are skid-mounted, prepackaged air treatment system design to treat a broad range of odors. The first treatment stage is a biotrickling filter utilizing our AiraGlass™ foamed glass media. This stage is primarily designed to treat hydrogen sulfide. The second stage activated carbon media then polishes the remaining odors. Since the entire system is shop assembled, tested, and pre-loaded with media, installation is fast and easy.

## 2. CONTACT INFORMATION

### Manufacturer

Anua  
 4106 Bernau Ave.  
 Greensboro, NC 27407  
 Michael Busch  
 Phone: (346) 225-8033  
 michael.busch@anuainternational.com  
[www.anuainternational.com](http://www.anuainternational.com)

## 3. INSTALLATION LIST

			
Year	City	State/Province	CFM
2009	Orange	FL	300
2011	Nevada	CA	750
2011	Oconee	GA	465
2011	Cary	NC	500
2012	Bragg Creek	AB	700
2012	Gastonia	NC	470
2012	Moorseville	NC	6,000
2012	Weekapaug	RI	470
2012	Hilton Head	SC	240
2013	Perryman	MD	2,600
2013	League City	TX	1,400
2013	League City	TX	700
2014	Manchester	CT	3,000
2014	Athens	GA	125
2014	Biddeford	ME	1,000
2015	Bragg Creek	AB	700
2015	San Francisco	CA	2,500
2015	San Francisco	CA	2,500
2015	Oconee	GA	60
2015	Salt Lake City	UT	1,000
2015	Salt Lake City	UT	200
2016	Moorseville	NC	250
2016	Moorseville	NC	250
2017	Plymouth	MA	2,000
2018	Nevada	CA	250
2018	Nevada	CA	250
2018	Woods Hole	MA	250
2018	San Angelo	TX	250
2018	Travis	TX	250
2018	Salt Lake City	UT	2,000
2019	Mt. Pleasant	NC	750
2019	Conroe	TX	5,000
2019	Conroe	TX	5,000
2019	Frisco	TX	500
2019	Salt Lake City (500S)	UT	3,000
2020	Mt. Pleasant	SC	3,700
2020	Salt Lake City (700S)	UT	3,000

#### **4. WARRANTY**

Anua warrants that the products and services delivered to the Buyer shall be free from defects in manufacture, materials and workmanship, provided that the system has not been subject to accident, abuse, or misuse, and that the unit has been operated in accordance with the manufacturer's recommendations and within agreed inlet design parameters as specified in Section 6.

All equipment provided by Anua is warranted for a period of 12 months from the date of system startup, or 18 months from delivery (whichever comes first).

AiraGlass™ 1<sup>st</sup> stage Biotrickling filter media is warranted against structural decomposition and degradation for a period of 10 years after start-up.

Activated carbon media carries no warranty

If a product is determined to be in breach of this warranty, Anua shall repair or replace such product, at its option, which shall be the Buyer's sole remedy for such breach of warranty.

This warranty is in lieu of all other warranties, expressed or implied, whether statutory or otherwise, and buyer waives all other warranties, obligation or liabilities, oral or written, expressed or implied, including without limitation an implied warranty or commercial acceptability or fitness for a particular purpose. This warranty may not be extended or altered except by written authorization of Anua.

Anua shall not be liable for any direct or consequential damages including materials lost, labor or installed cost, injury, or other property damage caused by any defect in any products sold by it.

## 5. EQUIPMENT

Two (2) identical AiraHybrid™ odor treatment systems are to be provided, each comprised of the following components:

- GRP treatment vessel with integral media support flooring and galvanized steel skid.
- AiraGlass™ Biotrickling filter media
- AiraCarb-HC carbon media
- Electrical Control Panel with VFD
- Fan
- Water control panel containing all water recirculation valves, instrumentation, and controls.
- Recirculation pump for continuous 1<sup>st</sup> stage media irrigation
- Differential pressure gauges (local read)
- Media bed temperature indicator (local read)



Figure 1 – Typical AiraHybrid Unit

## 6. DESIGN & SERVICE CONDITIONS

<b>Two (2) Identical AiraHybrid™ Multi-Stage Systems to be Provided, each per:</b>	
Airflow (max)	300CFM
Treatment system footprint	4' W x 10.5' L x 7.5' H (approx.)
System shipping weight	6,000lbs (approx.)
System operating weight	10,500lbs (approx)
1 <sup>st</sup> Stage biological media volume	70 ft <sup>3</sup>
2 <sup>nd</sup> Stage carbon media volume	450lbs
Fan model / Design / Motor	PB-10A / 300CFM @ 8" wc / 1HP 460/3/60VAC TEFC
Recirc pump model / Design / Motor	DB4P-M613 / 11GPM @ 20' Head / 0.25HP 120/1/60VAC TEFC
System foul air inlet connection	6" Round
Foul air conditions	50-105F
Inlet H <sub>2</sub> S design (average)	<180ppm
Inlet H <sub>2</sub> S design (peak)	<300ppm
Expected H <sub>2</sub> S removal	>99% or 0.1ppm H <sub>2</sub> S at outlet
Electrical requirement	460/3/60VAC, + ground
Fresh water supply	1" dia 30-80PSI
Drain plumbing req'd	1" dia
Overflow Connection	1" dia
Expected water usage	<370GPD (@ 180ppm H <sub>2</sub> S)

## 7. TREATMENT VESSEL

The treatment vessel consists of modular glass reinforced plastic (GRP) panels that bolt together. The gasketing between each panel is butyl rubber. All internal hardware is 316SS. All external hardware is either galvanized or zinc-plated carbon steel. The entire vessel sits atop a galvanized steel skid. The vessel roof contains maintenance hand-holes and/or larger Quick-opening manways to access and maintain internal components as required.

The vessel contains a media support flooring system consisting of FRP grating panels, topped with plastic netting. This system properly supports the media, while allowing even airflow across the media bed(s).



**8. 1<sup>st</sup> STAGE AiraGlass™ BIOTRICKLING FILTER MEDIA**

The 1<sup>st</sup> stage AiraGlass™ media is manufactured from recycled post-consumer glass. The glass is screened, crushed, and mixed with foaming agents. It is “foamed” by heating in a kiln running at extremely high temperatures. The media is extremely lightweight, crush resistant, inert, robust, and contains an exceptionally large surface area for bacteria to colonize. The media is warranted against physical degradation for ten years. The media is pre-loaded at the factory.

**9. 2nd STAGE AiraCarb-HC MEDIA**

The 2nd stage activated carbon media is a 4MM pelletized product, and has an H2S capacity of 0.30 g/cc. It is designed to polish remaining odors in the airstream not treated in the 1<sup>st</sup> stage. The media is pre-loaded at the factory.

**10. ELECTRICAL CONTROL PANEL W/ VFD**

The NEMA4X FRP control panel contains a VFD for the fan, and motor starter for the recirculation pump. The panel is designed for 460/3/60VAC + grounding. It is shop-assembled and wired.

**11. FAN**

The fan extracts odorous air from the source(s), is directed through the odor control system, and exhausts treated air directly to atmosphere. The fan operates under negative pressure with the fan located on the outlet side of the GRP treatment vessel. The fan is shop assembled and wired.

Design Airflow	300CFM @ 8” wc @ 70F
Model	Cincinnati Fan PB-10A
Material	Cast Aluminum housing, epoxy coating
Connections	Round inlet, flanged outlet
Arrangement	4 (direct drive)
Motor	1HP, 3500RPM, 230/460/3/60VAC, TEFC
Misc	Epoxy-coated steel base frame
Misc	Flanged exhaust silencer (GSA-5)

**12. WATER CONTROL PANEL**

The water control panel is a NEMA4X FRP cabinet that contains all the valves, pressure gauges, flowmeters, and wye-strainers that control the 1<sup>st</sup> stage recirculated water line and the vessel sump fill line. The water panel is shop-assembled and mounted on the treatment skid. It will have one (1) 1” dia threaded connection for the fresh water supply connection (30-80PSI required).

### 13. RECIRCULATION PUMP FOR 1<sup>st</sup> STAGE MEDIA BED

The recirculation pump for the 1<sup>st</sup> stage of the AiraHybrid™ system is a seal-less centrifugal drive pump, designed for continuous duty. It is completely corrosion resistant. This pump provides the spray water to continuously irrigate the first stage media bed. The recirculation pump is shop assembled and wired.

Design Flow	11GPM @ 25' head
Model	Finish Thompson DB4P-M613
Motor	1/4HP 120/1/60VAC, TEFC

### 14. DIFFERENTIAL PRESSURE GAUGES

Each media bed shall have one (1) 0-6" wc differential pressure gauge (local read). At start-up, it is typical to have between a reading between 1-2" wc. If either stage reads >5" wc, the system should be shut-down and Anua should be contacted.

### 15. MEDIA BED TEMPERATURE GAUGE

The system shall contain one (1) local read bi-metal thermometer, to check media bed temperature. For a biological odor control system to properly operate, the media bed must be between 50-105F. If it is outside of this range, performance will likely be reduced.

### 16. UTILITIES REQ'D FOR INSTALLATION

Electrical Feed	460/3/60VAC + ground
Fresh Water	One (1) 1" dia, 30-80PSI req'd
Main System Drain	1" dia to sanitary sewer
Overflow Connection	1" dia to sanitary sewer
Foul Air Ductwork	6" dia round connection on treatment vessel inlet

### 17. SPARE PARTS INCLUDED

Item	Qty
Control panel fuses	One (1) set
Control panel indicator lenses	One (1) set
Wye-strainer basket	One (1)

# 18. Drawings



SYSTEM TYPE:

AIRAHYBRID

SHOP ORDER #:

SO2418

AIRFLOW (MAX):

300 CFM

SYSTEM SHIPPING WEIGHT:

6000 LBS

FAN MODEL:

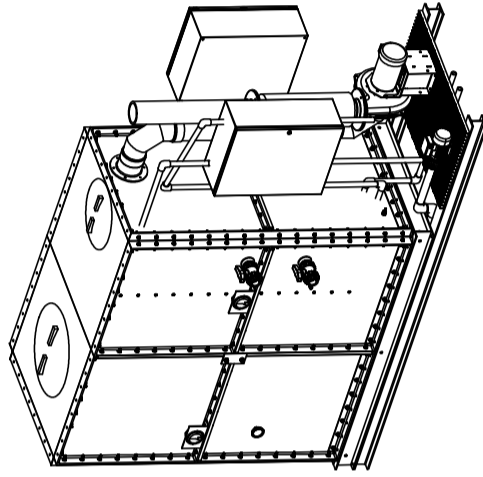
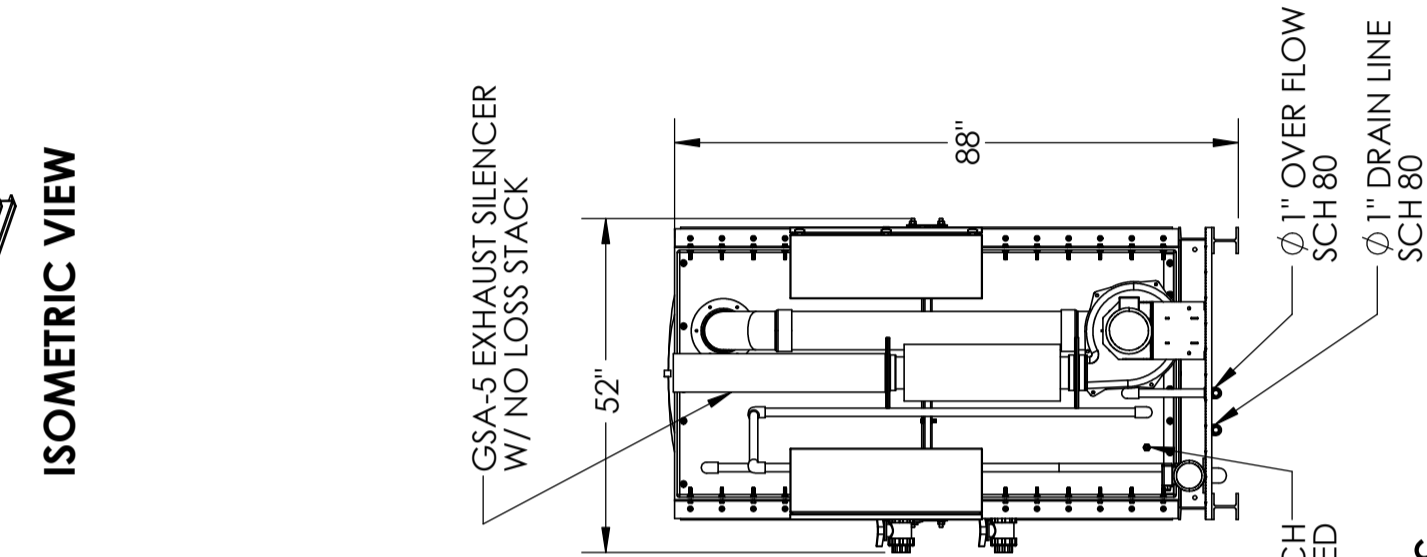
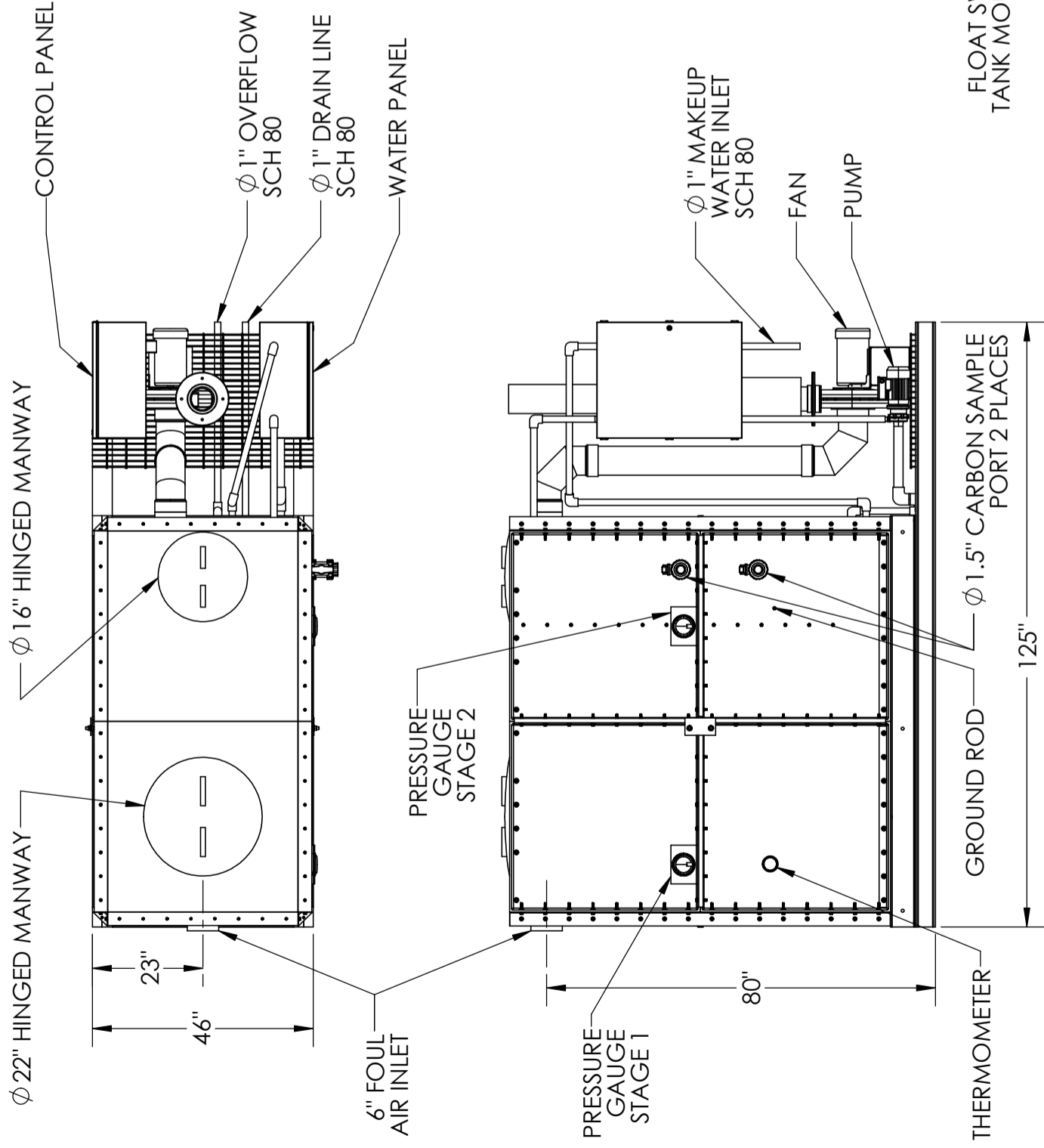
PB10A / 400 CFM @8"W/C/ 1HP 230/460/3/60VAC TEFC

FOUL AIR CONNECTION:

6"

PUMP MODEL:

11 GPM @ 20'HEAD 0.25HP 120/1/60VAC TEFC



### ISOMETRIC VIEW

#### GENERAL NOTES:

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Legend:

- |  |                        |  |                      |
|--|------------------------|--|----------------------|
|  | Valve Unspecified      |  | Globe Valve          |
|  | Ball Valve             |  | Ball Valve NC        |
|  | Knife Valve NC         |  | Butterfly Valve      |
|  | Knife Valve NO         |  | Regulating Valve     |
|  | Needle Valve           |  | Diaphragm Valve      |
|  | Normal Open            |  | Parallel slide Valve |
|  | Check Valve            |  | Normal Close         |
|  | Manual Air Damper      |  | Solenoid             |
|  | Fan                    |  | Flexible Connection  |
|  | Motor                  |  | Fan                  |
|  | Pump                   |  | Immersion Heater     |
|  | Pressure Indicator     |  | Flowmeter            |
|  | Differential Pressure  |  | Ultrasonic Sensor    |
|  | Pressure Transducer    |  | Float Switch         |
|  | Temperature Indicator  |  | Y Strainer           |
|  | Temperature Transducer |  | Customer Connection  |
|  | Water Line             |  | Cabinet Heater       |
|  |                        |  | Electric Line        |

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	<input type="checkbox"/> TENDER	<input type="checkbox"/> FOR CONSTRUCTION	
Rev.	Status	DATE	

ANUA  
4106 Bernau Avenue - Greensboro, NC 27407  
Phone 336-547-9338  
www.anuainternational.com

Project: RAW SEWAGE PS/ SCREEN GRIT STRUCTURE  
Client: JEFFERSON, GA

Drawing Title: AIRAHYBRID 1 X 2 X 2 - 300 CFM

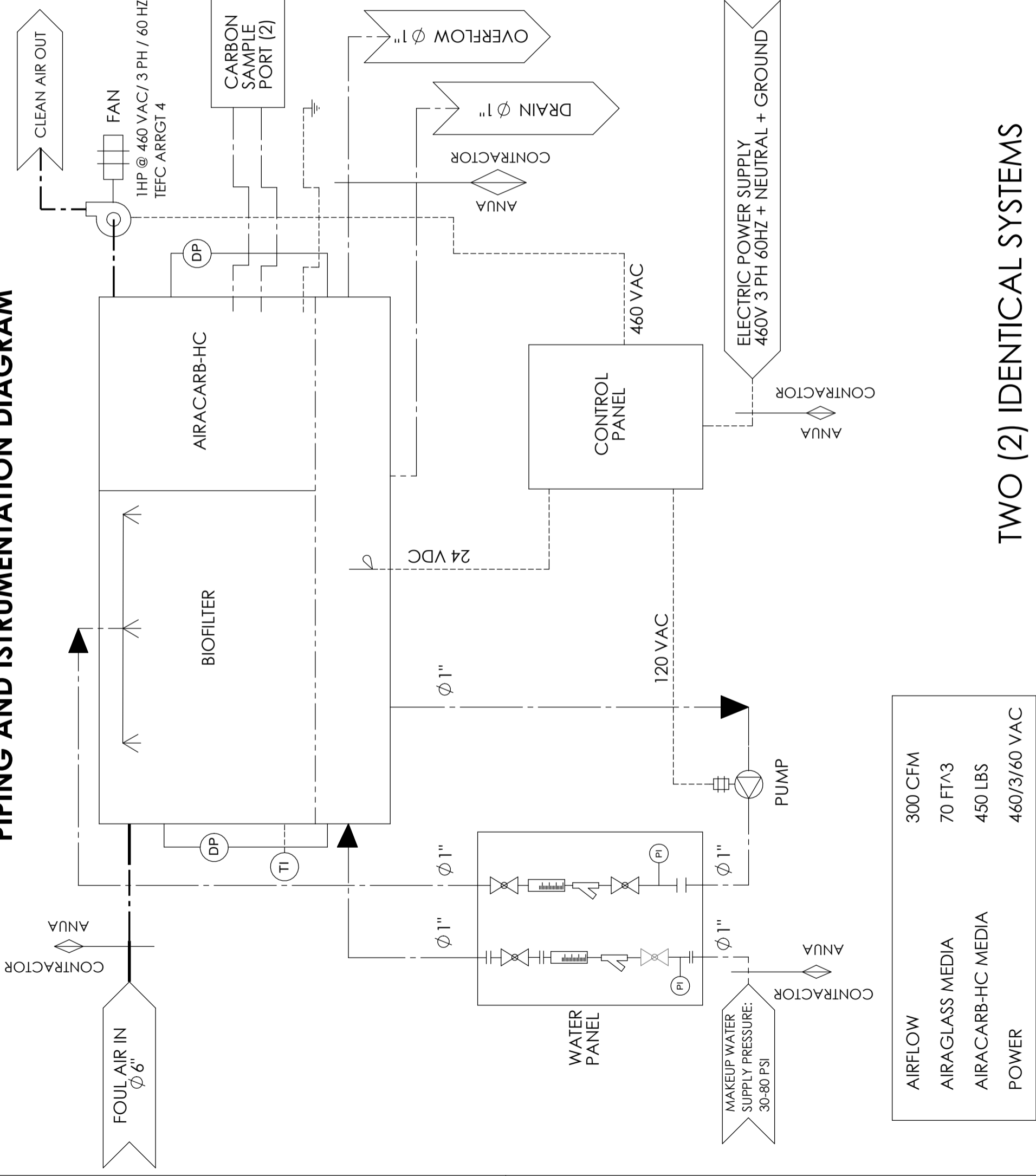
Sheet: 1 of 2  
Scale (A0): ADAML  
Checked by: Approved by:

Dwg. No.: A-AH-1P-2-2-RS PS-JEFFERSON

## TWO (2) IDENTICAL SYSTEMS

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# PIPING AND INSTRUMENTATION DIAGRAM



AIRFLOW	300 CFM
AIRGLASS MEDIA	70 FT^3
AIRCARB-HC MEDIA	450 LBS
POWER	460/3/60 VAC

TWO (2) IDENTICAL SYSTEMS

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|  | Valve Unspecified      |  | Globe Valve          |
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|  | Butterfly Valve        |  | Regulating Valve     |
|  | Knife Valve            |  | Diaphragm Valve      |
|  | Needle Valve           |  | Parallel slide Valve |
|  | NO Normal Open         |  | NC Normal Close      |
|  | Check Valve            |  | Solenoid             |
|  | Manual Air Damper      |  | Flexible Connection  |
|  | Fan                    |  | Fan                  |
|  | Motor                  |  | Immersion Heater     |
|  | Pump                   |  | Flowmeter            |
|  | Pressure Indicator     |  | Ultrasonic Sensor    |
|  | Differential pressure  |  | Float Switch         |
|  | Pressure Transducer    |  | Y Strainer           |
|  | Temperature Indicator  |  | Customer Connection  |
|  | Temperature Transducer |  |                      |

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Rev	Status	DATE	

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Project: **RAW SEWAGE PS/ SCREEN GRIT STRUCTURE**

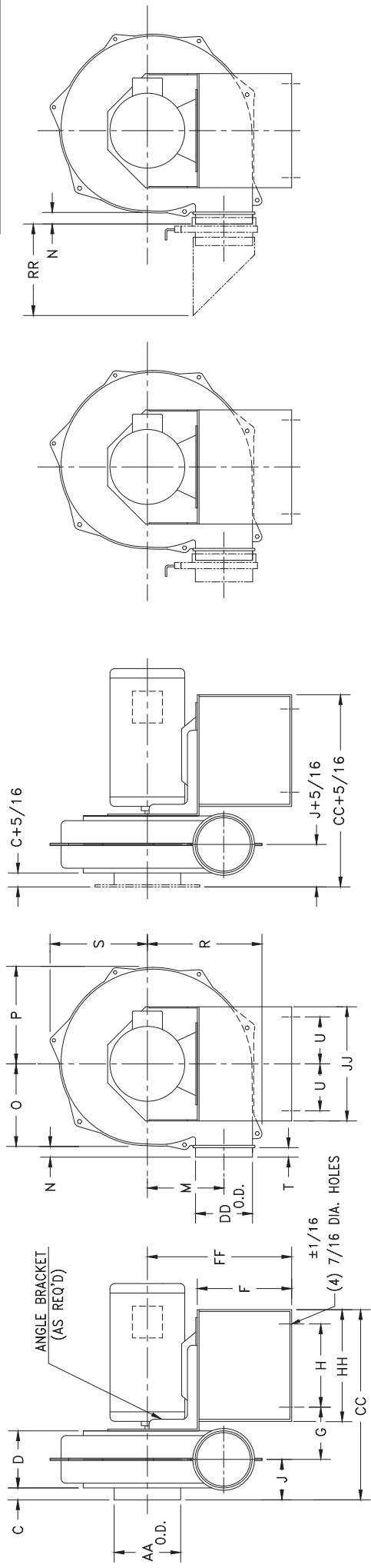
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Drawing Title: **AIRAHYBRID 1 X 2 X 2 - 300 CFM**

Sheet: **2 of 2** | Scale (A0) | Drawn by: **ADAML** | Checked by: | Approved by: |

Dwg. No.: **A-AH-1P-2-2-RS PS-JEFFERSON**

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CW BOTTOM HORIZONTAL DISCHARGE SHOWN

OPTIONAL INLET FLANGE

OPTIONAL SLIDE GATE DAMPER

OPTIONAL DAMPER+WEATHER CVR

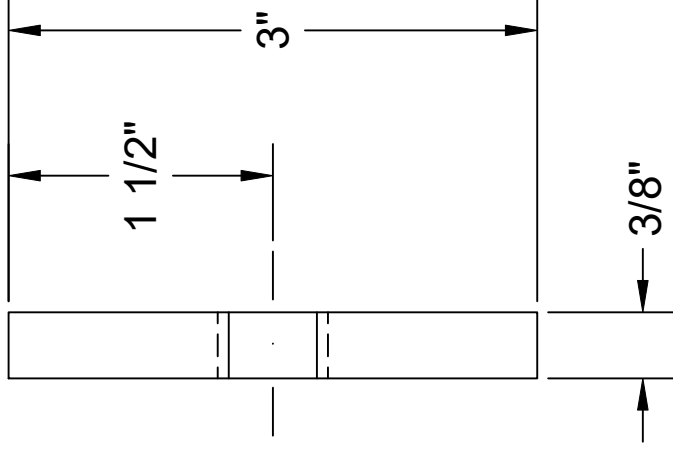
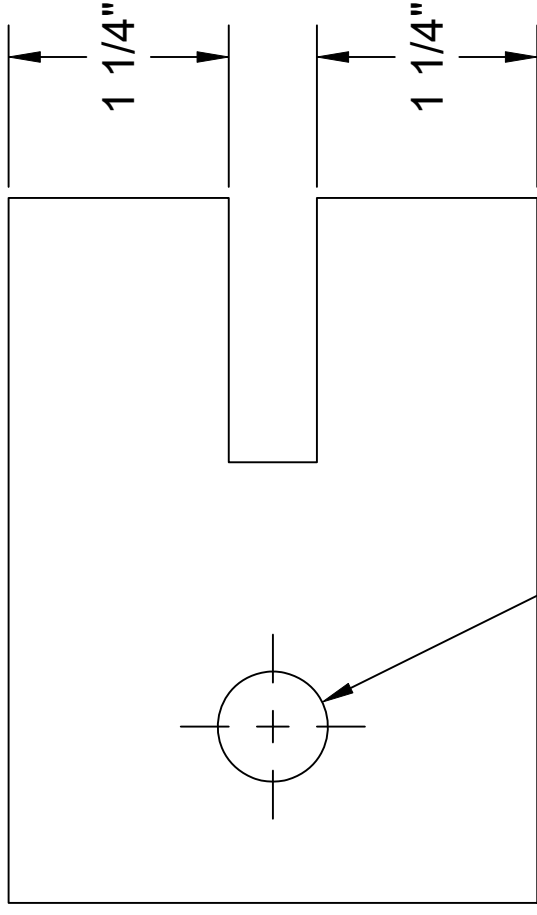
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PB-12A	56	1 1/4	5	3 3/4	7 9/16	7/8	8	9 5/8	11 11/16	9 7/16	1	6	8 1/4	4 5/8	5	3 3/4	14 7/8	11 7/8	8	9	8 5/8
PB-14A	56C *	1 1/4	6	4 1/4	8 1/16	1	8 13/16	10 3/8	12 3/16	10 1/4	1	6	6 7/16	5	8 3/4	4 15/16	19	11 3/4	12	12	8 5/8
PB-15A	56C *	1 1/4	7 1/4	4 7/8	7 7/8	1	9 13/16	11 3/8	13	10 13/16	1	8	9 15/16	8 3/4	8 3/4	4 15/16	20	15 3/16	11 3/4	12	11
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PB-18WA	56C *	1 1/4	8 1/16	5 5/16	9 7/8	7/8	11	13 3/16	15 1/8	11 13/16	1	8	11 3/4	6 1/2	10 3/4	6 1/4	24 1/16	18	16 1/2	11	11

DIM "AA" AVAILABLE INLET SIZES

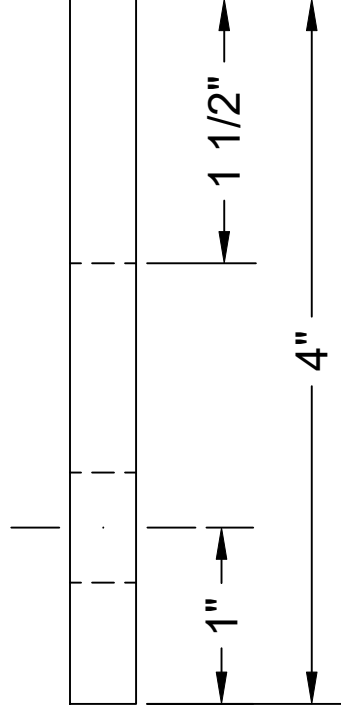
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- 5" INLET AVAILABLE FOR PB-9
- 6" INLET AVAILABLE FOR PB-10A, 14A, 15A & 18
- 7" INLET AVAILABLE FOR PB-12A, 14A, & 15A
- 8" INLET AVAILABLE FOR PB-14A, 15A, 18, & 18WA
- 10" INLET AVAILABLE FOR PB-15A, 18, & 18WA

NOTES:

- HOUSINGS ARE ROTATABLE IN 45° INCREMENTS.
- DISCHARGE FLANGE NOT AVAILABLE FOR DOWN BLAST DISCHARGE, ALL MODELS EXCEPT PB-18, 182T THRU 215T MOTORS.
- PB-14A 56 FRAME MOTOR MUST BE 56C ROUND BODY ONLY (NOT FOOT MOUNT).



Ø 5/8"



**NOTES:**

**Material:** A36  
**Surface Treatment:** Hot Dip Galvanized

**Anchoring":** Use 1/2" dia x 6" min embedment anchor bolts (UNO). Supplied by contractor.



**QTY:**

6

**Notes:**  
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 Reviewer Note:  
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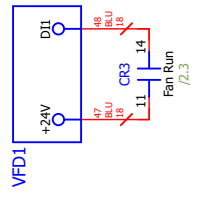
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 Knife Valve NC  
 Knife Valve NO  
 Needle Valve  
 Normal Open  
 Check Valve  
 Manual Air Damper  
 Fan  
 Motor  
 Pump  
 Pressure Indicator  
 Differential pressure switch  
 Pressure Transducer  
 Temperature Indicator  
 Temperature Transducer  
 Water Line
  - Globe Valve  
 Ball Valve NC  
 Butterfly Valve  
 Regulating Valve  
 Diaphragm Valve  
 Parallel slide Valve  
 Normal Close  
 Solenoid  
 Flexible Connection  
 Fan  
 Immersion Heater  
 Flowmeter  
 Ultrasonic Sensor  
 Float Switch  
 Y Strainer  
 Customer Connection  
 Electric Line

<b>Rev.</b>	<b>DESCRIPTION</b>	<b>DATE</b>
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<b>Project:</b> Hold Down Bars for Air Treatment Units		
<b>Client:</b> All		
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<b>Date:</b> 2/24/2021	<b>Scale (A3):</b> NTS	<b>Drawn by:</b> CASSANI <b>Checked by:</b> BUSCH
<b>Status:</b>		<b>Approved by:</b> BUSCH
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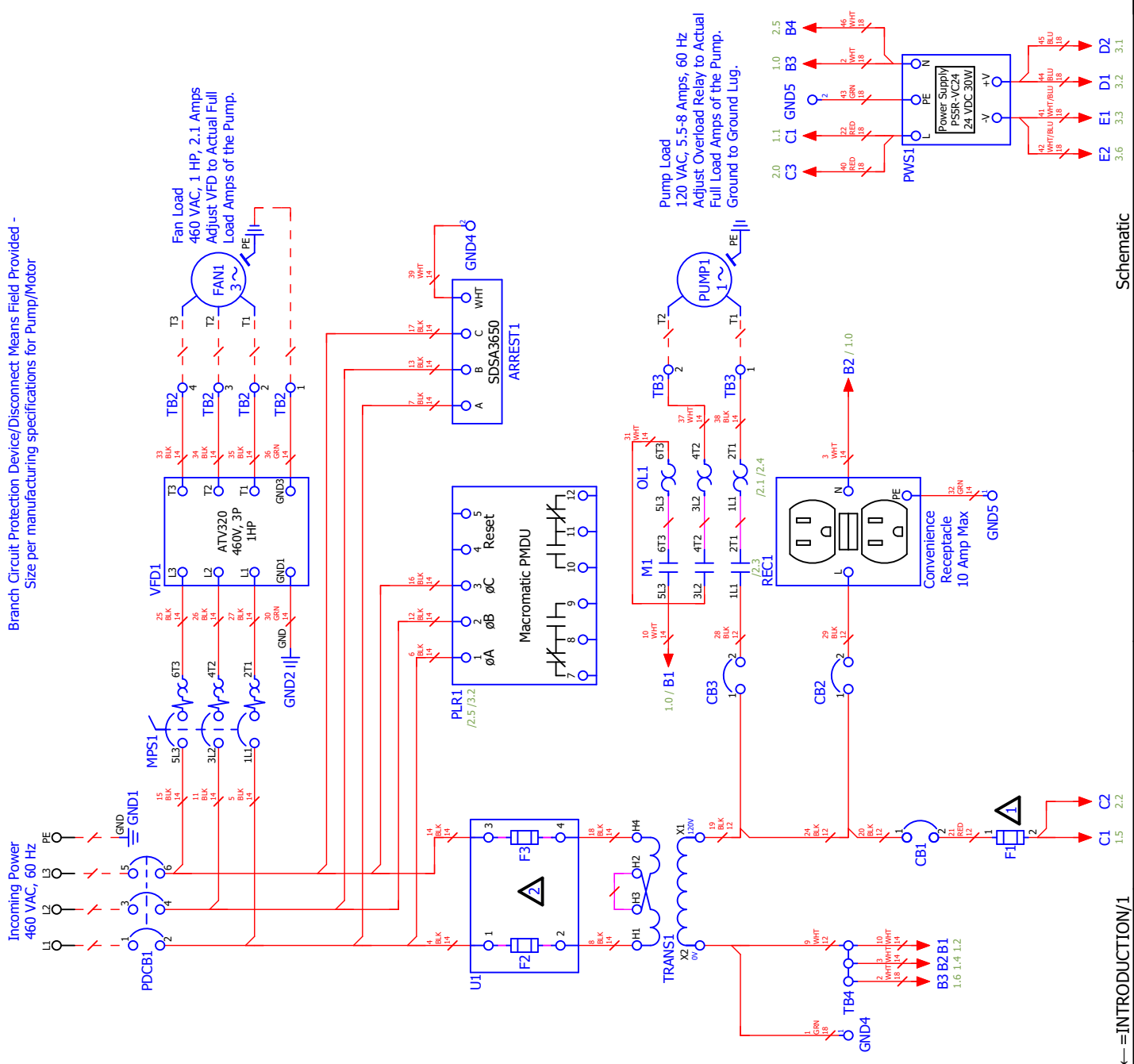
Device Tag	Description	Primary Voltage	Secondary Voltage
ARREST1	Lightning Arrestor 3 Phase		
CB1; CB2	Circuit Breaker 1 Pole 10 A	45 In-lb	
CB3	Circuit Breaker 1 Pole 15 A	45 In-lb	
F1	1A Control Fuse	7 In-lb	
F2; F3	Fuse 10A		
GND1	Ground Lug	45 In-lb	
GND2	Ground Screw		
GND4	Ground Modular Terminal Block		
GND5	Ground Modular Terminal Block		
MPS1	Motor Protection Switch 2.5-4.0 A	15 In-lb	
OLI	Overload 5.5-8 A	22 In-lb	15 In-lb
PDCB1	Circuit Breaker 15A	45 In-lb	
PLR1	Phase Loss Relay		
REC1	GFI Receptacle 15A	15 In-lb	
TB2; TB3	Terminal Block 50A	15 In-lb	
TB4	Terminal Block 20A	15 In-lb	
TRANS1	Transformer, 2KVA	8 In-lb	
U1	Fuse Holder, 2P, 30A		
VFD1	VFD, 1HP, 460V		

- 1 F1 FUSE MUST BE REPLACED WITH 1 AMP TYPE 5mmX20mm FAST ACTING 250V MAX
- 2 F2 & F3 FUSE MUST BE REPLACED WITH 10 AMP TYPE FNQR SLOWBLOW 600V MAX

CAUTION: Nonmetallic enclosure does not provide grounding between conduit connections. Use grounding bushings and jumper wires.  
 ATTENTION: Les boîtiers non-métalliques ne permettent pas de mise à la terre entre les connexions de conduits. Utilisez des manchons de mise à la terre et des fils de liaison.



Branch Circuit Protection Device/Disconnect Means Field Provided - Size per manufacturing specifications for Pump/Motor



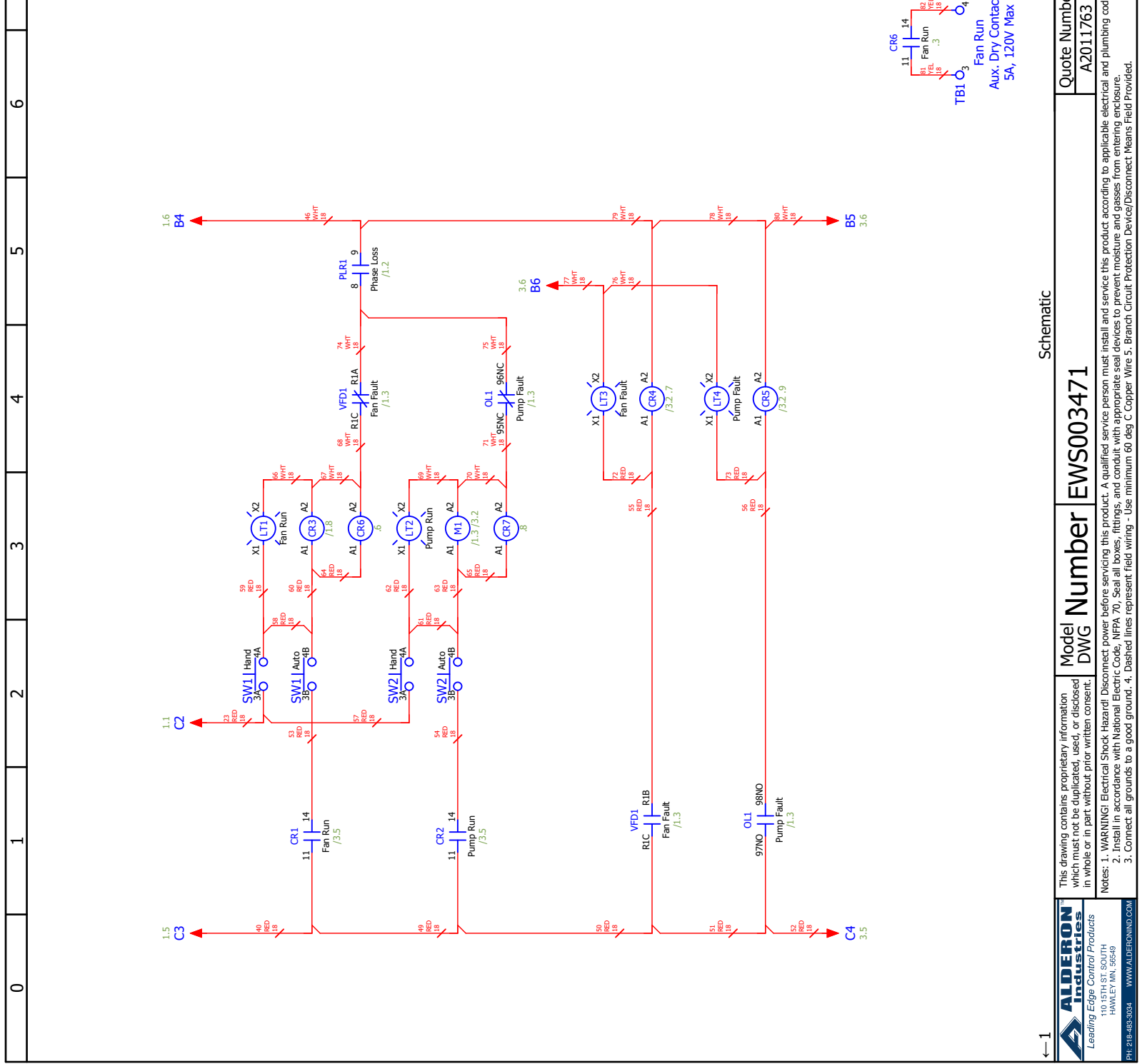
← INTRODUCTION/1

Schematic

<p>ALDERON Industries Leading Edge Control Products 110 15TH ST. SOUTH HAWLEY MN, 55549 PH: 218-463-3064 WWW.ALDERONIND.COM</p>	Model Number	EWS003471	Quote Number	A2011763	Drawn By	B. Nelson	Page Number	1 Of 3
	DWG				Checked By		Date	6/3/2022
<p>This drawing contains proprietary information which must not be duplicated, used, or disclosed in whole or in part without prior written consent.</p> <p>Notes:          1. WARNING! Electrical Shock Hazard! Disconnect power before servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes.          2. Install in accordance with National Electric Code, NFPA 70. Seal all boxes, fittings, and conduit with appropriate seal devices to prevent moisture and gasses from entering enclosure.          3. Connect all grounds to a good ground.          4. Dashed lines represent field wiring - Use minimum 60 deg. C Copper Wire 5. Branch Circuit Protection Device/Disconnect Means Field Provided.</p>		Revision	AAA					



0	1	2	3	4	5	6	7	8	9
							<b>Legend</b>		
Device Tag		Description		Primary		Auxiliary		Field Supplied	
CR3,CR6,CR7		Relay, 120VAC, SPDT		7.1 In-lb					
CR4,CR5		Relay, 120VAC, DPDT		4.5 In-lb					
LT1,LT2		Green Light 120V							
LT3,LT4		Red Light 120V							
M1		Contactor 18 A - 120V Coil		15 In-lb		15 In-lb			
SW1,SW2		HOA Switch							
TBI		Terminal Block 30A		6 In-lb					



Quote Number		A2011763		Checked By		B. Nelson		Page Number		2 Of 3	
Drawn By		B. Nelson		Date		6/3/2022		Revision		AAA	

Schematic

**Model Number EWS003471**

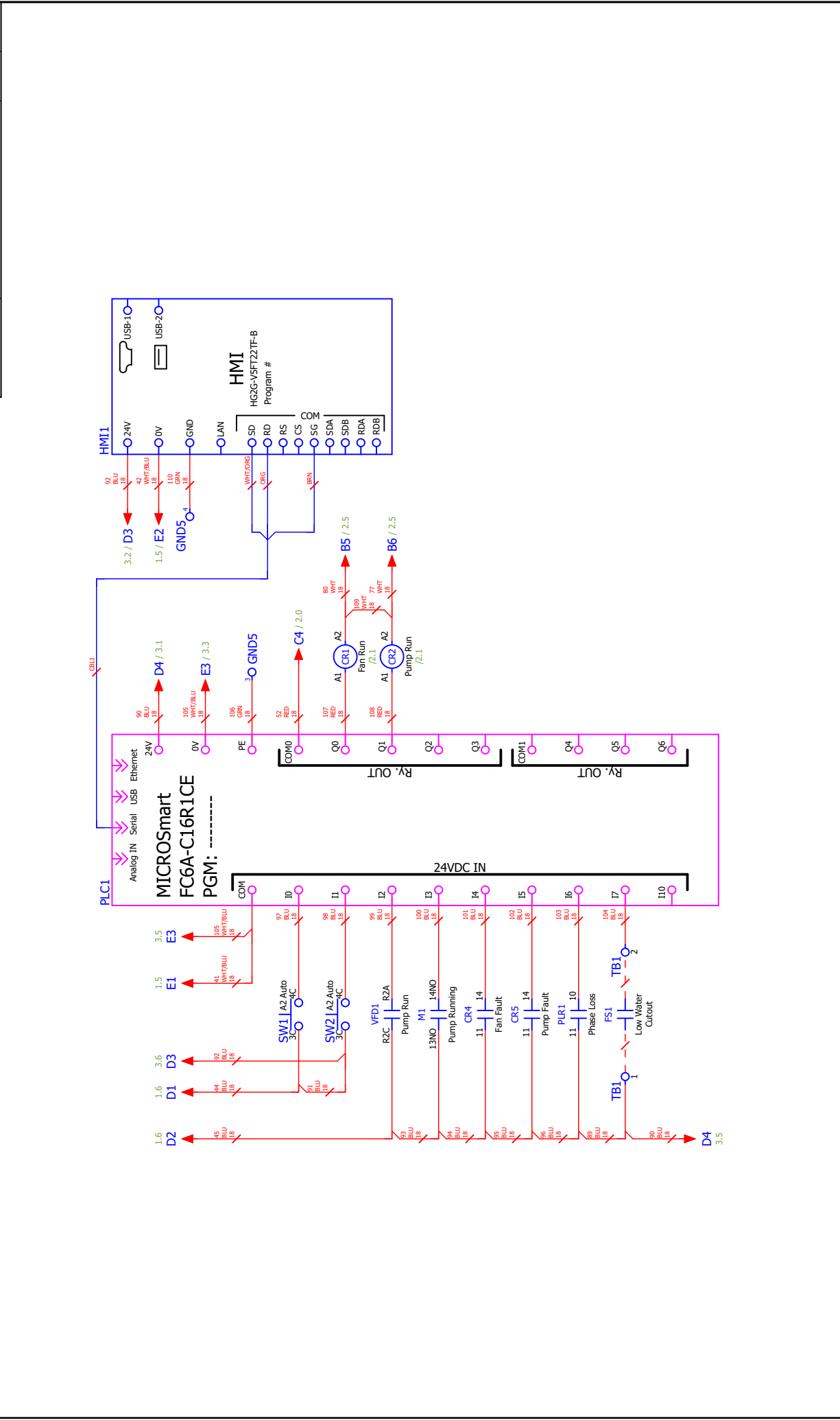
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0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

# Legend

Device Tag	Description	Primary Wire Size	Auxiliary Wire Size
CR1,CR2	Relay, 120VAC, SPDT	7.1 In-lb	
HMI1	HMI Display	2.5 In-lb	
PLC1	PLC, 9T/7O		6 In-lb
TB1	Terminal Block 30A		



Schematic

= STANDARD\_REPORT/1 →

Quote Number	A2011763	Drawn By	B. Nelson
Checked By		Date	6/3/2022
Revision	AAA	Page Number	3 of 3

Model Number **EWS003471**

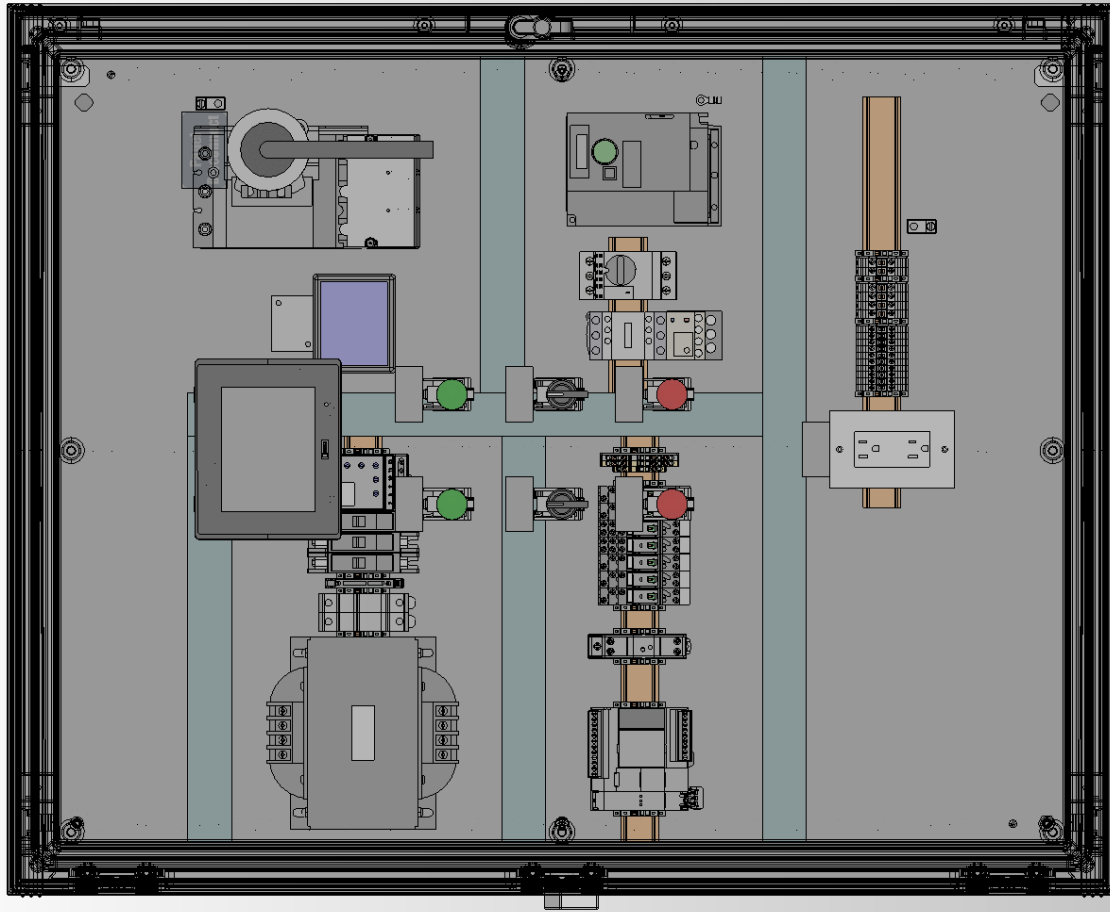
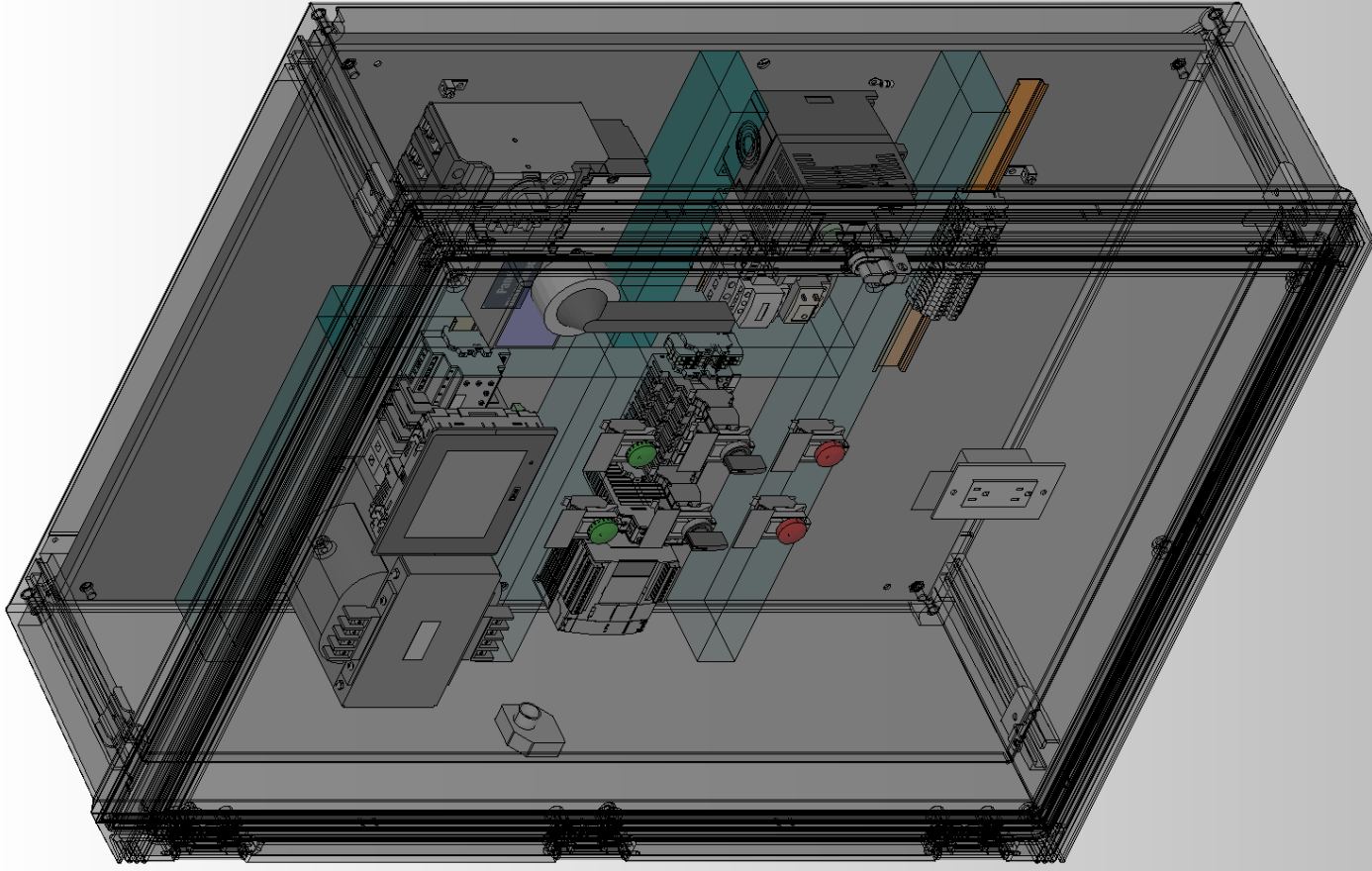
DWG Number **EWS003471**

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 3. Connect all grounds to a good ground. 4. Dashed lines represent field wiring. 5. Branch Circuit Protection Device/Disconnect. Means Field Provided.

← 2

**ALDERON Industries**  
 Leading Edge Control Products  
 110 15TH ST. SOUTH  
 HAWLEY MN, 55549  
 PH: 218-463-3064    WWW.ALDERONIND.COM



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**Model Number EWS003471**  
**DWG Number**

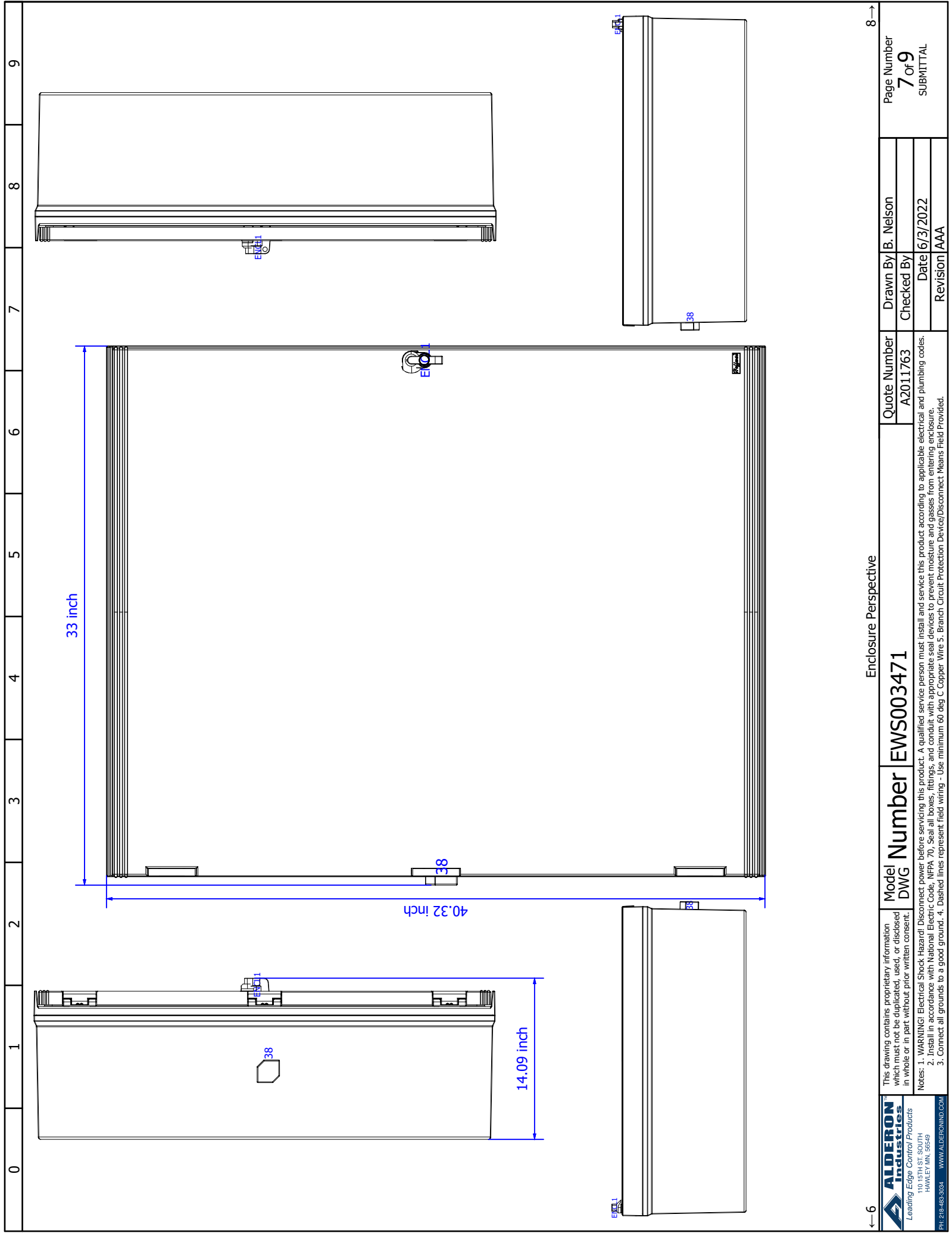
**Quote Number**  
 A2011763

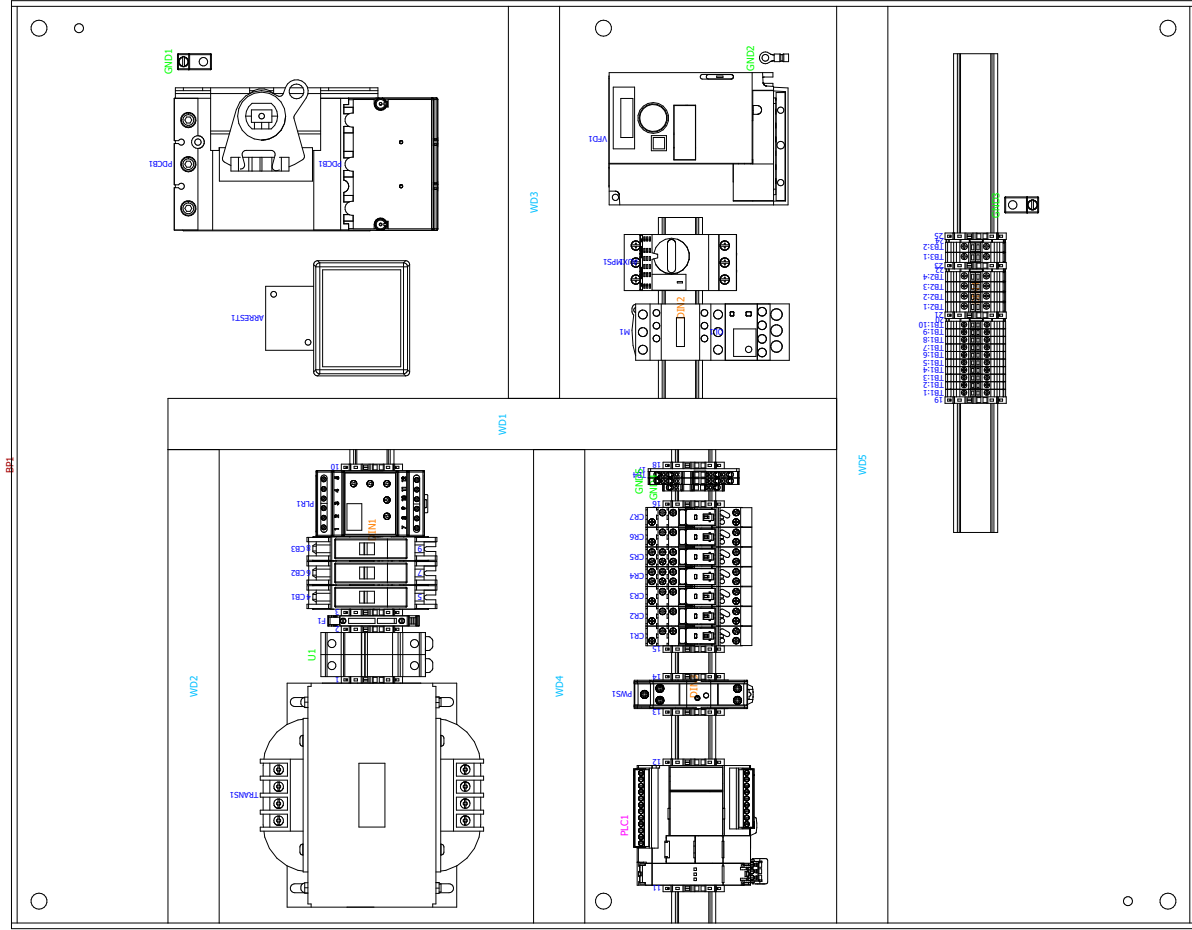
**Drawn By** B. Nelson  
**Checked By**

**Page Number**  
**6 of 9**  
 SUBMITTAL

**Notes:** 1. **WARNING!** Electrical Shock Hazard! Disconnect power before servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes.  
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**Date** 6/3/2022  
**Revision** AAA



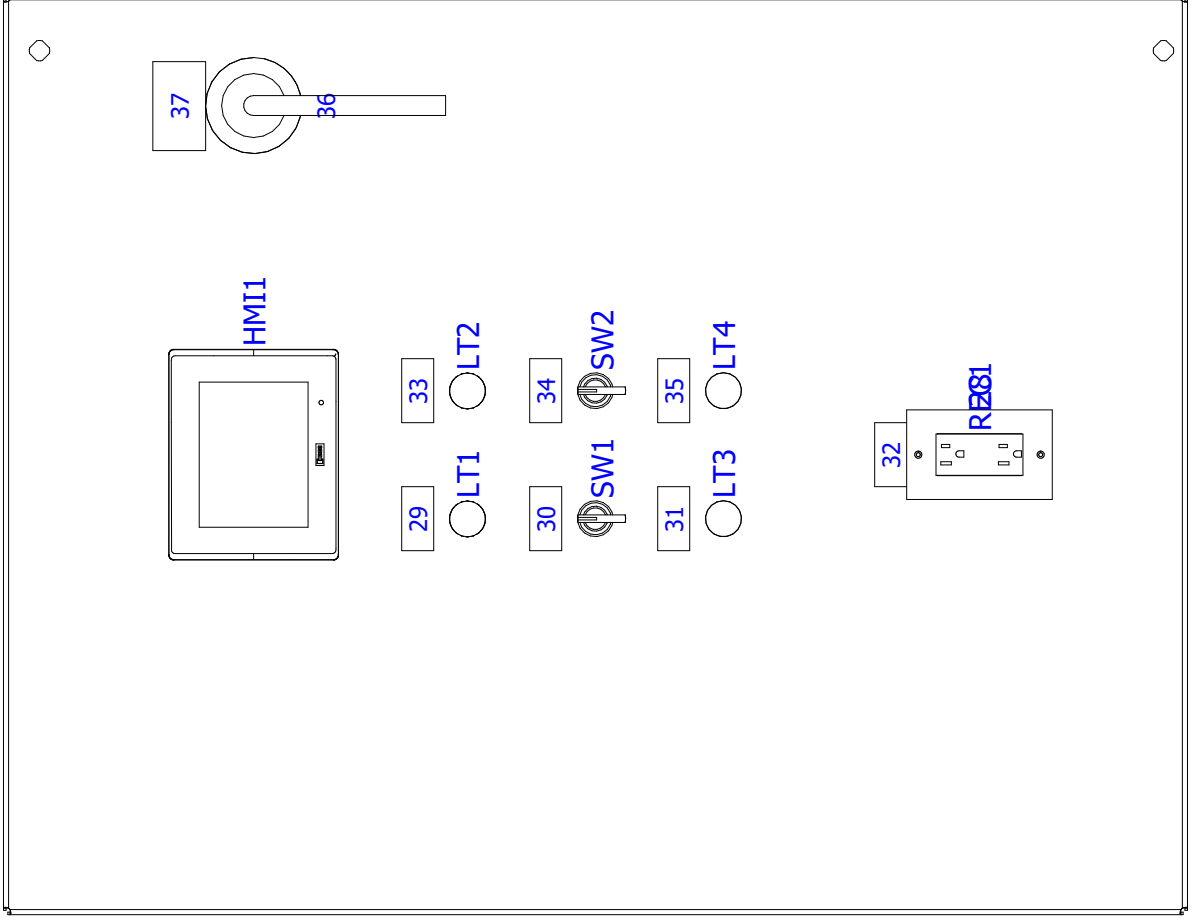


Mounting Panel Layout

←7

Mounting Panel Layout

<p><b>ALDERON Industries</b> Leading Edge Control Products 110 15TH ST. SOUTH HAWLEY MN, 55449 PH: 218-463-3064 WWW.ALDERONIND.COM</p>	<p>This drawing contains proprietary information which must not be duplicated, used, or disclosed in whole or in part without prior written consent.</p> <p>Notes: 1. <b>WARNING!</b> Electrical Shock Hazard! Disconnect power before servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes. 2. Install in accordance with National Electric Code, NFPA 70. Seal all boxes, fittings, and conduit with appropriate seal devices to prevent moisture and gasses from entering enclosure. 3. Connect all grounds to a good ground. 4. Dashed lines represent field wiring - Use minimum 60 deg. C Copper Wire 5. Branch Circuit Protection Device/Disconnect. Means Field Provided.</p>	<p>Model Number <b>EWS003471</b></p> <p>DWG Number <b>EWS003471</b></p>	<p>Quote Number <b>A2011763</b></p>	<p>Drawn By <b>B. Nelson</b></p>	<p>Page Number <b>8 of 9</b></p> <p>SUBMITTAL</p>
	<p>9 →</p>	<p>Checked By</p> <p>Date <b>6/3/2022</b></p> <p>Revision <b>AAA</b></p>	<p>Revision</p>	<p>Revision</p>	<p>Revision</p>



Inner Door Layout

Inner Door Layout

**ALDERON Industries**  
 Leading Edge Control Products  
 110 15TH ST. SOUTH  
 HAWLEY MN, 55449  
 PH: 218-483-3064 WWW.ALDERONIND.COM

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 2. Install in accordance with National Electric Code, NFPA 70. Seal all boxes, fittings, and conduit with appropriate seal devices to prevent moisture and gasses from entering enclosure.  
 3. Connect all grounds to a good ground.

Model Number **EWS003471**

Quote Number **A2011763**  
 Drawn By **B. Nelson**  
 Checked By  
 Date **6/3/2022**  
 Revision **AAA**

Page Number **9 Of 9**  
 SUBMITTAL

## 20. Detailed Equipment Information / Cut Sheets





**WRAS**  
APPROVED  
PRODUCT



# SUNG IL **GRP/ENM** WATER TANK



Hot Press Moulded GRP Sectional Panel Tank

 **SUNGIL GRP**



# SUNG IL GRP ENM WATER TANK

◆ 30 million US dollars exporting of GRP (Composite materials) building materials. ◆

Excellent in Clean & Hygienic and Non-leakage.

GRP Sectional Water Tank for Easy to Design and Installation.

## Korea Certificate

Korea : KCW-2013-0135  
(Korea water and waste water works Association)

## Authority Certificate

U.K : WRAS BS6920  
BS EN13280 : 2001

Singapore : PSB SS245 : 1995  
SS375 : 2001

## Patents Status in Korea

Heat Insulation Panel	: No. 0495287
All-in-one Water Tank	: No. 20-0457565
Reinforced frame for Water Tank	: No. 30-0801784
ENM Water Tank	: No. 30-0867794

## Characteristic of GRP Water Tank

GRP Water Tank always keeps clean water with excellent water pressure resistance & corrosion resistance.

### Various Capacity Design

Various size panels can use limited space for its best using way so can satisfy your needs.

### Intensity and Durability

Glass fiber Reinforced Panel is mulded under condition of high temperature and pressure to maintain the best endurance.

Since using stainless steel for inside structure, plated steel for outside and HDG for outside, it shows best performance against corrosion.

### Watertightness

The joints sealed with special sealing tape especially developed for water tank.

### Heat Insulation and Dewdrops Prevention

The heat insulation panel with 4 layer structured improves heat insulation effect. Protects water from dewdrops and minimizes temperature variation of the stored water.



The 2<sup>nd</sup> Hot Press Factory



The 3<sup>rd</sup> Hot Press Factory

## Differentiated SUNGIL GRP Water Tank

### GRP Water Tank Panel

ITEM	Unique Characteristics of SUNGIL (Strong Point)	Other Companies
GRP Sheet	SUNGIL produces high-quality and differentiated GRP Sheet in the own GRP Sheet (Raw material) plant	No GRP Sheet plant
Competitive price for panel	Competitive pricing for Panel caused by SUNGIL own GRP Sheet using	Deterioration in product quality & uncompetitive prices
2X1M Roof Panel	2X1M Roof Panel production ( it is possible to ensure competitive price )	1X1M Roof Panel only
Manhole Panel	Double Sealant Structure of Manhole cover ( No Dust and pollutant )	Single sealant structure
Heat Insulated Panel	As using the patented insulation panel cover (Patent No. 0495287) which nonwoven is applied, secure the perfect insulation & prevent a defect.	As using ABS & not using nonwoven, there are many defect factors.
Automation system construction of hole drill facilities	As constructing automation system of hole drill facilities, it makes the mass production possible & it is possible to ensure competitive price.	Using hand-operated hole drill facilities.
Using high-pressure foaming equipment for panel insulation	As using latest high-pressure foaming equipment for panel insulation, secure effectiveness of insulation & excellent quality.	Using low-pressure & hand-operated foaming equipment.

### GRP Water Tank Reinforced materials

ITEM	Unique Characteristics of SUNGIL (Strong Point)	Other Companies
The safety factor for Skid Base	The patented Skid Base of SUNGIL for Water tank (Design registration-0664436) has a better safety factor than general Skid Base	As using general Skid base, there is more unstable and weak against Earthquake
Earthquake resistant design for Skid base	Skid base of SUNGIL is designed with Earthquake resistant & there is stable and safe till magnitude 5.0. (Over magnitude 5.0, it needs additional reinforcement.)	
TIE ROD	Preventing corrosion & rusting issues with PET Coating	Not using PET Coating
Powder painting for internal STS materials	Preventing corrosion & rusting issues with powder Coating on the internal STS materials	No powder Coating
STS Bolts for internal	As using STS304 or STS316 bolt/nut with STS316 washer for internal, solve rusting issue.	Using STS 304 Washer for internal
HDG Bolt for external bolt	As using HDG bolt for external bolt, prevent the rusting issue (with Bolt cap)	Using galvanizing Bolt
Epoxy coating on Internal Bolting hole	Epoxy coating on the all internal bolting parts & connection part for preventing corrosion and rusting issue	No Epoxy coating
Using Bolt Cap	As using acetyl cap bolt for roof panel bolts and using bolt cap(PVC) for external bolts, prevent rusting issue.	No using acetyl cap bolt & bolt cap
GRP Roof support	As using GRP Roof support, it is better easy to install tie rod and strong against loading	Using PVC roof support
Water Level indicator	PE clear tube type with Aluminum case	Using clear tube only
Name plate for water tank	It is easy to check the safety management rules with name plate on the water tank	No name plate

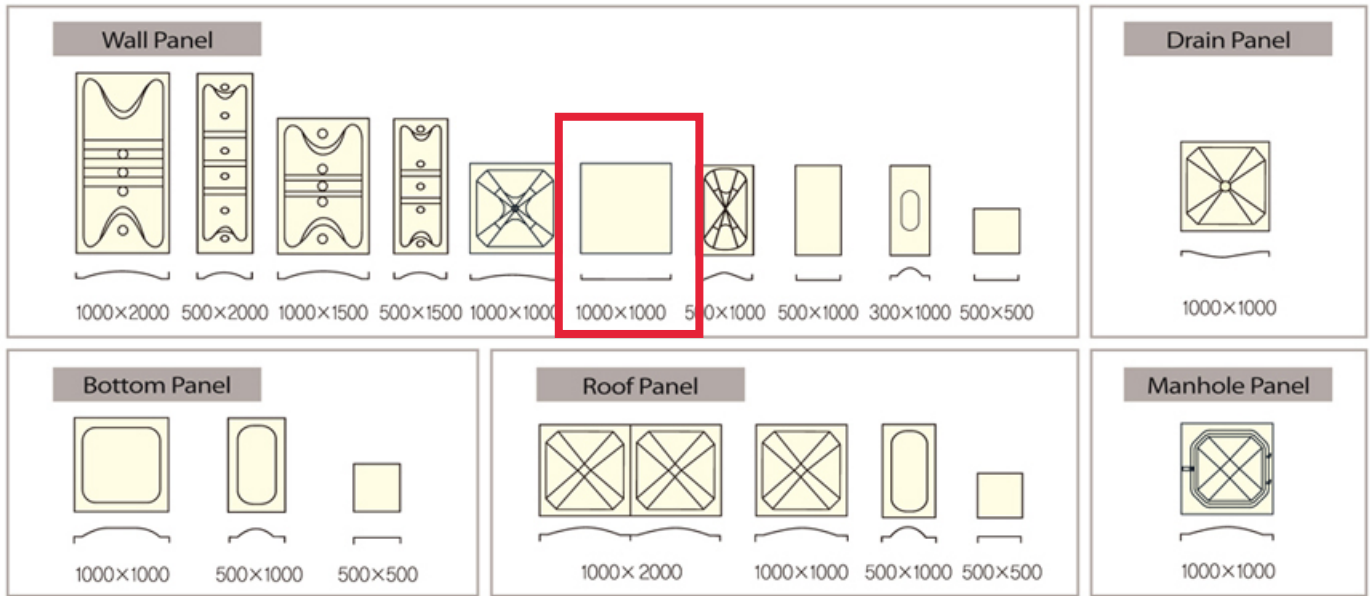


GRP (Raw Material) Stirring Line

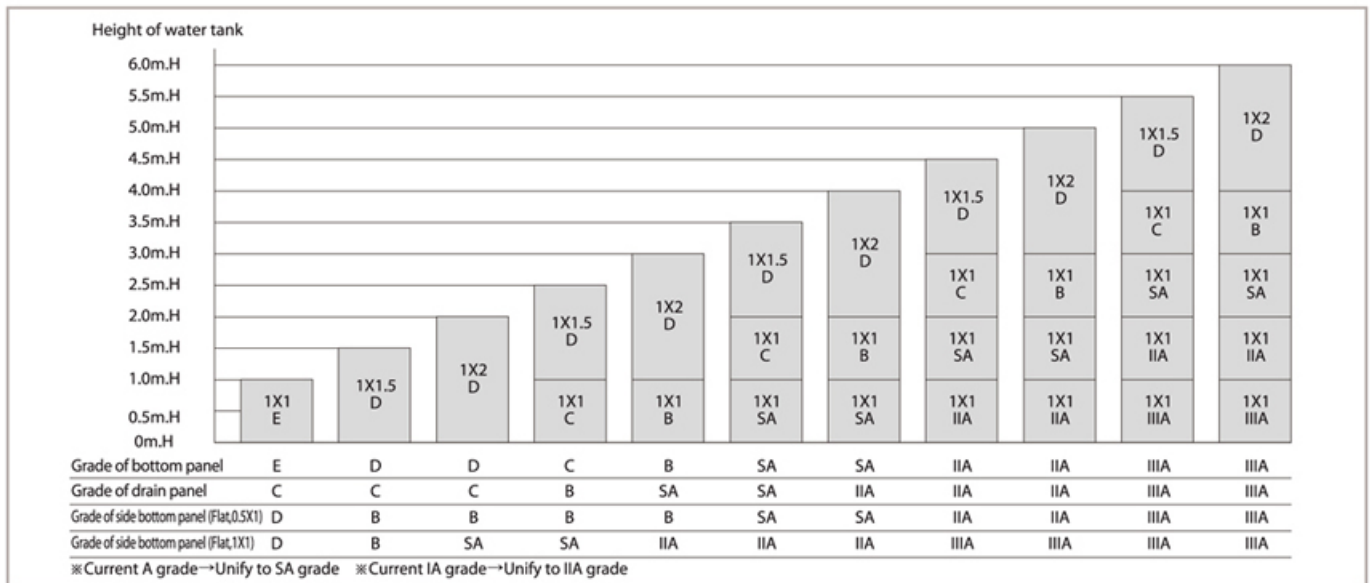


GRP Sheet (Raw Material) Line

## GRP Panel Type and Size



## GRP Panel Composition by Height



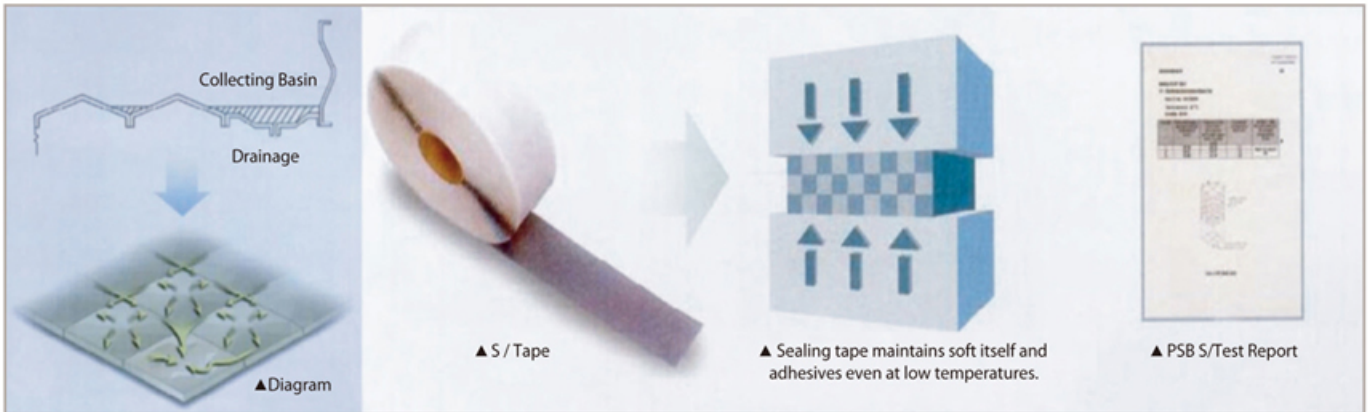
## Panel Physical Properties (KS F 4811 Standard)

item	Unit	Standard	Result	Test Method	Remark
Tensile Strength	MPa	Over 60	91.4	KS F 4811:2016	
Bending Strength	MPa	Over 80	200	KS F 4811:2016	
Elastic modulus in Bending	MPa	Over 6000	15287	KS F 4811:2016	
Glass fiber Content	%	Over 25	31	KS F 4811:2016	
Barcol Hardness	-	Over 30	61	KS F 4811:2016	
Water absorption	%	Below 1.0	0.05	KS F 4811:2016	
Hydrostatic pressure	-	Over 4 times	4 times	KS F 4811:2016	

## Perfect watertight & Drain System

- As using foaming type sealant tape which is excellent water proof & force of restitution, maintains perfect non-leakage of the Water tank. The concave drain panel facilitates complete and quick drainage.

Type of Sealing Tape	Characteristic
Optional Item	EVA+PVC
	Applicable to 50°C
	Butyl+PVC
	Preventing to Stick PVC tape out from GRP Panel



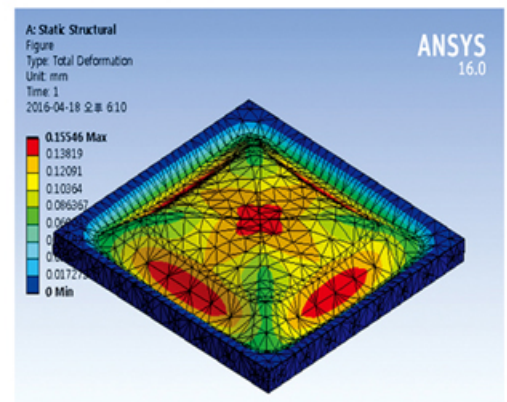
## Strength & Durability of GRP Water Tank

Section	Design Standard
Hydrostatic Pressure	Water pressure reinforcement 4 times standard Transformation rate in filled u with water : Less than 1% form water tank heigh
Wind Force	Less than 60m/sec
Earthquake Force	Stable and safe till magnitude 5.0 (Over magnitude 5.0, it needs additional reinforcement)
Snow load	60Kg/m <sup>2</sup> , Snow fall less than 30cm
Illumination Rate	Less than 0.1%
Out-fit Force	No leakage under condition of vertical 100Kg after install of 100A fitting with 70mm span supprot
Water Temperature	Usable temperature : Less than 30°C / Limited temperature : Max 70°C
Water quality	Tap water, well water : chlorine below 50mg/ℓ Seawater : applicantion Externally Reinforced water tank (max 3m height)

## Stress analysis of GRP Panel

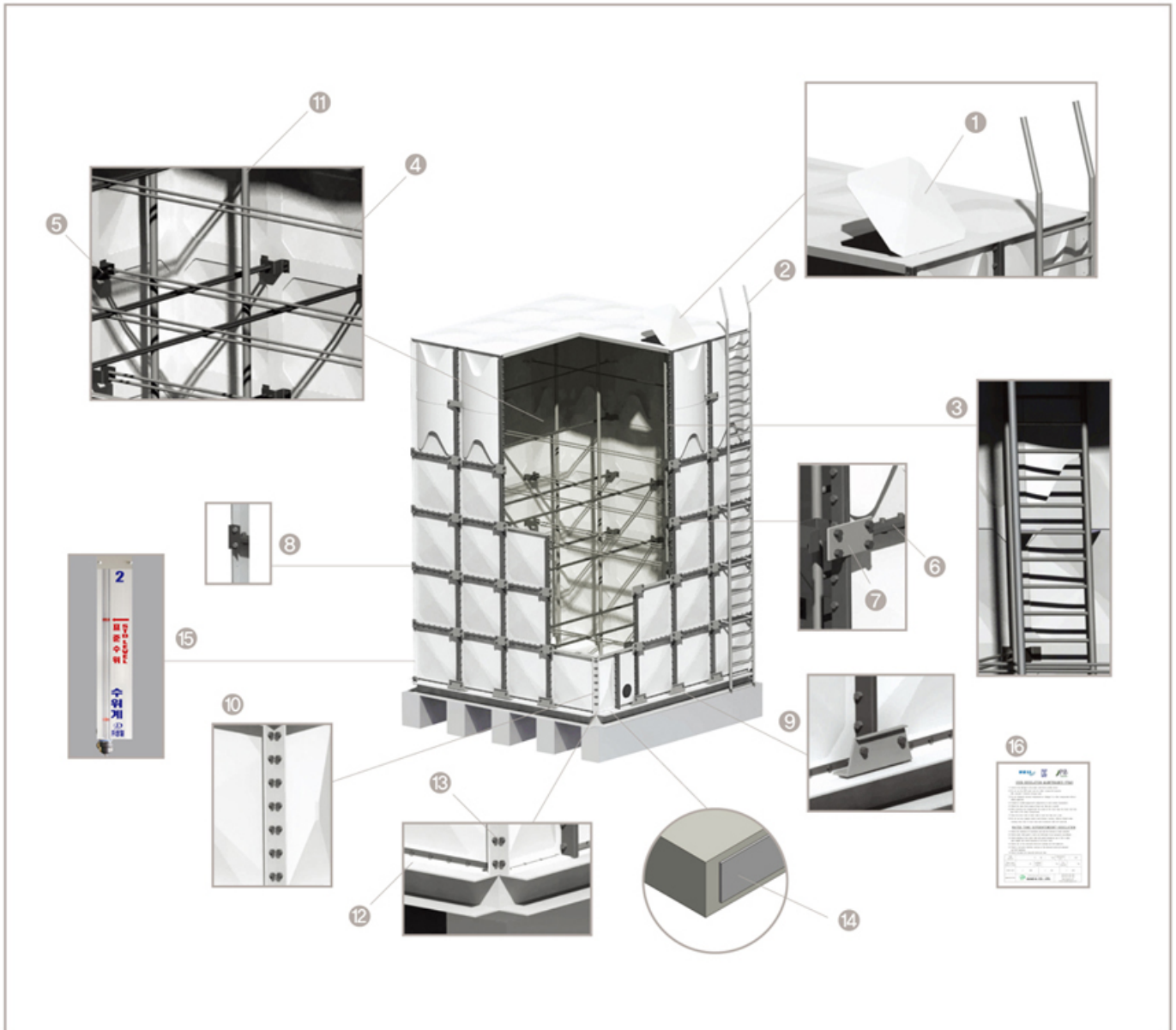
- GRP Water tank panel is designed with special shape for maximizing safety against stress and deformation, so it has better structural strength than normal circle designed panel.

- As GRP Water panel is manufactured by oil-hydraulic press under high temperature and high pressure, it maintains top water pressure strength and there is no dimensional deviation by temperature change.



## Internally Reinforced System

- It is possible that various capacity's design and flexible space should be used by GRP panels standardized
- Excellent watertightness, hygienic conditions and non-leakage applied internally reinforced stay(Stainless)



No.	Name	Material
1.	Manhole panel	GRP
2.	External ladder	SS400(HDG)
3.	Internal ladder	GRP (Pultrusion)
4.	Internal Tie Rod	STS(PET coating), STS 304,316
5.	Internal bracket	STS(Powder coating), STS 304,316
6.	Flange bar, Flat bar	SS400(HDG)
7.	External bracket	
8.	Corner bracket	
9.	Bottom bracket	
10.	Corner frame	

No.	Name	Material
11.	Roof support pipe	GRP(Pultrusion)
12.	Base frame	SS400(HDG)
13.	Bolts and Nuts	Inside STS : Bolt/Nut(304, 316), Washer(316) Roof Panel: acetyl cap bolt(M10) Outside : HDG Bolt + PVC Bolt cap Connection: HDG + Acetyl Cap (M14) Size: M10, M14
14.	Sealing Tape	PVC Sealant + Butyl or EVA Sealant + PVC Sealant
15.	Water Level Gauge	Aluminum Case+PE Clear Tube+Socket
16.	Name Plate	Aluminum(Water Tank Safety Management Instructions)

## Features of Internally Reinforced System

### Excellent Hygienic Conditions

- Internal tie-rod of water tank is coated with PET and internal bracket is coated with powder.
- Internal Bolt for tie-rod and bracket is coated with epoxy after fastening.
- Prevented rust appearance as Chlorine GAS stay through external assembly bolts(HDG) added PVC bolt-caps of water tank.

### Outstanding View

- Prevented white peril or rust appearance through external assembly bolts added bolt-caps of Water Tank, and outstanding view.

### Easy to Assembly

- Easy to assembly through internal and external optimized options of reinforced system.

### Best Structure Stability

- SUNG IL CO., LTD's internally Reinforced System is verified structure stability of water tanks which have built in domestic and international sites for 20years.

- Location : Cheonan Industrial Complex Reservoir
- Size(M):  $34 \times (15+15) \times 5h = 5,100m^3$

The biggest GRP Water Tank in South Korea, installed by SUNG IL



# NSF International

789 N. Dixboro Road, Ann Arbor, MI 48105 USA

RECOGNIZES

## Sung Il Co., Ltd.

Facility: Gyeongsangnam-Do, Korea, Republic of

AS COMPLYING WITH NSF/ANSI/CAN 61 AND ALL APPLICABLE REQUIREMENTS.  
PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE  
AUTHORIZED TO BEAR THE NSF MARK.



ISO/IEC 17095  
Product Certification Body  
#0216

Certification Program  
Accredited by the  
American National  
Standards Institute



Certification Program  
Accredited by the  
Standards Council  
of Canada

This certificate is the property of NSF International and must be returned upon request. This certificate remains valid as long as this client has products in Listing for the referenced standards. For the most current and complete Listing information, please access NSF's website ([www.nsf.org](http://www.nsf.org)).

A handwritten signature in black ink, appearing to read "Theresa Bellish".

January 18, 2021

Certificate# C0538428 - 01

Theresa Bellish

General Manager, Water Systems



# TEST REPORT

15, Jongga-ro, Jung-gu, Ulsan, 44412, Korea

TEL 82-52-220-3000

FAX 82-52-220-3001

Report No : TAK-2020-028660

Receipt Date : 2020.02.18.

Representative : Hong-Gi Sinn, Seong-Jin Kim

Test Completion Date : 2020.03.09.

Company name : SUNG IL CO.,LTD

Address : 20, Gimhae-daero 1031beon-gil, Hallim-myeon, Gimhae-si, Gyeongsangnam-do, Republic of Korea

Sample name : Glass Fiber Reinforced Plastics(GRP water tank)

## Test Results

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Specific Gravity(23 °C/23 °C)(Test Method A)	-	-	1.859	ASTM D792-13
Water Absorption(24 h Immersion)	%	-	0.04	ASTM D570-98(2018)
Tensile Strength(**)	MPa	-	116	ASTM D638-14
Tensile Elastic Modulus(**)	GPa	-	17.8	ASTM D638-14
Flexural Strength(Procedure A)	MPa	-	200	ASTM D790-17
Flexural Modulus of Elasticity(Procedure A)	GPa	-	16	ASTM D790-17
Shear Strength	MPa	-	105	ASTM D732-17
Izod Impact Resistance(Test Method A)(***)	J/m	-	588	ASTM D256-10(2018)
Compressive Strength(****)	MPa	-	169	ASTM D695-15
Barcol Hardness	-	-	54	ASTM D2583-13a
Ignition Loss(Glass fiber content)	%	-	32	ASTM D2584-18(Apply)
Coefficient of linear thermal expansion	$\mu\text{m}/\text{m} \cdot ^\circ\text{C}$	-	17.9	ASTM D696-16(*)
Thermal Conductivity(20 °C)	W/(m · K)	-	0.174	KS L 9016 : 2010(Apply)
Thermal Conductivity[Mean Temperature (20±5) °C],By Means of the Heat Flow Meter Apparatus	W/(m · K)	Insulation	0.024	KS L 9016 : 2010

- Next Page -

*Lim Jongcheol*

Prepared by Lim Jongcheol  
Tel : 052-220-3188

*Ki-Hyeok Chang*

Reviewed by Ki-Hyeok Chang  
Tel : 1577-0091(ARS ①→④)

2020.03.09

## Korea Testing & Research Institute

President



QR Code for forgery





# TEST REPORT

15, Jongga-ro, Jung-gu, Ulsan, 44412, Korea

TEL 82-52-220-3000

FAX 82-52-220-3001

Report No : TAK-2020-028660

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Company name : SUNG IL CO.,LTD

Address : 20, Gimhae-daero 1031beon-gil, Hallim-myeon, Gimhae-si, Gyeongsangnam-do, Republic of Korea

Sample name : Glass Fiber Reinforced Plastics(GRP water tank)

## Test Results

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
-----------	------	--------	--------	-------------

(\*) Temp range : (-30 ~ 30)°C, Heating rate : 1°C/min

(\*\*) Specimen Type : Type I , Speed of Testing : 10 mm/min(Tensile modulus Speed of Testing : 1.0 mm/min)

(\*\*\*) Break Type : Partial Break

(\*\*\*\*) Specimens Size(W×D×H) : 12.6 mm × 12.7 mm × 25.4 mm.

- Usage of Report : QUALITY CONTROL

- Note :
1. The test results of this test report are only limited in to the samples and sample names provided by the client and do not guarantee the quality of all products of the client. You Can check website ([www.ktr.or.kr](http://www.ktr.or.kr)) or QR code to verify the authenticity of the certificate.
  2. This test report shall be used only within the purpose of its defined usage and shall not be used for public relation, advertisement and lawsuit.
  3. This test report is only valid when printed on KTR original report paper with hologram and when re-issued by KTR. The copy and the electronic file of the test report are only for reference.

*Lim Jongcheol*

Prepared by Lim Jongcheol

Tel : 052-220-3188

*Ki-Hyeok Chang*

Reviewed by Ki-Hyeok Chang

Tel : 1577-0091(ARS ①→④)

2020.03.09

# Korea Testing & Research Institute

President



QR Code for forgery



財團法人國家實驗研究院  
國家地震工程研究中心地震模擬實驗室  
National Center for Research on Earthquake Engineering



Testing Laboratory  
1451

台北市辛亥路三段 200 號 200, Sec.3, Hsinhai RD, Taipei, Taiwan  
Tel : 886-2-6630-0888 Fax : 886-2-6630-0858  
<http://www.ncree.org.tw> 統一編號 : 94901073

## Earthquake Simulation Shaking Table Test Report

Report No.: NCREE-LT-TQM-D-T1601  
2009005

Date: May 12, 2010

Test item: Shaking-resistant test for assembly type water storage tank  
Test object : Assembly type water storage tank  
Applicant : Ta Shin F.R.P. Co., Ltd. (Manufacturer : SUNG IL Co.,LTD)  
Address : No.4, Kong-Yeh 2<sup>nd</sup> Road, Jen-Wu Village, Jen-Wu Xiang, Kaohsiung County  
Tel. No.: 07-3713111

The foregoing equipment has been tested by the Laboratory with the results stated in this report. Six (6) pages including the appendix (excluding the cover page) in total, separation use of them will void their validity.



蔣克能

Director of NCREE



財團法人國家實驗研究院  
國家地震工程研究中心地震模擬實驗室  
National Center for Research on Earthquake Engineering

## Instruction to use the Test Report

- 1 A complete copy of this Report shall be used when the Submitting Unit uses this Report; and unless otherwise permitted by the Laboratory, any excerption or reproduction of this Report is not allowed.
- 2 The Test Report refers only to the item tested.
- 3 A Test Report stamped with “Reissued Test Report” will nullify the original Test Report.

Laboratory Manager

(The undersigned of Report)

Quality Manager

Technology Manager



Applicant :Ta Shin F.R.P. Co., Ltd. (Manufacturer : SUNG IL Co.,LTD)  
Date of Test(s) :May 6, 2010  
Item Tested:Assembly type water storage tank(Brand: Ta Shin (SG), Model No.:2.0M x 2.0M x 2.0M, Serial No. : N/A)  
Equipment Used :Tri-Axial Earthquake Simulator System

Preparation for the Test :

- 1 Dimensions of assembly type water storage tank: 2m x 2m x 2m, weight: 720kg Capacity of water storage tank: approximately 6.5 tons at 80% full (Figure 1).
- 2 Used M20 bolts x 16 pieces to retain four (4) sides of foundation for assembly type water storage tank to the shaking table (Figure 2).
- 3 Since the assembly type water storage tank has been filled with water, in order to prevent the overflowing phenomenon from the water inside the tank, the perimeter of shaking table was surrounded by canvas.

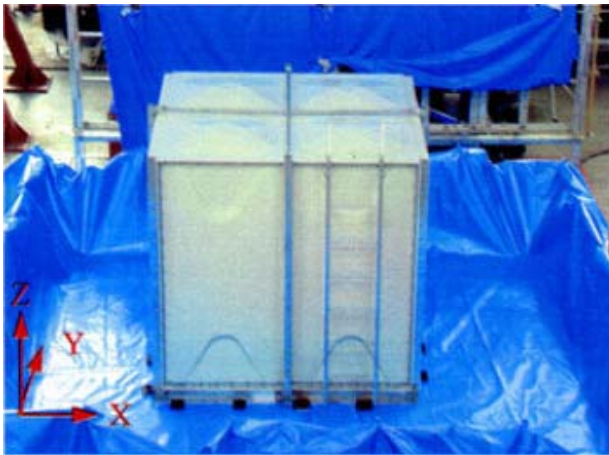


Figure 1: Appearance overview of the assembly type water storage tank

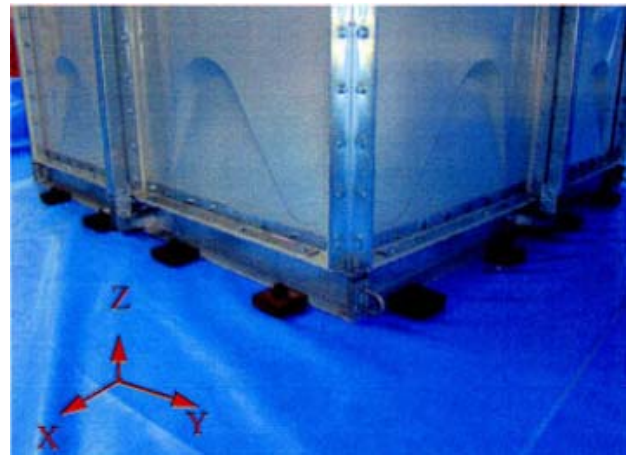


Figure 2: Foundation of the assembly type water storage tank was retained by M20 bolts.

Test method : The test method of earthquake simulation shaking table refers to:  
Earthquake simulation test method is based on:  
921 Chichi devastating earthquake TCU129 measuring station in Taiwan,  
earthquake intensity – magnitude 7, tri-axial test.



財團法人國家實驗研究院  
國家地震工程研究中心地震模擬實驗室  
National Center for Research on Earthquake Engineering

Report No.:NCREE-LT-TQM-D-T2001  
2009005

Test Item :Applied the data of earthquake duration, name, orientation, intensity, testing information collected by TCU129 measuring station at Chichi earthquake in Taiwan as the inputs of test in the following table:

Item	Earthquake-inputting duration	Earthquake-inputting direction/Test-required acceleration (g*)	Intensity**
(1)	Tri-axial earthquake simulation test by simulating the 921 Chichi earthquake in Taiwan (TCU129 measuring station, Nantou Minjian Xiang, Xinjie Elementary School)	X-axial direction shall be up to >0.080g Y-axial direction shall be up to >0.050g Z-axial direction shall be up to >0.027g	5(Strong)
(2)	Tri-axial earthquake simulation test by simulating the 921 Chichi earthquake in Taiwan (TCU129 measuring station, Nantou Minjian Xiang, Xinjie Elementary School)	X-axial direction shall be up to >0.250g Y-axial direction shall be up to >0.155g Z-axial direction shall be up to >0.085g	6 (Severe)
(3)	Tri-axial earthquake simulation test by simulating the 921 Chichi earthquake in Taiwan (TCU129 measuring station, Nantou Minjian Xiang, Xinjie Elementary School)	X-axial direction shall be up to >0.400g Y-axial direction shall be up to >0.248g Z-axial direction shall be up to >0.136g	7(Extreme)
(4)	Tri-axial earthquake simulation test by simulating the 921 Chichi earthquake in Taiwan (TCU129 measuring station, Nantou Minjian Xiang, Xinjie Elementary School)	X-axial direction shall be up to >0.400g Y-axial direction shall be up to >0.248g Z-axial direction shall be up to >0.136g	7 (Extreme)

\*  $1g=9.807m/s^2$

\*\* According to the classification of earthquake intensity promulgated by the Central Weather Bureau of Ministry of Transportation and Communication on August 1, 2000:

Classification of earthquake intensity		Peak Ground Acceleration, PGA
5	Strong earthquake	0.08g~0.25g
6	Severe earthquake	0.25g~0.4g
7	Extreme earthquake	>0.4g

Test method or procedure:

- 1 Perform the tri-axial earthquake simulation test in order according to the test item (1)~(4).
- 2 Standard Operating Procedure of Earthquake Simulation Shaking Table (2008, NCREE)
- 3 Sampling frequency 200Hz was applied to the foregoing tests.

Report No.:NCREE-LT-TQM-D-T2001



Test Results:

- 1 Actually tested data of earthquake duration, name, orientation, intensity, testing information by the shaking table are shown in the following table:

Item	Earthquake-inputting duration	Earthquake-inputting direction/Measured maximum acceleration of each axis (g)	Intensity
(1)	Tri-axial earthquake simulation test by simulating the 921 Chichi earthquake in Taiwan (TCU129 measuring station, Nantou Minjian Xiang, Xinjie Elementary School)	X-axis / 0.234g Y-axis / 0.133g Z-axis / 0.205g	5(Strong)
(2)	Tri-axial earthquake simulation test by simulating the 921 Chichi earthquake in Taiwan (TCU129 measuring station, Nantou Minjian Xiang, Xinjie Elementary School)	X-axis / 0.321g Y-axis / 0.177g Z-axis / 0.120g	6 (Severe)
(3)	Tri-axial earthquake simulation test by simulating the 921 Chichi earthquake in Taiwan (TCU129 measuring station, Nantou Minjian Xiang, Xinjie Elementary School)	X-axis / 0.478g Y-axis / 0.274g Z-axis / 0.167g	7(Extreme)
(4)	Tri-axial earthquake simulation test by simulating the 921 Chichi earthquake in Taiwan (TCU129 measuring station, Nantou Minjian Xiang, Xinjie Elementary School)	X-axis / 0.774g Y-axis / 0.469g Z-axis / 0.291g	7 (Extreme)

- 2 After having taken the assembly type water storage tank to go through the test items (1)~(4) for earthquake simulation test, the results from the tri-axial test in the table are shown in Figure 3 ~ Figure 6 that indicate the ground acceleration of each axis during the earthquake. According to the results, the subject assembly type water storage tank has no visible deformation, damage, water leaking while the bolts that retaining the foundation have no slackening or falling phenomena to the bolts that retain the foundation. .

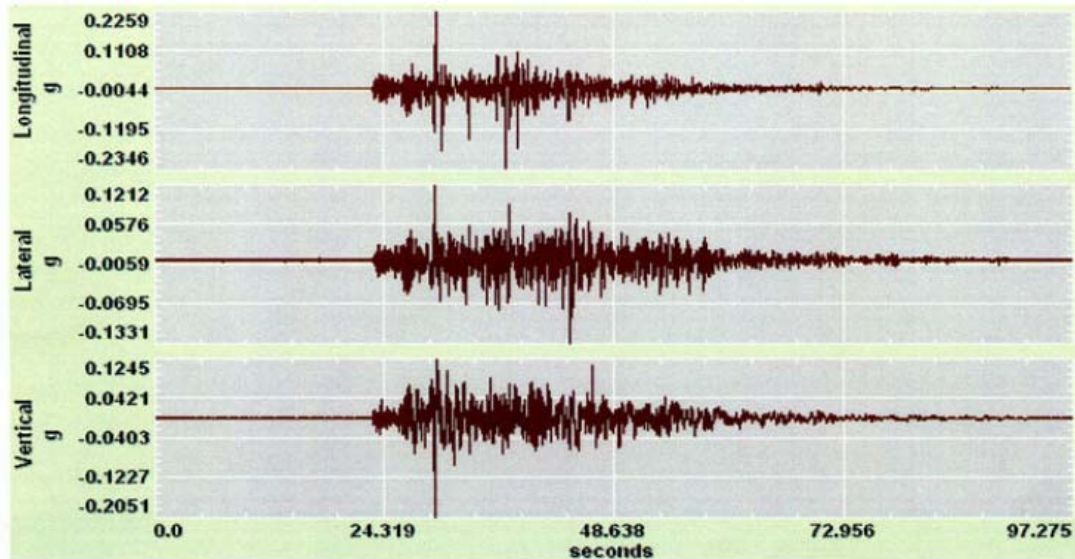


Figure 3:Test item (1):The results are obtained from performing by simulating the earthquake duration of 921 Chichi earthquakes in Taiwan. The maximum accelerations in X, Y and Z directions in the shaking table are 0.234g, 0.133g and 0.205g respectively from top to bottom in the Figure.

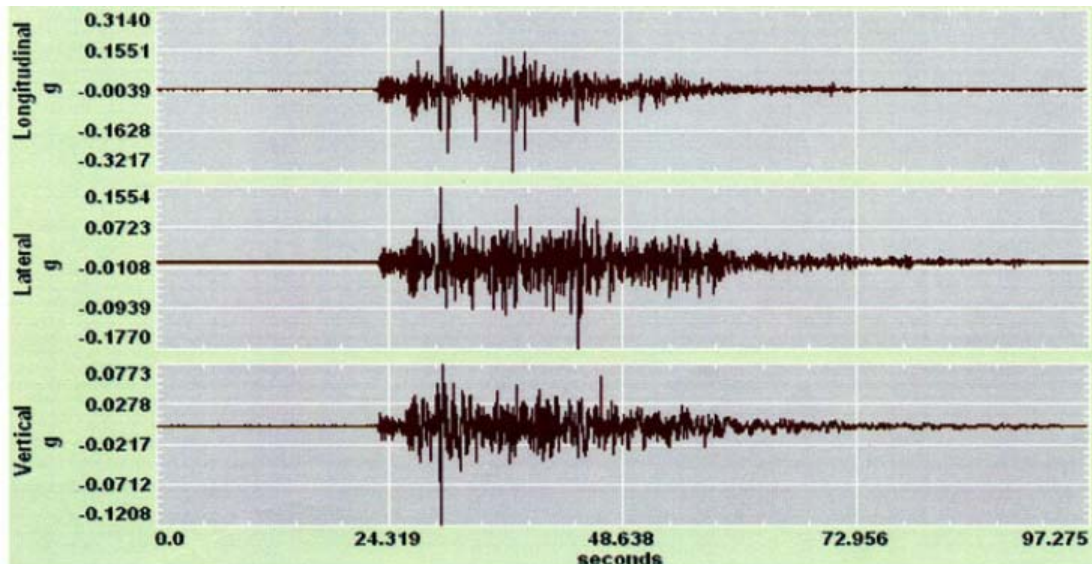


Figure 4:Test item (2):The results are obtained from performing by simulating the earthquake duration of 921 Chichi earthquakes in Taiwan. The maximum accelerations in X, Y and Z directions in the shaking table are 0.321g, 0.177g and 0.120g respectively from top to bottom in the Figure.

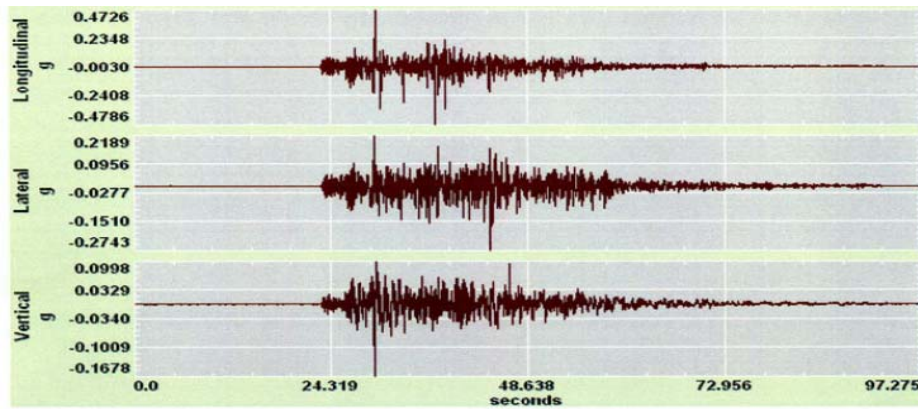


Figure 5:Test item (3):The results are obtained from performing by simulating the earthquake duration of 921 Chichi earthquakes in Taiwan. The maximum accelerations in X, Y and Z directions in the shaking table are 0.478g, 0.274g and 0.167g respectively from top to bottom in the Figure.

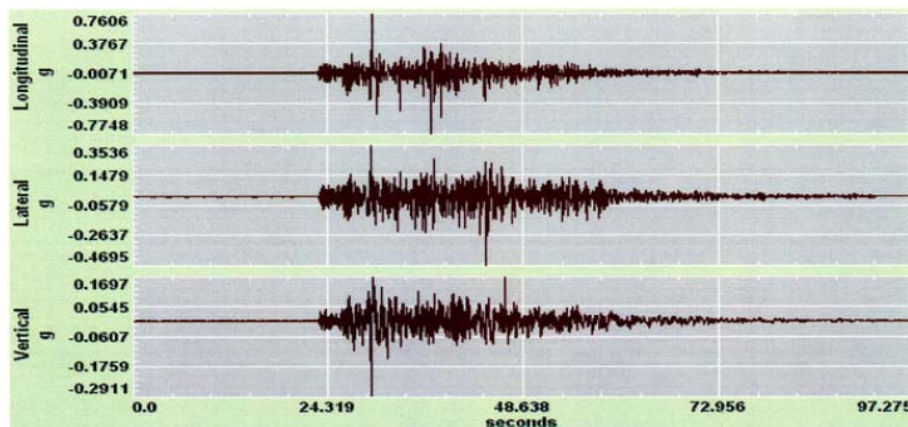


Figure 6:Test item (4):The results are obtained from performing by simulating the earthquake duration of 921 Chichi earthquakes in Taiwan. The maximum accelerations in X, Y and Z directions in the shaking table are 0.774g, 0.469g and 0.291g respectively from top to bottom in the Figure.

Descriptions:

- 1 Unless otherwise agreed by the Center, the Applicant shall not apply the experimental results to thereof signs of commercial advertisement, evidences of litigation, etc. Any violation in this regard will be filed a lawsuit according to the laws. Anyone that damages the reputation of the Center will be claimed a compensation for damage.
- 2 The contents of Test Report refer only to the items and objects tested. The Applicant shall not extend to rephrase the interpretation from the experimental results by citing "Passed the test of National Center for Research on Earthquake Engineering" or "Certified by the National Center for Research on Earthquake Engineering".





Head Office View



– GRP Building Materials Company –

**SUNG IL CO., LTD.**

20, Gimhae-daero 1031 Beon-gil, Hallim-myeon,  
Gimhae-si, Gyeongsangnam-do, Korea  
Tel.82-55-346-1490~6 Fax.82-55-346-1498  
Homepage : [www.sungilgrp.co.kr](http://www.sungilgrp.co.kr)  
E-mail : [sungil@sungilgrp.co.kr](mailto:sungil@sungilgrp.co.kr)

# 22" HINGED MANWAYS

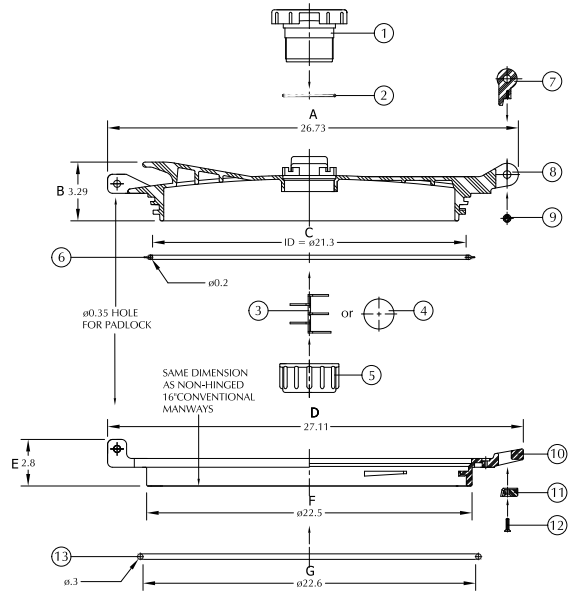
## FEATURES

- Locking feature designed to accept Padlocks for tampering prevention
- Excellent venting performance. Available with two venting options: Anti-splash Baffle (standard) or Ball Check valve
- Liquid tight seal for splash resistance
- One piece molded construction allows for easy use and minimum assembly parts for failure or replacement
- Grooved profiled handles for easy turning of lid for opening and closing
- Closed version also available



## DURABLE CONSTRUCTION

- Approximately 1KG heavier than our competitor's
- Made from copolymer polypropylene resin with excellent cold weather impact resistance (Up to -40°C or -40°F)
- Excellent U.V resistance



## SPECIFICATIONS

DIMENSION	A	B	C	D	E	F	G
INCHES	26.73	3.29	21.3	27.11	2.8	22.5	22.6

ITEM	PART #	DESCRIPTION	MATERIAL
1	KF15902HM5V-B	3-1/2" VENT BODY*	P.P.
2	KF15902HM5CV-E50	#568-238 O-RING FOR 22" HINGED MAN-WAY LID*	EPDM
3	KF15902HM5V-BF	3-1/2" VENT BAFFLE*	P.P.
4	PP70	2-3/4" BALL FOR 2" VALVE*	P.P.
5	KF15902HM5V-C	3-1/2" VENT CAP*	P.P.
6	KF15902HM5L-E50	22" HINGED MAN-WAY GASKET	EPDM
7	KF15902HM5H-B	22" HINGED MAN-WAY LID HINGE BODY	P.P.
8	KF15902HM5L	22" HINGED MAN-WAY OPEN LID*	P.P.
	KF15902HM4L	22" HINGED MAN-WAY CLOSED LID	P.P.
9	KF15902HM5H-P	22" HINGED MAN-WAY LID HINGE PIN	P.P.
10	KF15902HMR456	22" HINGED MAN-WAY RIM	P.P.
11	KF15902HM5H-BR	22" HINGED MAN-WAY LID HINGE BODY RETAINER	P.P.
12	KF15902HM5H-S	3.5MM SELF TAPPING COUNTERSUNK SCREWS	STAINLESS STEEL
13	KF15902HMR456-E50	22" HINGED MAN-WAY RIM SPONGE O-RING	NEOPRENE SPONGE

\* : Available only on vented version - KF15902HM5

PART #	DESCRIPTION
KF15902HM5	22" PP BLACK HINGED MAN-WAY WITH RING, GASKET & VENT
KF15902HM4	22" PP BLACK HINGED MAN-WAY WITH RING

# AiraGlass™ Biotrickling Filter Media

AiraGlass biotrickling filter media is designed for the treatment of high levels of hydrogen sulfide (H<sub>2</sub>S), and other select odorous compounds. It is manufactured from post-consumer recycled glass.

## Advantages

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Inert

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Acid resistant

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Lightweight

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High strength

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Rigid

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Long life

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High surface area

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## Specifications

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Weight (dry): <13 lb/ft<sup>3</sup>

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Surface Area: 0.026 m<sup>2</sup>/g

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Compressive Strength: <2,900 psi

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Design Differential: 0.125" per foot of media

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Packaging: 50ft<sup>3</sup> bulk bags

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Typical EBRT: 10-20 seconds (project specific)

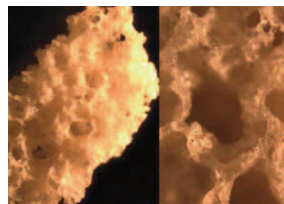
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Typical Face Velocity: 20-70 fpm

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Foamed Glass Media



Media Detail

Media is manufactured in the USA



# AiraGlass Media

## Safety Data Sheet

### Section 1 - Identification

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**Product Identification:** AiraGlass Biotrickling Filter Media

**Product Use:** Biological air treatment

**Supplier:** Anua  
4106 Bernau Ave  
Greensboro, NC 27407

**Telephone:** 336-547-9338

### Section 2 - Hazard(s) Identification

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**Hazard Classification:** NA

**Signal Word:** NA

**Hazard Statement:** NA

**Hazard Pictogram:** NA

**Precautionary Statements:** NA

### Section 3 - Composition/Information on Ingredients

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Contains no hazardous ingredients at levels requiring disclosure by the OSHA Hazard Communication Standard

### Section 4 - First Aid Measures

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Route(s) of Exposure	Symptoms	First Aid
Skin	May cause skin irritation. Skin abrasion or scratches.	Take off contaminated clothing, Wash skin with plenty of water.
Eye	Direct contact with eyes is likely to be irritating. Irritating to eyes.	Immediately flush eyes thoroughly with water for at least 15 minutes, Remove contact lenses, if present and easy to do. Continue rinsing.
Ingestion	May cause gastrointestinal irritation	Rinse mouth, Do NOT induce vomiting, get medical advice/attention if you feel unwell.
Inhaled	May cause respiratory irritation.	Remove person to fresh air and keep at rest in a position comfortable for breathing.

## Section 5 - Fire-Fighting Measures

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<b>Suitable Extinguishing Media:</b>	Use media suitable for surrounding the fire.
<b>Unsuitable Media:</b>	None
<b>Unusual fire &amp; explosion hazards:</b>	None
<b>Special Firefighting procedures:</b>	Exercise caution when responding to any fire. Firefighters should wear full protective gear.

## Section 6 - Accidental Release Measures

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<b>Personal Precautions:</b>	Wear protective equipment
<b>General precautions:</b>	Avoid contact with eyes.

## Section 7 - Handling and Storage

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<b>Safe Handling:</b>	Do not handle until all safety precautions have been read and understood. Do not get in eyes, on skin, or on clothing. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Avoid dust formation.
<b>Safe Storage:</b>	Store in a dry place.

## Section 8 - Exposure Controls/Personal Protection

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<b>Engineering Guidelines:</b>	Local exhaust and general ventilation to meet exposure standards. Gloves,
<b>Personal Protective Equipment:</b>	Safety glasses, work clothes, dust mask as determined appropriate.
<b>General Hygiene:</b>	Wash hands after handling

## Section 9 - Physical and Chemical Properties

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<b>Physical State</b>	Solid	<b>LEL</b>	NA
<b>Boiling point</b>	NA	<b>pH</b>	7-8 (before prep.)
<b>Appearance</b>	Solid	<b>Vapor Density</b>	NA
<b>Flash Point</b>	Non Flammable	<b>Relative Density</b>	0.2-0.24 g/cm <sup>3</sup>
<b>Color</b>	White	<b>Partition Coefficient:</b>	NA
<b>Evaporation Rate</b>	NA	<b>Melting Point</b>	NA
<b>Odor</b>	None	<b>Auto ignition Temperature</b>	NA
<b>Flammability (solid/gas) C</b>	Non Flammable	<b>Freezing Point</b>	NA

## Section 9 - Physical and Chemical Properties Cont.

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<b>Odor Threshold</b>	None	<b>Decomposition Temperature</b>	NA
<b>UEL</b>	NA	<b>Solubility</b>	Insoluble
<b>Vapor Pressure</b>	NA	<b>Viscosity</b>	NA

## Section 10 - Stability and Reactivity

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<b>Incompatibility:</b>	None
<b>Chemical Stability:</b>	Yes
<b>Conditions to Avoid:</b>	None
<b>Materials to Avoid:</b>	None

## Section 11 - Toxicological Information

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### ACUTE EFFECTS:

<b>Ingestion</b>	See Section IV
<b>Eye Irritation</b>	See Section IV
<b>Skin Irritation</b>	See Section IV
<b>Sensitization</b>	Not Determined
<b>Signs and Symptoms of Exposure</b>	Irritation and redness of the eyes and/or skin.

### CHRONIC EFFECTS:

<b>Carcinogenicity</b>	Not Classified
<b>Mutagenicity</b>	Not Classified
<b>Reproduction Effects</b>	Not Classified
<b>Developmental Factors</b>	Not Classified

## Section 12 - Ecological Information

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<b>Ecotoxicity</b>	No additional information available
<b>Persistence/Degradability</b>	The product is not biodegradable
<b>Bioaccumulation Potential</b>	This material is not expected to bioaccumulate.
<b>Mobility in Soil</b>	Not Determined
<b>Other Adverse Effects</b>	Not Determined

## **Section 13 - Disposal Considerations**

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Obtain the consent of pollution control authorities before discharging to wastewater treatment plants. Dispose in a safe manner in accordance with local/national regulations. Avoid release to aquatic environment as sediment. Refer to manufacturer or supplier for information on recovery or recycling.

## **Section 14 - Transport Information**

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**UN Number:** Not applicable

**UN Name:** Not applicable

Ship in accordance with DOT/ADR/RID/ADNR/IMDP/ICAO/IATA

## **Section 15 - Regulatory Information**

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**SARA Section 311/312 Hazard Classes** None

All chemical substances in this product are listed in the EPA (Environment Protection Agency) TSCA (Toxic Substances Control Act) Inventory or are exempt

## **Section 16 - Other Information**

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The information and recommendations listed are believed to be true and accurate to the best of our knowledge as of the prepared date. Anua makes no warranty with respect to same and disclaims all liability for reliance therein.

# AiraCarb™-HC Activated Carbon Media

AiraCarb-HC activated carbon media is designed for the treatment of hydrogen sulfide (H<sub>2</sub>S) and other odorous compounds in vapor phase applications. It has a high capacity for H<sub>2</sub>S, which greatly extends the life of the carbon in municipal odor control applications.

## Advantages

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Highly active wood-based carbon

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High surface area

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High density

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Low differential pressure

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Superior hardness

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## Specifications

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Weight (dry): 27-29 lb/ft<sup>3</sup>

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Differential Pressure:

- 1" per foot of media at 45FPM face velocity
- 

Packaging: 50ft<sup>3</sup> bulk bags, or 1ft<sup>3</sup> boxes

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H<sub>2</sub>S capacity (min. g/cc): 0.3

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Particle Size: 4mm pellet

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Hardness (min): 97.0

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Typical Face Velocity: 20-70 fpm

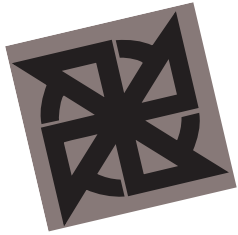
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Activated Carbon Media

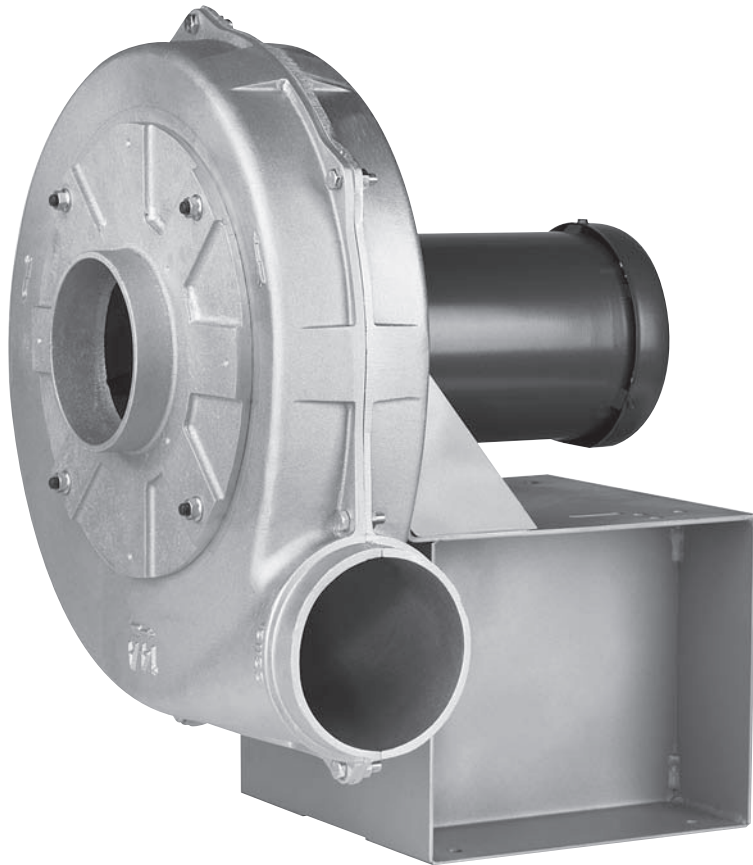






# cincinnati fan

OEM and Industrial Air Handling Specialist



## PB SERIES

## CAST ALUMINUM PRESSURE BLOWERS

7697 Snider Road, Mason, OH 45040-9135

Telephone: 513-573-0600

Visit us at [www.cincinnati-fan.com](http://www.cincinnati-fan.com) for more information.

Cat. No. PB-0811  
Supersedes PB-1206



# Cincinnati Fan

## A Company That Stands Behind Its Product

Since the founding of **Cincinnati Fan** in 1956, the company's mission has been to provide quality products at competitive prices, backed by dependable service.

This mission is carried out by specializing in the market for industrial air handling products up to 125 HP. But specialization does not mean the product line is small. **Cincinnati Fan** offers a wide variety of standard and customized products, production flexibility, and customer responsiveness.

**Cincinnati Fan** has over 170 experienced sales engineers across the U.S. and Canada ready to serve your air handling needs.

**Cincinnati Fan** can provide:

- Technical evaluation for correct performance conditions.
- Review of air stream and ambient conditions that require special attention.
- Selection of proper components to meet required design specifications.
- Selection of proper accessories.

**Cincinnati Fan** operates in a modern facility specifically designed for world class manufacturing enabling us to build standard products to order, including accessories, and ship within 5 to 10 working days.

With support like this, you can be sure your **Cincinnati Fan** product will be well-built and will provide maximum dependability and longevity.

Visit us at [www.cincinnati-fan.com](http://www.cincinnati-fan.com) for more information.



## FEATURES/BENEFITS OF CAST ALUMINUM

*Cincinnati Cast Aluminum Blowers are a smart buy now and for many years to come because aluminum is:*

### **NON-SPARKING**

Cincinnati Cast Aluminum Blowers are AMCA Type B spark resistant. With the addition of a non-sparking shaft, they meet AMCA Type A requirements. See Page 5.

### **CORROSION-FREE**

No painting required. Maintenance free in moist environments.

### **LIGHTWEIGHT**

Aluminum is 1/3 the weight of steel and, therefore, less structural support is required.

### **NON-TOXIC**

Aluminum is friendly to foods, beverages and medicines. Cast Aluminum Blowers are used in many food processing applications where cleanliness is important.

### **STRONG**

Aluminum's strength is exhibited in products such as high-way guard rails, truck trailers and baseball bats. In high speed blower wheels, aluminum is alloyed with magnesium and other metals for greater strength.

### **ATTRACTIVE**

Aluminum's natural appearance is desirable. No other metal accepts a greater variety of finishes. It can be brushed, buffed, colored by anodizing and has excellent paint adhesion.

### **NON-MAGNETIC**

Resists magnetism even in magnetic fields making it ideal in electronic applications where prevention of interference is very important.

### **WORKABLE**

Aluminum can be machined by every known metal working process. This makes future modifications easier.

### **NOT AFFECTED BY COLD**

Unlike many materials that become brittle when super cold, aluminum alloys can actually become stronger. Cast aluminum blowers are used in many sub-zero applications.

### **AVAILABLE**

Approximately eight percent of the earth's crust contains aluminum, making it the most common metal on earth.

## SUGGESTED SPECIFICATIONS FOR CAST ALUMINUM BLOWERS

Blowers shall be cast with commercial grade 319 cast aluminum, having a 3/16" minimum wall thickness. Housing halves should be attached with tapered lugs having a minimum 45 degree taper from centerline for additional strength. Inlets and outlets shall be round for convenient slip fit of duct work or hose. Blower sizes 14A and larger shall have a reversible housing that is rotatable. Blowers shall be AMCA type B spark resistant or better. Blower performance shall be derived from data as tested per AMCA Standard 210.

Blower wheels with tip speeds up to 13,000 feet per minute shall be 319 cast aluminum. Blower wheels with tip speeds over 13,000 feet per minute shall be 356 aluminum with a T6 heat treatment. Wheel hub shall be an integral part of the wheel casting. Wheels shall be locked onto the motor or fan shaft with two, knurled, cup point set screws with a locking patch or nylon insert. Set screws shall be 90° – 120° apart with one over shaft keyway. Up to 13" diameter wheels shall have 5/16-18 set screws torqued to 165 inch pounds. Wheels over 13" in diameter shall have 3/8-16 set screws torqued to 228 inch pounds.

Balancing shall be accomplished by removal of material only – no additional weights are to be used in the

balancing process. Wheel diameters up to 13" shall be statically balanced. Wheel diameters above 13" shall be dynamically balanced.

Fan motor and bearing cap vibration levels shall not exceed 1.5 mils displacement at 3450 RPM.

All fan bases shall be a minimum of 12 gauge steel.

All motors shall be continuous duty type.

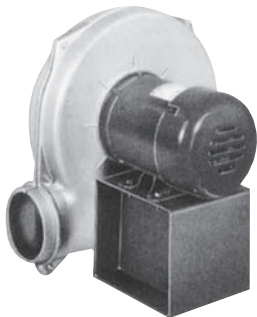
Inlet or outlet flanges (if required) shall be 319 cast aluminum and shall meet ANSI bolt circle and outside diameter dimensions (see dimensions on page 21).

### **DANGER**

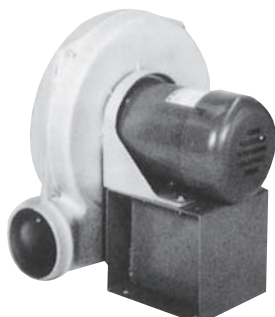
All fans & blowers shown have rotating parts and pinch points. Severe personal injury can result if operated without guards. Stay away from rotating equipment unless it is disconnected from its power source.

Read operating instructions.

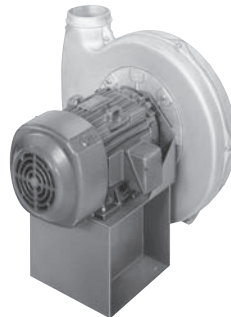
## 9 STANDARD ARRANGEMENTS



**Arrangement 4**  
(Foot & flange motor)



**Arrangement 4**  
(Flange mount-footless motor)



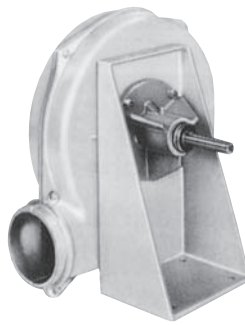
**Arrangement 4**  
(Foot mounted motor)



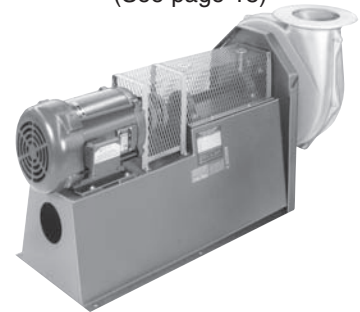
**Arrangement 4HM**  
(Horizontal mount)  
(See page 18)



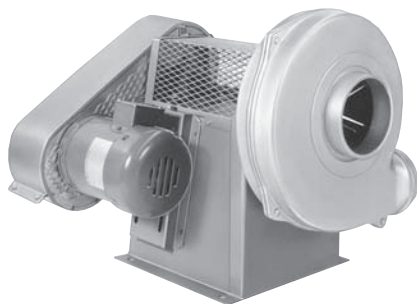
**Arrangement 1**



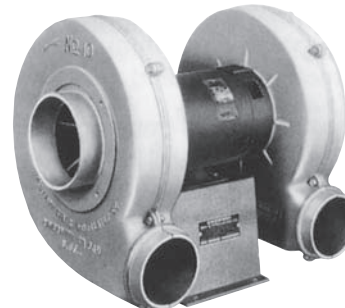
**Arrangement 2**



**Arrangement 8**  
(Shaft/coupling guard standard)

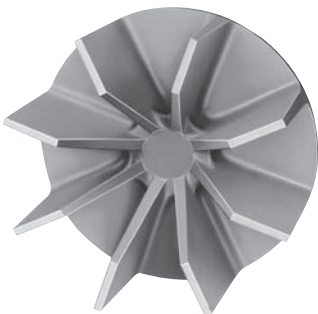


**Arrangement 9**  
(Belt guard standard. Shaft guard optional.)

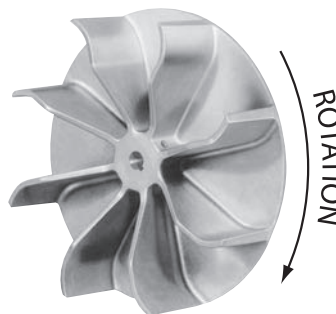


**Arrangement 4D**  
(Double blower unit)

## BLOWER WHEELS



**CAST ALUMINUM RADIAL**



**CAST ALUMINUM B.C.**  
(Backward Curve)



**OPTIONAL FABRICATED  
STEEL or STAINLESS STEEL**  
(Not available in B.C.)

All wheels have two set screws, 90°-120° apart, with one being over keyway. Up to 13" diameter wheels are dynamically, single plane balanced. Wheels over 13" in diameter are dynamically, 2 plane balanced. Use steel wheel for high abrasive or high temperature application above 200°F. (93° C). Stainless steel or coated wheels should be used in corrosive environments.



# FAN SELECTION And PERFORMANCE

Your Representative:  
Jonathan T. Todd  
Todd Air Solutions  
PO Box 4245  
Salisbury NC 28145  
(704) 630-1101 Phone  
(704) 630-0528 Fax  
jtodd@toddas.com

Friday, April 8, 2022

Job Name: ANUA INTERNATIONAL LLC  
Reference: Jefferson, GA Project Quote: 464277

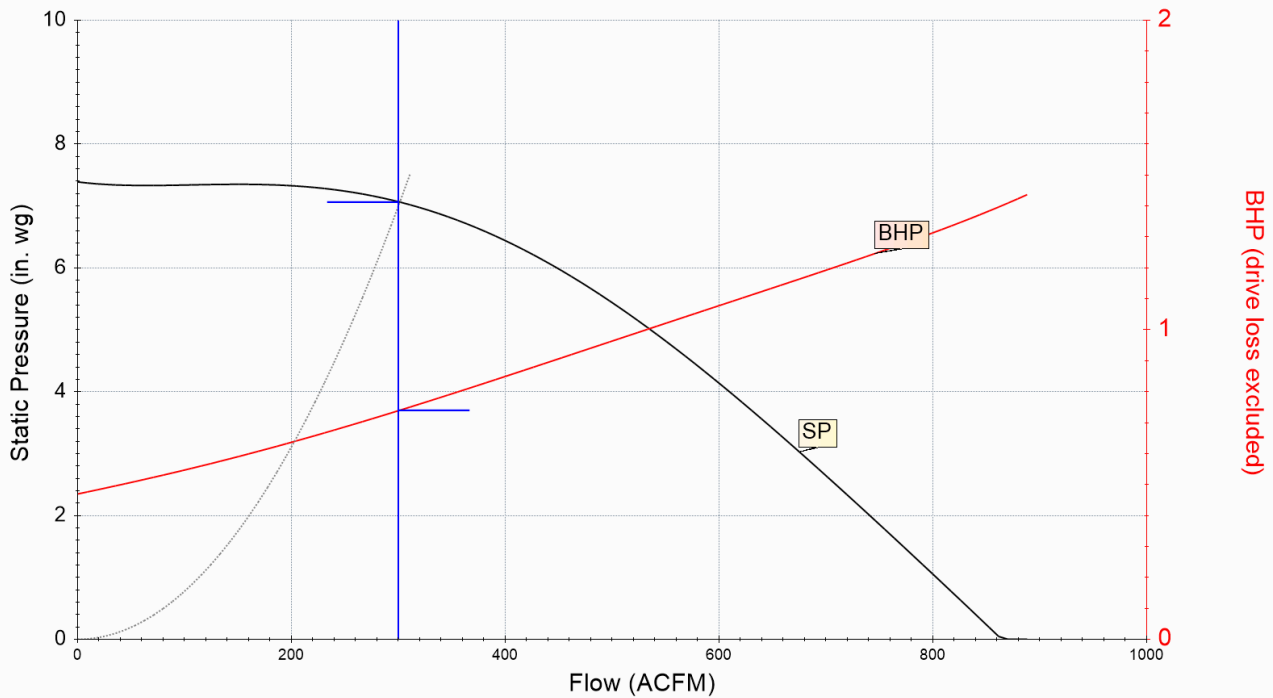
## Operating Requirements

Volume, ACFM	300
SP, in. wg {with Accessories}	7.0 {7.052}
Density, lb./ft. <sup>3</sup>	0.0729
Operating Temperature, °F	70
Site Altitude, Feet ASL	751
AMCA Arrangement No.	4
Motor Frequency, Hz	60
Start-Up Temperature, °F	70

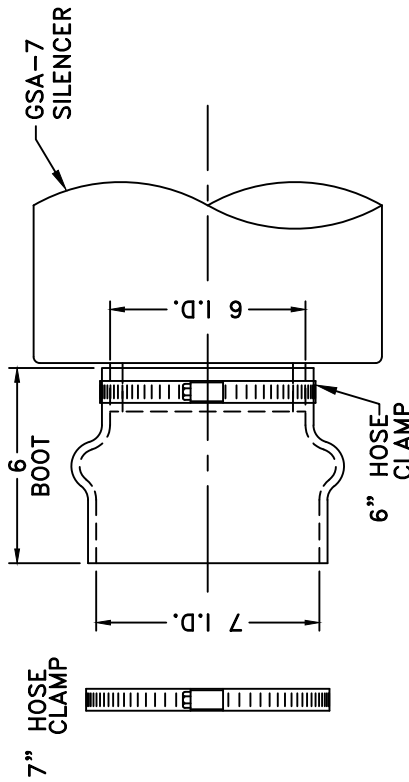
## Fan Selection and Specifications

Model	PB-10A	
Fan RPM	3,450	
Wheel Description	10-5/8 X 2-5/8 Radial	
Wheel Width, %	100%	
Wheel Diameter, in.	10.63	
Inlet Diameter, in.	6.00	
Outlet Velocity, ft./min.	2,209	
Fan BHP	0.74	Suggested Motor HP: 0.75
Static Efficiency, %	45.6%	
Cold Start BHP	0.74	
Construction Class	N/A	

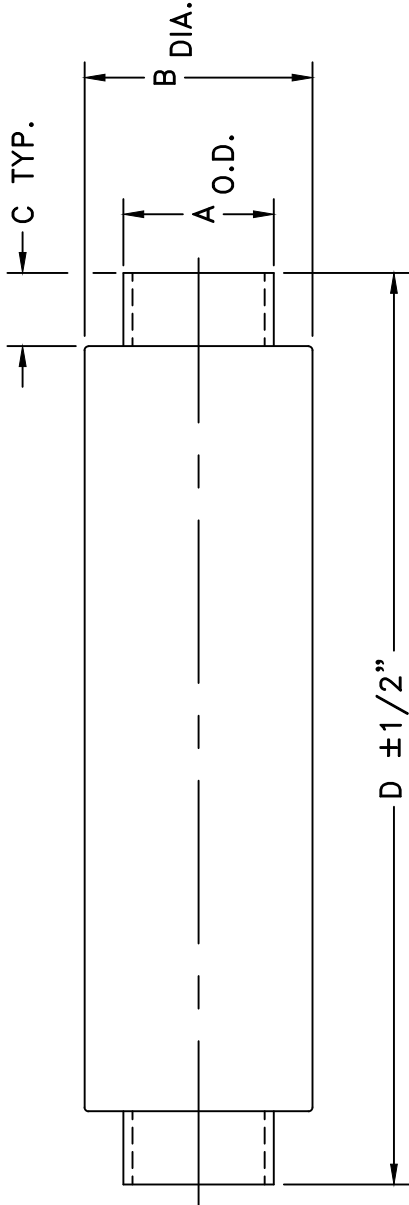
Cincinnati Fan PB-10A 10-5/8 X 2-5/8 Radial Wheel (Full Width) @ 3,450 RPM, GSA-5 Attenuator  
Rating Point: 300 ACFM @ 7.0 in. wg SP, 0.0729 lb./ft.<sup>3</sup> Density, 0.74 BHP, 6.0 in. Inlet



GSA-7 MODEL ONLY



7" BOOT KIT (STANDARD) - 1 END



GSA SOUND ATTENUATOR


- NOTES:
1. MAXIMUM STATIC PRESSURE: 20 IN. WG.
  2. MAXIMUM TEMPERATURE: 200 DEGREES F.
  - \* 3. GSA-7 WEIGHT INCLUDES 6 INCH TO 7 INCH BOOT WEIGHT.

MODEL NO.	SILENCER SIZE	A O.D.	B DIA.	C	D	WT. (LBS.)*
GSA-4	4	4	7-7/8	2-1/4	28-1/2	10
GSA-5	5	5	8-7/8	2-1/4	28-7/8	11
GSA-6	6	6	9-7/8	1-3/8	26-1/8	12
GSA-7	6	6	9-7/8	1-3/8	26-1/8	14
GSA-8	8	8	11-7/8	2-3/4	29-3/4	16
GSA-10	10	10	14	2-1/4	39-5/8	26

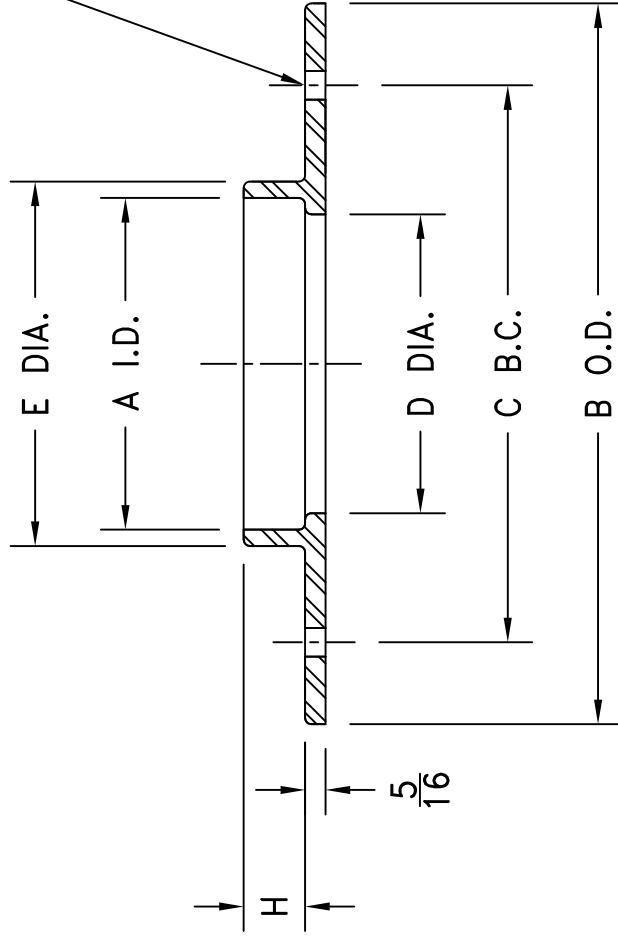
<p>TOLERANCES: ALL DIMENSIONS IN INCHES                  ANGLES: ± 1°                  FRACTIONS ± 1/8</p>	<p>SUPERSEDES:</p>	<p>CERTIFIED DRAWING</p>	<p>TITLE GALVANIZED STEEL SOUND ATTENUATORS (GSA SERIES) &amp; BOOT KIT</p>	<p>DRAWING NO. <b>A</b> GSA</p>	<p>REV. <b>2</b></p>
				<p>7697 SNIDER ROAD MASON, OHIO 45040</p>	

INSERTION LOSS (dB)

	OCTAVE BAND CENTER FREQUENCY, HZ							
MODEL	125	250	500	1K	2K	4K	8K	
GSA-4	8	14	26	34	41	45	25	
GSA-5	6	12	22	28	37	38	22	
GSA-6	5	10	18	23	33	30	19	
GSA-8	4	9	17	22	29	25	18	
GSA-10	6	11	21	27	39	25	19	

		 <b>Cincinnati fan</b> 7697 SNIDER ROAD MASON, OHIO 45040	
TOLERANCES: FRACTIONS ± 1/16 ANGLES: ± 1° DECIMALS: X.XXX = ±0.005 X.XX = ±0.060 X.X = ±0.120 ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED		SCALE: NONE DATE: 5/9/13 DR. BY: JH CHK. BY:	TITLE GSA SILENCER INSERTION LOSS DATA
SUPERSEDES: SIMILAR TO:		MATERIAL:	
CERTIFIED BY:		ASSEMBLY:	
NO.	DESCRIPTION	DATE	INITIALS
REVISIONS			
DRAWING NO. A GSA-1		SHEET REV. 1 of 1	

(G) 7/16 DIA. HOLES  
(SEE NOTES)



A I.D.	B O.D.	C B.C.	D DIA.	E DIA.	H	G QTY.
4 1/16	9	7 1/2	3 11/16	9 9/16	15 15/16	4
5 1/16	11	8 1/2	4 9/16	5 9/16	15 15/16	4
6 1/16	11	9 1/2	5 1/2	6 9/16	1 1/16	4
7 1/16	11	9	6 7/16	7 11/16	15 15/16	8
8 1/16	13 1/2	11 3/4	7 1/2	8 5/8	1	8
10 1/16	16	14 1/4	9 11/16	10 9/16	1	8

NOTES:

STANDARD FLANGES PROVIDED WITHOUT HOLES.

OPTIONS:

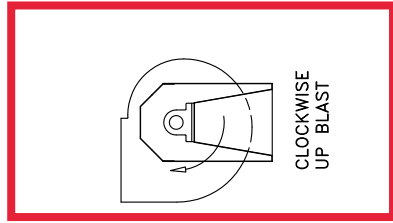
- HOLES PROVIDED, ON VERTICAL CENTERLINE (CFV STANDARD LOCATION)
- HOLES PROVIDED, STRADDLING CENTERLINE

TOLERANCES:

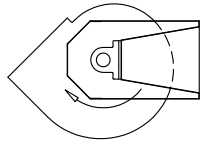
CAST DIMENSIONS (A, B, D, E, H) ±3/32  
MACHINED DIMENSIONS (C, FLANGE HOLE DIA.) ±1/16



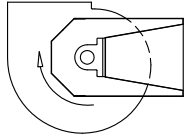
CLOCKWISE ROTATION



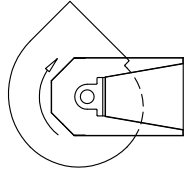
CLOCKWISE  
UP BLAST



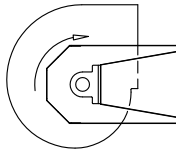
CLOCKWISE  
TOP ANGULAR UP



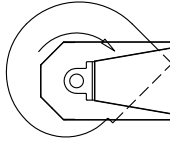
CLOCKWISE  
TOP HORIZONTAL



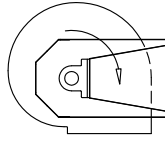
CLOCKWISE  
TOP ANGULAR DOWN



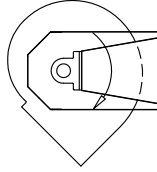
CLOCKWISE  
DOWN BLAST



CLOCKWISE  
BOTTOM ANGULAR DOWN

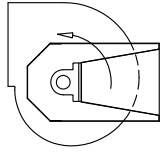


CLOCKWISE  
BOTTOM HORIZONTAL

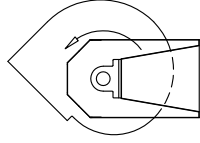


CLOCKWISE  
BOTTOM ANGULAR UP

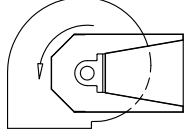
COUNTERCLOCKWISE ROTATION



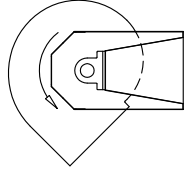
COUNTERCLOCKWISE  
UP BLAST



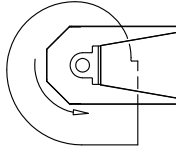
COUNTERCLOCKWISE  
TOP ANGULAR UP



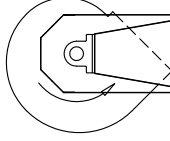
COUNTERCLOCKWISE  
TOP HORIZONTAL



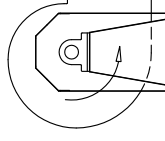
COUNTERCLOCKWISE  
TOP ANGULAR DOWN



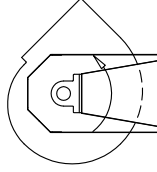
COUNTERCLOCKWISE  
DOWN BLAST



COUNTERCLOCKWISE  
BOTTOM ANGULAR DOWN



COUNTERCLOCKWISE  
BOTTOM HORIZONTAL



COUNTERCLOCKWISE  
BOTTOM ANGULAR UP

NOTES:

1. DIRECTION OF ROTATION IS DETERMINED FROM DRIVE SIDE OF FAN.
2. SAME AS AMCA STANDARD 99-2406.





# FAN SOUND DATA

Your Representative:  
Jonathan T. Todd  
Todd Air Solutions  
PO Box 4245  
Salisbury NC 28145  
(704) 630-1101 Phone  
(704) 630-0528 Fax  
jtodd@toddas.com

Friday, April 8, 2022

Job Name: ANUA INTERNATIONAL LLC  
Reference: Jefferson, GA Project Quote: 464277

## Operating Requirements

Volume, ACFM	300
SP, in. wg {with Accessories}	7.0 {7.052}
Density, lb./ft. <sup>3</sup>	0.0729
Operating Temperature, °F	70
Site Altitude, Feet ASL	751
AMCA Arrangement No.	4
Motor Frequency, Hz	60
Start-Up Temperature, °F	70

## Fan Selection and Specifications

Model	PB-10A
Fan RPM	3,450
Wheel Description	10-5/8 X 2-5/8 Radial
Wheel Width, %	100%
Wheel Diameter, in.	10.63
Inlet Diameter, in.	6.00
Outlet Velocity, ft./min.	2,209
Fan BHP	0.74
Static Efficiency, %	45.6%
Cold Start BHP	0.74
Construction Class	N/A

## Fan Sound Data

- Lp = Sound Pressure Level at a specific distance from the fan. Measured in decibels (dB) or A-weighted decibels (dB(A)) re 0.0002 microbar.
- Lw = Sound Power Level of the fan. Measured in decibels (dB) or A-weighted decibels (dB(A)) re 1E-12 watt.
- dB = Decibel, ten times the logarithm (base 10) of the ratio of a value to a reference value.
- dB(A) = A-Weighted decibel. A-weighting corrects the spectrum for human hearing response.

Sound Directivity Factor, Q : 2 - HemiSpherical radiation  
Fan Inlet Ducting: Ducted  
Fan Outlet Ducting: Not Ducted

## Calculated Octave Band Sound Data (dB)

Quantity	63 Hz	125 Hz	250Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000Hz
Lw Total	81	90	98	94	91	87	83	72
Lw Inlet	78	87	95	91	88	84	80	69
Lw Outlet	78	87	95	91	88	84	80	69
Lw Outlet After GSA-5 Silencer	74	81	83	69	60	47	42	47
Lp Total	68	75	82	78	75	71	67	56
Lp Inlet	61	70	79	75	72	68	64	53
Lp Outlet	70	79	88	84	81	77	73	62
Lp Outlet After GSA-5 Silencer	66	73	76	62	53	40	35	40

Total A-weighted Sound Pressure Level, Lp dB(A) 80 at 3.0 feet from fan 68 from silencer exit  
Total A-weighted Sound Power Level, Lw dB(A) 97  
Blade Passage Frequency, Hz 345

- Sound Pressure values are calculated based upon assumed environmental conditions. Actual values may vary for specific installations due to environmental factors (other noise sources, walls, duct design, etc.)
- Noise from the driver is not included in these data.
- Sound Pressure Level calculations assume free field propagation occurring outdoors.
- Duct End Corrections applied (AMCA 300-85 Appendix C).

# Alderon Industries Submittal

Date: 6/3/2022

Job: A2011763

Model: EWS003471

Electrical: 460 VAC, 3Phase, 60Hz

**UL 508 Industrial Controls**  
**UL 698A Intrinsically Safe Controls**































*Leading Edge Control Products*

**Submittal Information**

PO Box 827 Hawley MN, 56549 Phone 218-483-3034

Fax 218-483-3036 [www.alderonind.com](http://www.alderonind.com)

ERP Number	Image	Quantity	Part Description	Device Tag	Manufacturer & Part #
000000		1	Ground Screw	GND2	GND Screw
1000058		2	Lug, Ground, KA6U, 6-14 AWG	GND1;GND3	Burndy KA6U
1000239		1	GFI, Receptacle, 15 Amp	REC1	Pass&Seymour 1597-W
1000240		1	GFI, Cover	28	Menards SL26-CC20
1000254		1	Arrestor, Lightning, 3 Phase	ARREST1	Schneider Electric SDSA3650
1000287		2	Fuse, 5mm X 20mm, 1A	F1	Littlefuse 0235001.HXP
1000426		4	Rail Din, Steel, Low	DIN1...DIN4	Wago 210-112
1000461		2	Circuit Breaker, SQD, 1P, 10A	CB1;CB2	Schneider Electric QOU110B
1000462		1	Circuit Breaker, SQD, 1P, 15A	CB3	Schneider Electric QOU115B
1000562		1	Trans, 2KVA, 230/460:120, SQ D	TRANS1	Schneider Electric 9070T2000D1
1000567		2	Pilot, SE, Contact Block, NO	SW1;SW2	Schneider Electric ZBE101
1000632		6	Circuit Breaker Feet	4...9	Schneider Electric QOUMF1B
1000784		10	Terminal Block 30A, SE	TB1	Schneider Electric NSYTRV42
1000785		3	Block, End Barrier, 30/50/65A, SE	20;22;24	Schneider Electric NSYTRAC22















ERP Number	Image	Quantity	Part Description	Device Tag	Manufacturer & Part #
1000786		6	Terminal Block 50A, SE	TB2;TB3	Schneider Electric NSYTRV62
1000850		1	Switch, MPS, TEL, 2.5-4.0 A	MPS1	Schneider Electric GV2P08
1000861		1	Switch, MPS, SE, AUX, NO or NC	AUX1	Schneider Electric GVAE1
1000864		1	Contactor, TEL, LC1, 18A	M1	Schneider Electric LC1D18G7
1000878		1	Block, Terminal, Fuse, SE	F1	Schneider Electric NSYTRV42SF5
1000880		4	Contact Block Pilot, NO	SW1;SW2	Schneider Electric ZBE1015
1000886		1	Overload, TEL, 5.5-8 A	OL1	Schneider Electric LRD12
1000933		1	Bracket, Lightning Arrestor, Bent	ARREST1	Alderon 1000933
1000970		1	Enclosure, ULT, Hoff, 40x30x12	ENCL1	Hoffman UU1008030
1000971		1	Padlock, ULT, Hoff	ENCL1	Hoffman UUHPL
1000976		1	Backplate, Hoff, 40x30, Steel	BP1	Hoffman A40P30
1001075		1	Kit, Vent, Ensto	38	Ensto BVD22
1001121		1	Label, Panel Disconnect	37	Alderon 1001121
1001246		2	Pilot, SE, 3M, Operator	SW1;SW2	Schneider Electric ZB4BJ3

← 1

Parts List : 1000786 - 1001246

<b>ALDERON Industries</b> Leading Edge Control Products 110 15TH ST. SOUTH HAWLEY MN, 55549 PH: 218-483-3064 WWW.ALDERONIND.COM	Model Number EWS003471	Quote Number A2011763	Page Number 2 of 9
	DWG Number	Drawn By B. Nelson	Checked By
Notes: 1. WARNING! Electrical Shock Hazard! Disconnect power before servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes. 2. Install in accordance with National Electric Code, NFPA 70. Seal all boxes, fittings, and conduit with appropriate seal devices to prevent moisture and gasses from entering enclosure. 3. Connect all grounds to a good ground. 4. Dashed lines represent field wiring - Use minimum 60 deg. C Copper. Wire 5. Branch Circuit Protection Device/Disconnect. Means Field Provided.		Date 6/3/2022	Revision AAA

3 →

ERP Number	Image	Quantity	Part Description	Device Tag	Manufacturer & Part #
1001252		6	Collar, Pilot	LT1...LT4;SW1;SW2	Schneider Electric ZB4BZ009
1001253		2	Pilot, SE, Light, Red, Head	LT3;LT4	Schneider Electric ZB4BV043
1001254		2	Pilot, SE, Light, Red, Module, 120V	LT3;LT4	Schneider Electric ZBVG45
1001255		2	Pilot, SE, Light, Green, Head	LT1;LT2	Schneider Electric ZB4BV033
1001256		2	Pilot, SE, Light, Green, Module, 120V	LT1;LT2	Schneider Electric ZBVG35
1001292		1	Power Supply, IDEC, 24VDC, 30W	PWS1	IDEC PS5R-VC24
1001299		2	Fuse, Primary, FNQR, 10 A	F2;F3	Bussman FNQ-R-10
1001428		7	Label, Brady, 2" x 1", BK	29...35	Alderon 1001428
1001449		1	Relay, Phase Loss, Macromatic	PLR1	Macromatic PMDU
1001562		1	Circuit Breaker, SE, HDL, JDL Handle 6"	36	Schneider Electric 9421LJ4
1001619		5	Duct, Wire, 1.5" x 3", WHT	WD1...WD5	Canalplast H153W
1001631		1	Inner Door, Ultrex, Aluminum, 40x30	BP2	Alderon 1001631
1001634		4	Inner Door, Ultrex, HKit, Keeper	BP2	Alderon 1001633
1002356		7	Relay, S.E. Int, Label Plate	CR1...CR7	Schneider Electric RSZL300

















**ALDERON Industries**  
Leading Edge Control Products  
110 15TH ST. SOUTH  
HAWLEY MN, 55549  
PH: 218-483-3064 WWW.ALDERONIND.COM

This drawing contains proprietary information which must not be duplicated, used, or disclosed in whole or in part without prior written consent.

Notes: 1. WARNING! Electrical Shock Hazard! Disconnect power before servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes.  
2. Install in accordance with National Electric Code, NFPA 70. Seal all boxes, fittings, and conduit with appropriate seal devices to prevent moisture and gasses from entering enclosure.  
3. Connect all grounds to a good ground. 4. Dashed lines represent field wiring - Use minimum 60 deg. C Copper Wire 5. Branch Circuit Protection Device/Disconnect. Means Field Provided.

Model Number **EWS003471**  
DWG Number **EWS003471**

Quote Number A2011763  
Drawn By B. Nelson  
Checked By  
Date 6/3/2022  
Revision AAA

ERP Number	Image	Quantity	Part Description	Device Tag	Manufacturer & Part #
1002800		1	Controller, Logic, Smart, 16, PLC, IDEC 9I/70	PLC1	IDEC FC6A-C16R1CE
1003173		5	Relay, S.E. Int, MF, 120V, 10A, SPDT	CR1...CR3;CR6;CR7	Schneider Electric RXG11F7
1003174		5	Relay, SE, 10A, 1 Pole Socket	CR1...CR3;CR6;CR7	Schneider Electric RGZE1S35M
1003175		2	Relay, S.E. Int, MF, 120V, 5A, DPDT	CR4;CR5	Schneider Electric RXG21F7
1003176		2	Relay, S.E. Int, Socket, DPDT	CR4;CR5	Schneider Electric RGZE1S48M
1003401		1	HDL Terminal Shield	PDCB1	Schneider Electric S37449
1003853		1	Circuit Breaker, SE, HDL, 15A, 600V, 3P	PDCB1	Schneider Electric HDL36015
1004348		1	PLC, HMI, 5.7" Color, IDEC, TFT, LCD	HMI1	IDEC HG2G-V5FT22TF-B
1004936		1	Block, Terminal, PXC, 20A, PT 2,5-QUATTRO	TB4	PXC 3209578
1004937		1	Block, End Barrier, PXC, D-ST 2,5-QUATTRO	17	PXC 3030514
1004942		1	Block, Terminal, PXC, PT 2,5-PE	GND4	PXC 3209536
1004943		1	Block, Terminal, PXC, 2,5-QUATTRO-PE	GND5	PXC 3209594
1005000		15	Block, End Clamp, PXC, 35-5	1...3;10...16;18;19;21;23;25	PXC 3022276
1005023		1	Connector, SE, Distribution, Circuit Breaker, HDL, H-Frame, (6) 14-6AWG	PDCB1	Schneider Electric PDC6HD6



←3

Parts List : 1002800 - 1005023

<b>ALDERON Industries</b> Leading Edge Control Products 110 15TH ST. SOUTH HAWLEY MN, 55549 PH: 218-483-3064 WWW.ALDERONIND.COM	Model Number DWG Number	EWS003471	Quote Number A2011763	Drawn By B. Nelson	Page Number 4 of 9
				Checked By	Date 6/3/2022
			Revision AAA		

This drawing contains proprietary information which must not be duplicated, used, or disclosed in whole or in part without prior written consent.  
Notes: 1. WARNING! Electrical Shock Hazard! Disconnect power before servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes. 2. Install in accordance with National Electric Code, NFPA 70. Seal all boxes, fittings, and conduit with appropriate seal devices to prevent moisture and gasses from entering enclosure. 3. Connect all grounds to a good ground. 4. Dashed lines represent field wiring - Use minimum 60 deg. C Copper Wire 5. Branch Circuit Protection Device/Disconnect. Means Field Provided.

5 →

ERP Number	Image	Quantity	Part Description	Device Tag	Manufacturer & Part #
1005024		1	Drive, SE, 3P, 1 HP, 460V	VFD1	Schneider Electric ATV320U07N4C
1006253		1	Holder, Fuse 30 Amp, 600V, 2P Class CC, KTK, FNQR, Socomec	U1	Socomec 57050002
1006452		2	Inner Door, Ultrex, HKit, Stop 3/8"	BP2	Alderon 1006452
1006453		2	Inner Door, Ultrex, HKit, Hinge 3/8"	BP2	Alderon 1006453

Parts List : 1005024 - 1006453

<b>ALDERON Industries</b> Leading Edge Control Products 110 15TH ST. SOUTH HAWLEY MN, 56549 PH: 218-493-3064 WWW.ALDERONIND.COM	Quote Number A2011763	Drawn By B. Nelson	Page Number 5 of 9
	Model Number EWS003471	Checked By	SUBMITTAL
<small>This drawing contains proprietary information which must not be duplicated, used, or disclosed in whole or in part without prior written consent.</small> <small>Notes: 1. WARNING! Electrical Shock Hazard! Disconnect power before servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes. 2. Install in accordance with National Electric Code, NFPA 70. Seal all boxes, fittings, and conduit with appropriate seal devices to prevent moisture and gasses from entering enclosure. 3. Connect all grounds to a good ground. 4. Dashed lines represent field wiring - Use minimum 60 deg. C Copper Wire 5. Branch Circuit Protection Device/Disconnect. Means Field Provided.</small>		Date 6/3/2022	
		Revision AAA	

← 4 6 →



# PREMIUM MAGNETIC-DRIVE SEALLESS CENTRIFUGAL PUMPS DB & SP SERIES



**FINISH THOMPSON INC.**

[finishthompson.com](http://finishthompson.com)

PUMPING SOLUTIONS **AROUND THE WORLD**

**DB SERIES | SP SERIES**

MAGNETIC DRIVE, SEALLESS, CENTRIFUGAL PUMPS



FINISH THOMPSON INC.

BEST EFFICIENCY

BEST RUN DRY

BEST WARRANTY

STATE OF THE  
ART DESIGNBacked by an  
industry **best**  
five-year warranty.**DB SERIES  
FLOODED SUCTION**The Standard for Hydraulic Efficiency  
and Corrosive Fluid Handling

- **Engineered for performance** with state of the art software
- **Runs dry** for hours without damage when equipped with a carbon bushing.
- **Best efficiency** of any of any pump in its class
- Polypropylene or PVDF corrosion resistant construction
- Horizontal or vertical (with IEC motor only) installation
- High specific gravity handling – over 1.8

**SP SERIES  
SELF-PRIMING**The Most Innovative and Versatile  
Mag-Drive Centrifugal Pump

- **Big on power** - short on energy consumption
- **Deep-lift capabilities** (up to 25 feet/7.6 meters)
- **Lightning-fast priming**  
(18 feet/5.5 meters in 90 seconds)
- Ease of operation
- No seal replacement and no leaks
- Corrosion-resistant materials handle the most difficult applications



# DB SERIES | SP SERIES

## TECHNICAL SPECIFICATIONS

### DB & SP SERIES FEATURES

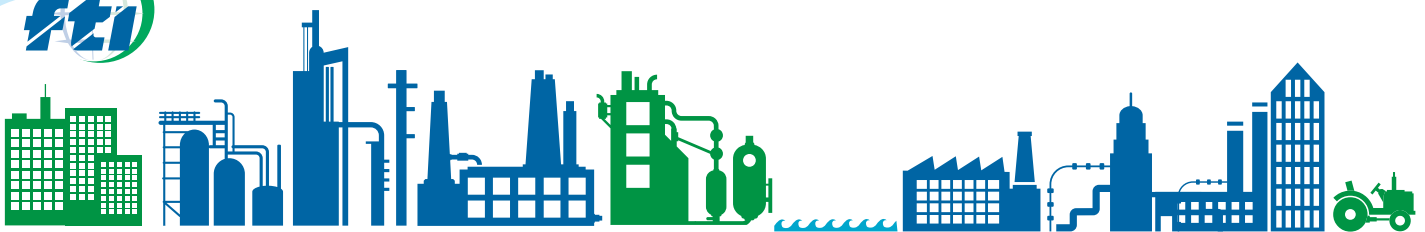
- Close-coupled design
- Polypropylene or PVDF construction
- Neodymium magnets on every model
- Replaceable shaft and bushing
- ISO 1940 G2.5 balancing
- Mounts to NEMA and IEC motor frames
- Easy Set measurement-free outer drive
- Mounts to motor without disassembly
- Back pullout design
- Five-year warranty
- CE certified
- ATEX available (DB only)

### DB & SP SERIES SPECIFICATIONS

- Up to 70% operating efficiency
- High working pressure up to 90 psi
- Maximum viscosity:  
DB - over 150 cP  
SP - over 50 cP
- Maximum temperature:  
Polypropylene - 180° F (82° C)  
PVDF - 220° F (104° C)

### SP SERIES SPECIFIC SPECIFICATIONS

- SP retains fluid for re-priming when shut off without a check valve
- SP lifts up to 25 feet (7.6 meters)\*\*
- SP primes up to 18 feet (5.5 meters) in 90 seconds\*\*\*.



### DB & SP SERIES INDUSTRIES

- Chemical processes
- Metal plating/working
- Wastewater treatment
- Electronics manufacturing
- OEM equipment supply
- DI & High purity water
- Fume scrubbing
- Mining
- Paper mills
- Printing
- Pharmaceutical
- Chillers

### SP SERIES

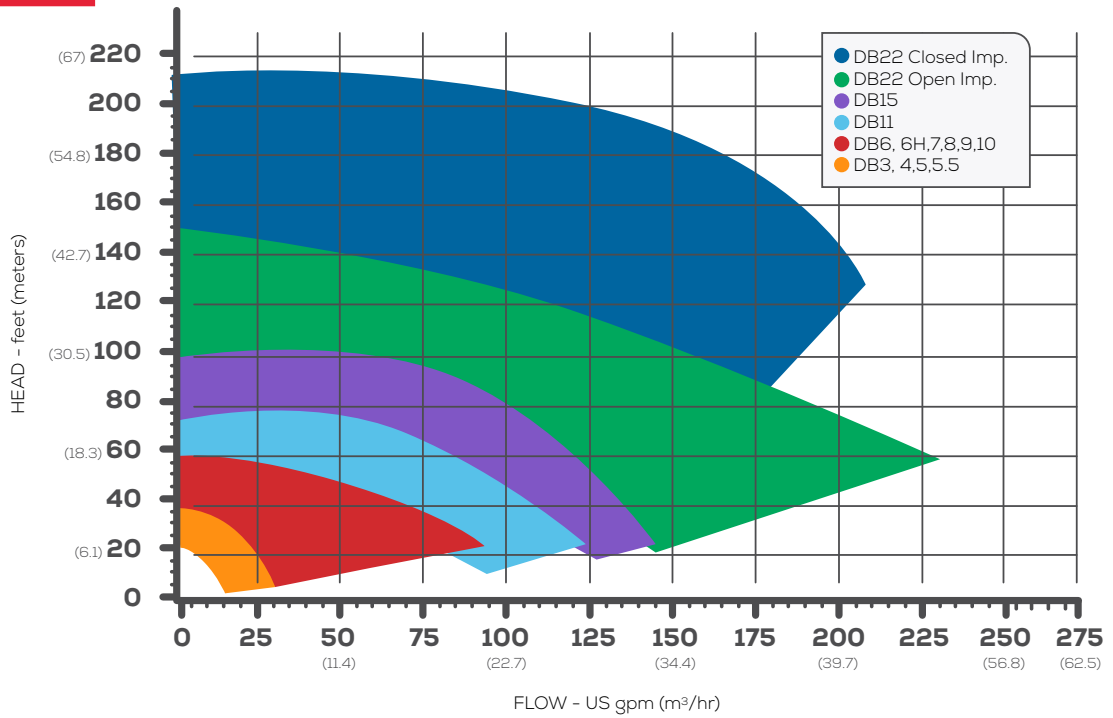
- Sumps
- Underground storage tanks
- Rail cars and tanker trucks
- Over-the-wall applications
- Double containment tanks
- Piping systems that tend to have trapped or entrained air

**NOTE:** SP Series is not recommended for pumping flammable liquids.

**SP SERIES CAPABILITIES:** \* Specific gravity affects lift capability. Divide 25 feet (7.6 meters) by the specific gravity to determine maximum lift.

\*\* Lift determined on fresh, cold water. \*\*\* With maximum diameter impeller

# DB SERIES 3450/2900 rpm

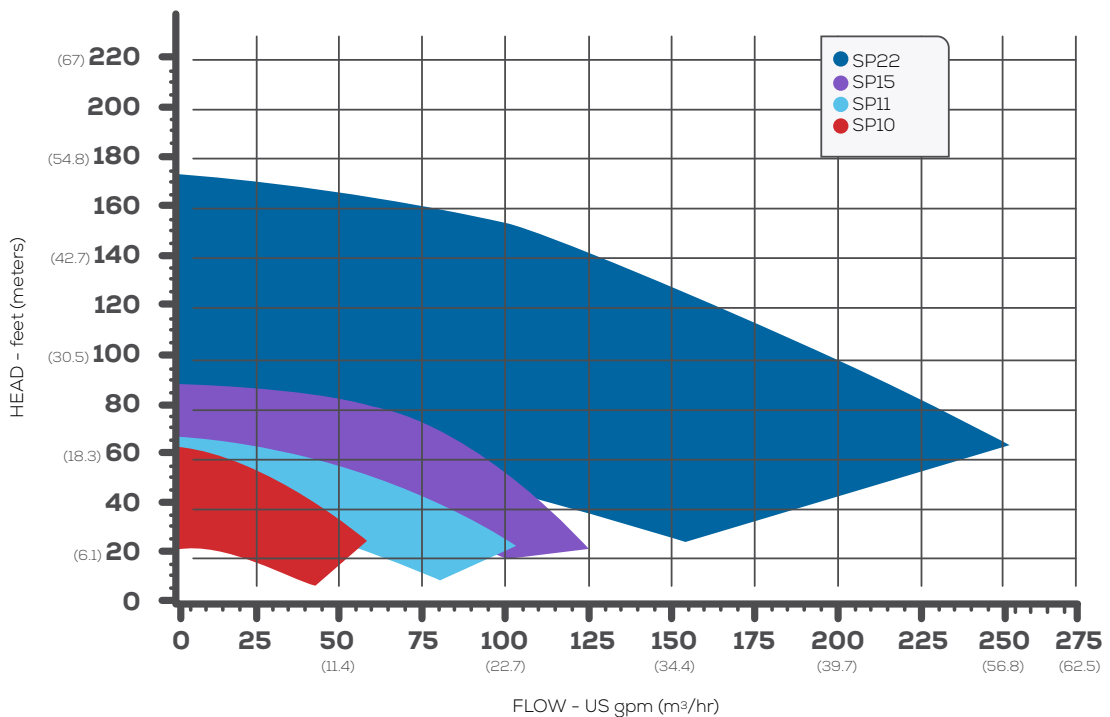


Note: Contact the factory or download the curve book for DB22 closed impeller performance at 2900 rpm.

The centrifugal selector program is designed to allow you to easily search Finish Thompson's collection of centrifugal pumps to find the products that most closely match your hydraulic and application criteria.



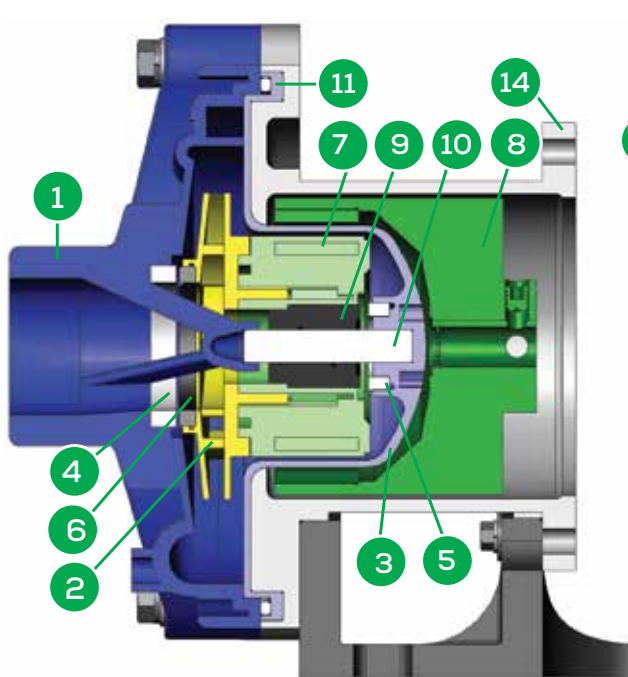
# SP SERIES 3450/2900 rpm



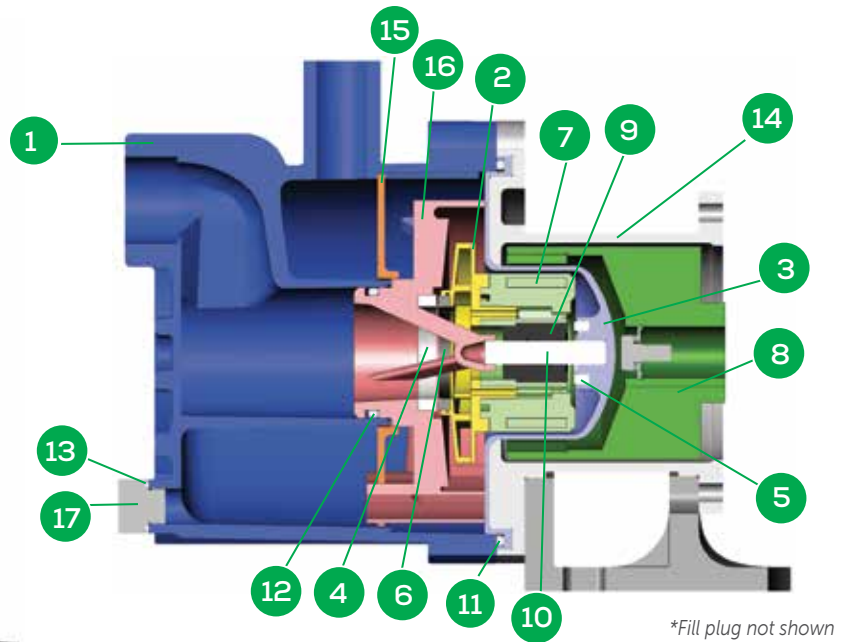
Note: SP curves based on flooded suction. Contact the factory or download the curve book for performance at various lifts.

# DB SERIES | SP SERIES

## MATERIALS OF CONSTRUCTION



DB SERIES



SP SERIES

\*Fill plug not shown

NOTE: The foot is offered only on the DB 11 & 15 and the SP 11 & 15 models

ITEM	DESCRIPTION	POLYPROPYLENE MODELS	PVDF MODELS
1, 2, 3, 15, 16	Housing, impeller, barrier, separator plate, inner volute	Glass fiber reinforced polypropylene	Carbon-fiber reinforced PVDF
4	Housing thrust ring, inner volute thrust ring	High-purity alumina ceramic, silicon carbide	
5	Barrier thrust ring	High-purity alumina ceramic	
6	Impeller thrust ring	Molybdenum disulfide filled PTFE, silicon carbide	
7	Inner drive magnet	Neodymium iron boron magnets encapsulated in unfilled polypropylene	Neodymium iron boron magnets encapsulated in unfilled PVDF
8	Outer drive magnet	Nickel-plated neodymium iron boron magnets / steel	
9	Bushing	Carbon, PTFE, high purity alumina ceramic, silicon carbide	
10	Shaft	High purity alumina ceramic, Hastelloy C, silicon carbide	
11, 12, 13	O-ring	FKM, EPDM (Simriz®, Kalrez®)	

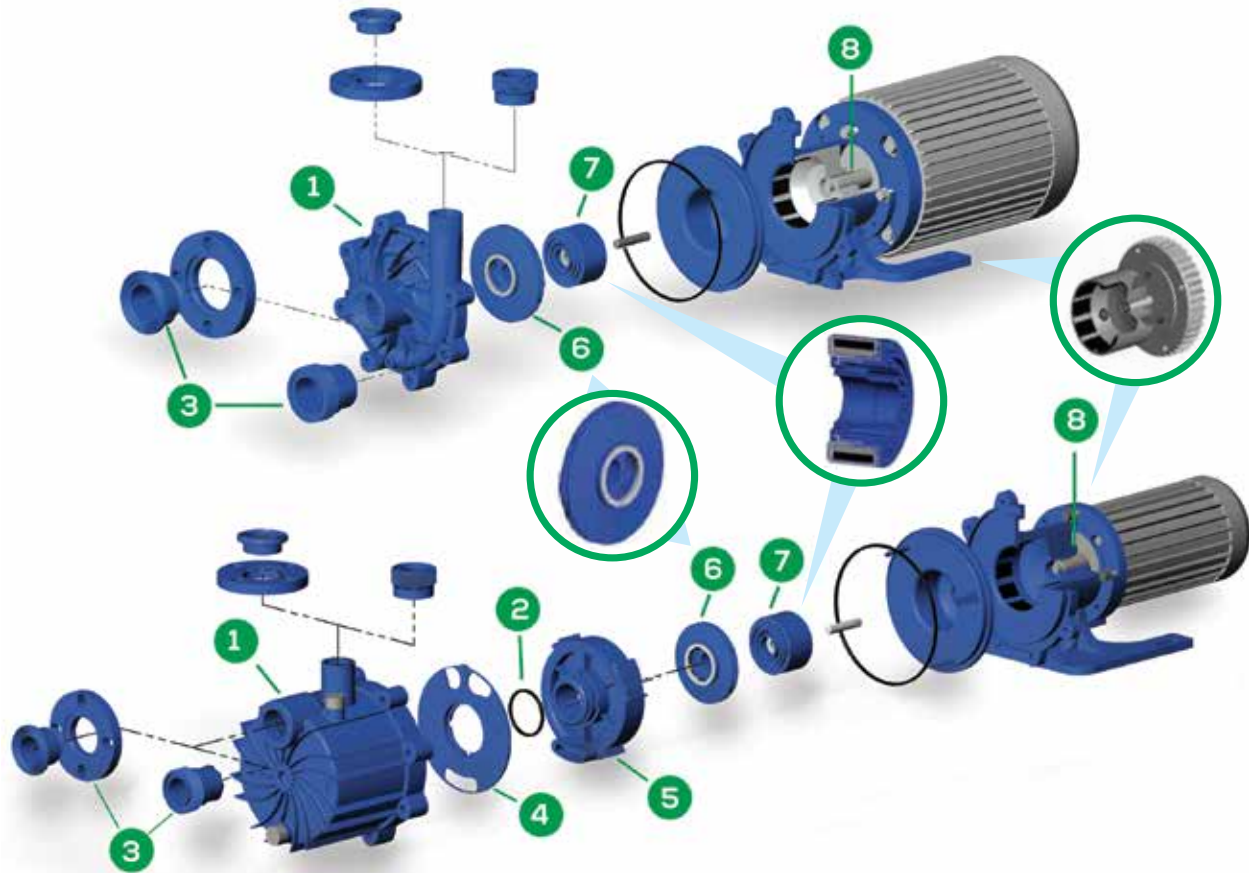
Kalrez® is a registered trademark of DuPont Performance Elastomers

Simriz® Perfluoroelastomer is a registered trademark of the Simrit® division of Freudenberg-NOK

Hastelloy® C is a registered trademark of Haynes International, Inc.

# DB SERIES | SP SERIES

## PREMIUM FEATURES



### 1 Thermoplastic Casing

Produces equivalent pump performance at both 60 Hz and 50 Hz operation. SP casing functions as a fluid reservoir featuring a molded-in "gooseneck" suction passage eliminating the need for internal check valves.

### 2 O-ring

On SP models, creates airtight seal between the inner volute and "gooseneck" suction passage. Helps maintain vacuum required for proper priming.

### 3 Multiple Connections

NPT or BSP threaded, raised-face adjustable flanges, or union connections.

### 4 Separator Plate - SP only

Allows liquid to flow to the impeller and discharge the air/liquid mixture created during priming back into the fluid reservoir.

### 5 Inner Volute - SP only

Allows air to be efficiently removed from the suction passages for fast priming.

### 6 Impeller

Two-piece impeller design allows impeller to be changed without having to replace inner drive.

### 7 Run Dry System/Magnet Technology

The DB and SP can run dry for hours without damage when equipped with a chemical grade carbon bushing.

Neodymium magnets are the most powerful and efficient magnets available. Inner magnets are completely encapsulated in unfilled polypropylene or PVDF for superior magnet protection.

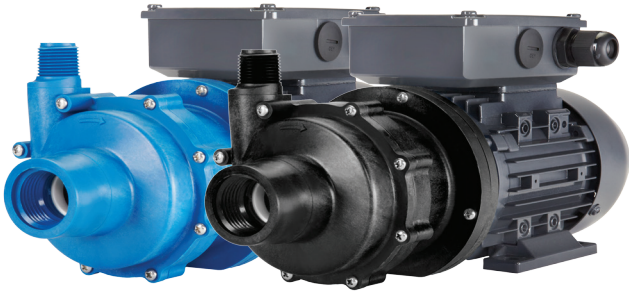
### 8 Easy Set Outer Drive

Measurement-free outer drive ensures optimum magnet alignment and easy motor installation.

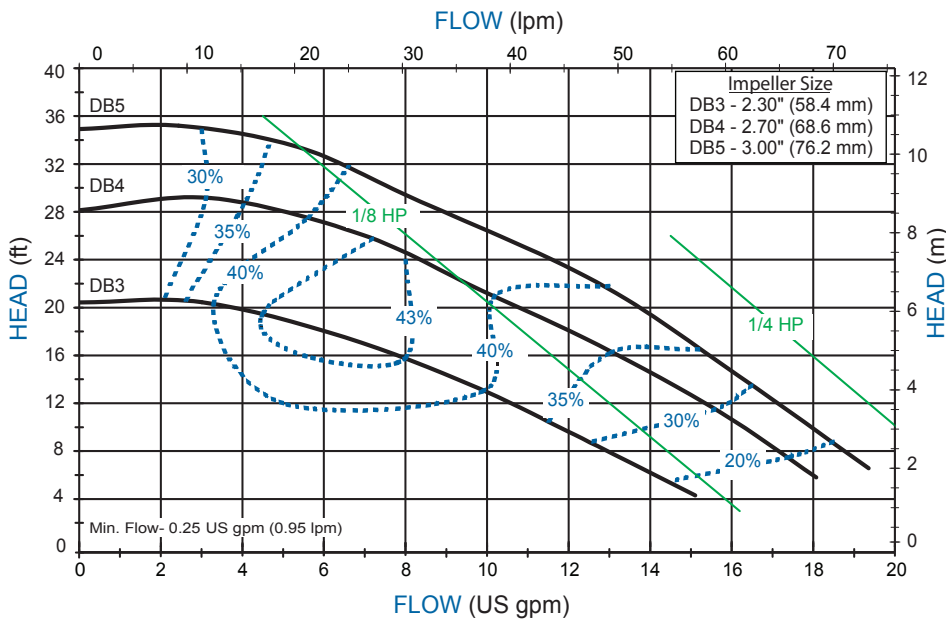


# DB SERIES

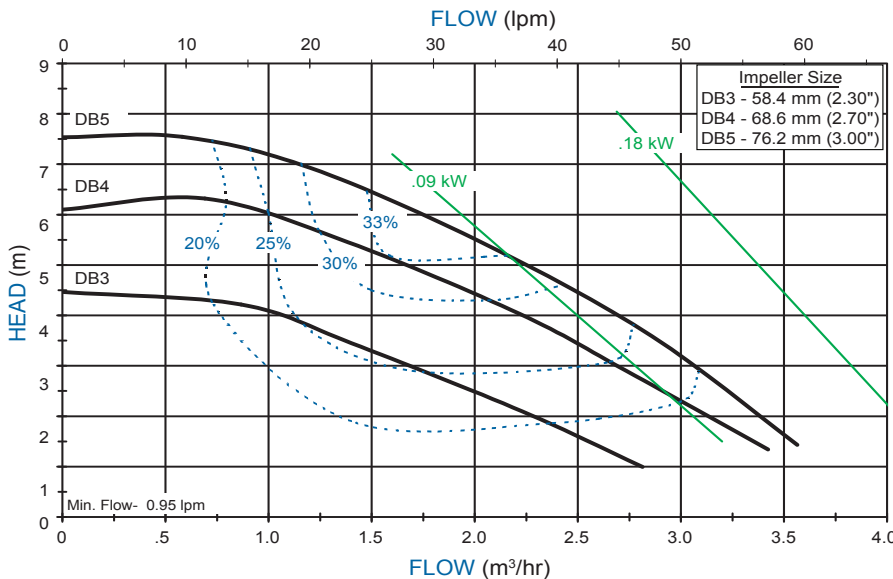
MODELS DB3, DB4, **DB5**



## DB3/4/5 PERFORMANCE 3450 RPM



## DB3/4/5 PERFORMANCE 2900 RPM



## FEATURES & CAPABILITIES

- + Five-year warranty
- + Extended run dry ability (with carbon bushing)
- + High operating efficiency
- + Polypropylene or PVDF construction
- + Powerful neodymium magnets
- + Close-coupled design
- + Threaded NPT or BSP connections
- + Horizontal or vertical installation
- + Back pullout design
- + Mounts to IEC 56, 63, & 71 B14 motor frames
- + Easy set, measurement free drive
- + CE certified
- + Working pressure to 60 psi (4.1 bar)
- + Specific gravity over 1.8
- + Viscosity up to 150 cP
- + Polypropylene—180° F (82° C)
- + PVDF—220° F (104° C)

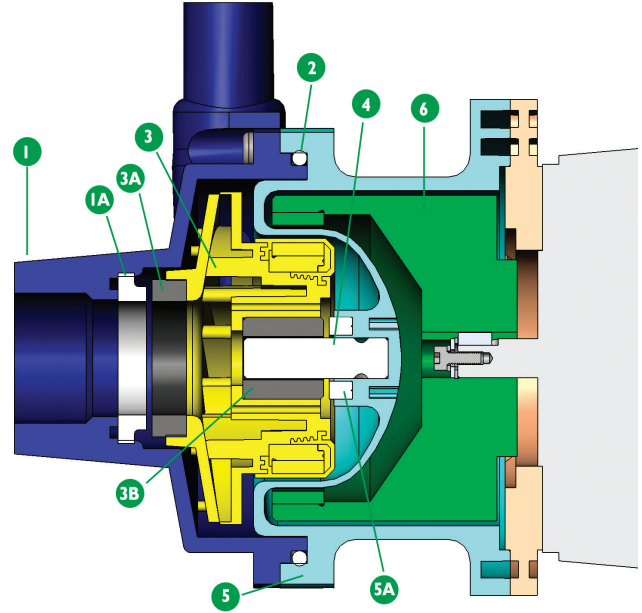
## APPLICATIONS

- + Chemical processing
- + Plating
- + Water and wastewater
- + Electronics
- + Pharmaceuticals
- + Wet scrubber
- + Pulp and paper
- + Heat exchanger
- + and many more!

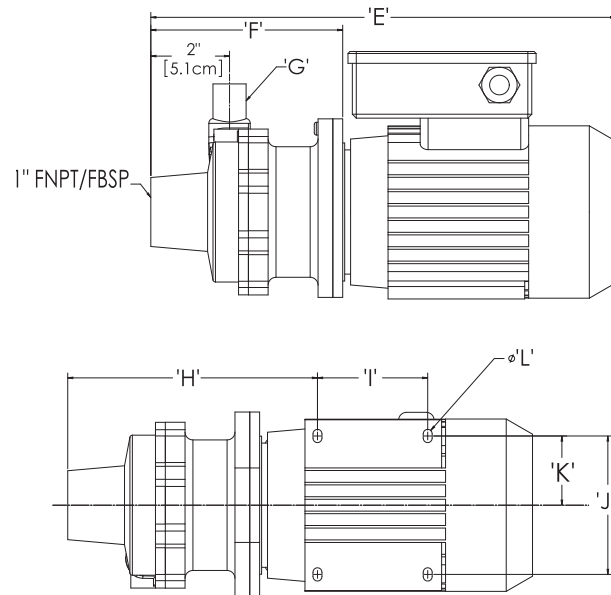
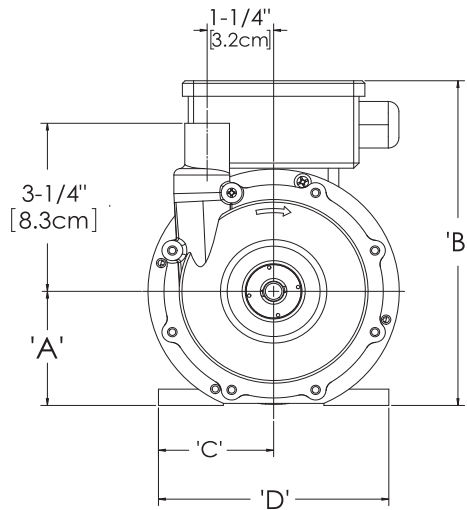
# DB SERIES

## Specifications

Description	Polypropylene	PVDF
1 Impeller housing	Glass-fiber reinforced polypropylene (GF PP)	Carbon-fiber reinforced PVDF (CF PVDF)
1A Impeller housing thrust ring	High purity alumina ceramic	
2 O-ring	FKM or EPDM	
3 Impeller	GF PP and neodymium iron boron magnets encapsulated in unfilled polypropylene	CF PVDF and neodymium iron boron magnets encapsulated in unfilled PVDF
3A Impeller thrust ring	Glass-fiber molybdenum disulfide filled PTFE	
3B Bushing	Carbon, PTFE, high purity alumina ceramic	
4 Shaft	High purity alumina ceramic	
5 Barrier/Motor adapter	GF PP	CF PVDF
5A Barrier thrust ring	Silicon carbide	
6 Outer drive magnets	Nickel-plated neodymium iron boron magnets/ epoxy painted steel	



## Dimensions



Motor Frame	A	B	C	D	E	F	G	H	I	J	K	L	Weight - lbs. [kg]	
													PP	PVDF
IEC 56 w/B14	2-7/32\"/>													

Dimensions and weights are for reference only. Weights listed are for pump only; motor not included.



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 49 (0)6181-90878-0 | fx 49 (0)6181-90878-18  
 email fti@finishthompson.com





## Globe Valve

### Standard Features (Sizes 1/2"– 4")

- Used for efficient throttling of flow
- Positive shut-off
- Displays excellent flow regulating characteristics throughout the entire lift of the disc
- All sizes rated for full vacuum service
- EPDM seals. FKM optional

### Parts List/Thd-Soc (Sizes 1/2"– 2")

PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC, PP
2	Bonnet	1	PVC, PP
3	Stem	1	PVC, PP
4	Gland	1	PVC, PP
5	Gland Nut	1	PVC, PP
6	Sheet Gasket	1	EPDM, Others
7	Gland Packing	2	EPDM, Others
8	Disc	1	PP
9	Stem Holder	1	PP
13	Ring	1	Stainless Steel 304
14	Hand Wheel	1	PP
15	Nut	1	PVC
16	Washer	1	PVC

### Sample Specification

All globe valves shall be of a thermoplastic construction and have no metal part that comes in contact with media. Sizes 1/2" through 2" shall be of union bonnet design, 2-1/2" through 4" shall be of outside stem and yoke type. PVC shall conform to ASTM D1784 Cell Classification 12454-A and PP conforming to ASTM D4101 Cell Classification PPO210B67272. PVC valves shall be rated to 150psi at 70° F sizes 1/2" through 2" 110psi at 70° F sizes 2-1/2" through 4". PP rated to 110psi at 70° F sizes 1/2" through 4", as manufactured by Asahi/America, Inc.

### Specifications

- Sizes:** 1/2" – 4"
- Bodies:** PVC and PP
- Models:** Flanged ANSI 1/2" – 4"\*  
 Socket PVC 1/2" – 2"  
 PP\*\* 1/2" – 1"  
 Thread PVC 1/2" – 2"  
 PP 1/2" – 1"
- Plug:** PP
- Seals:** EPDM or FKM

\* 2-1/2" – 4": Outside stem and yoke type  
 \*\* DIN Socket also available

### Parts List/Flanged (Sizes 1/2" – 4")

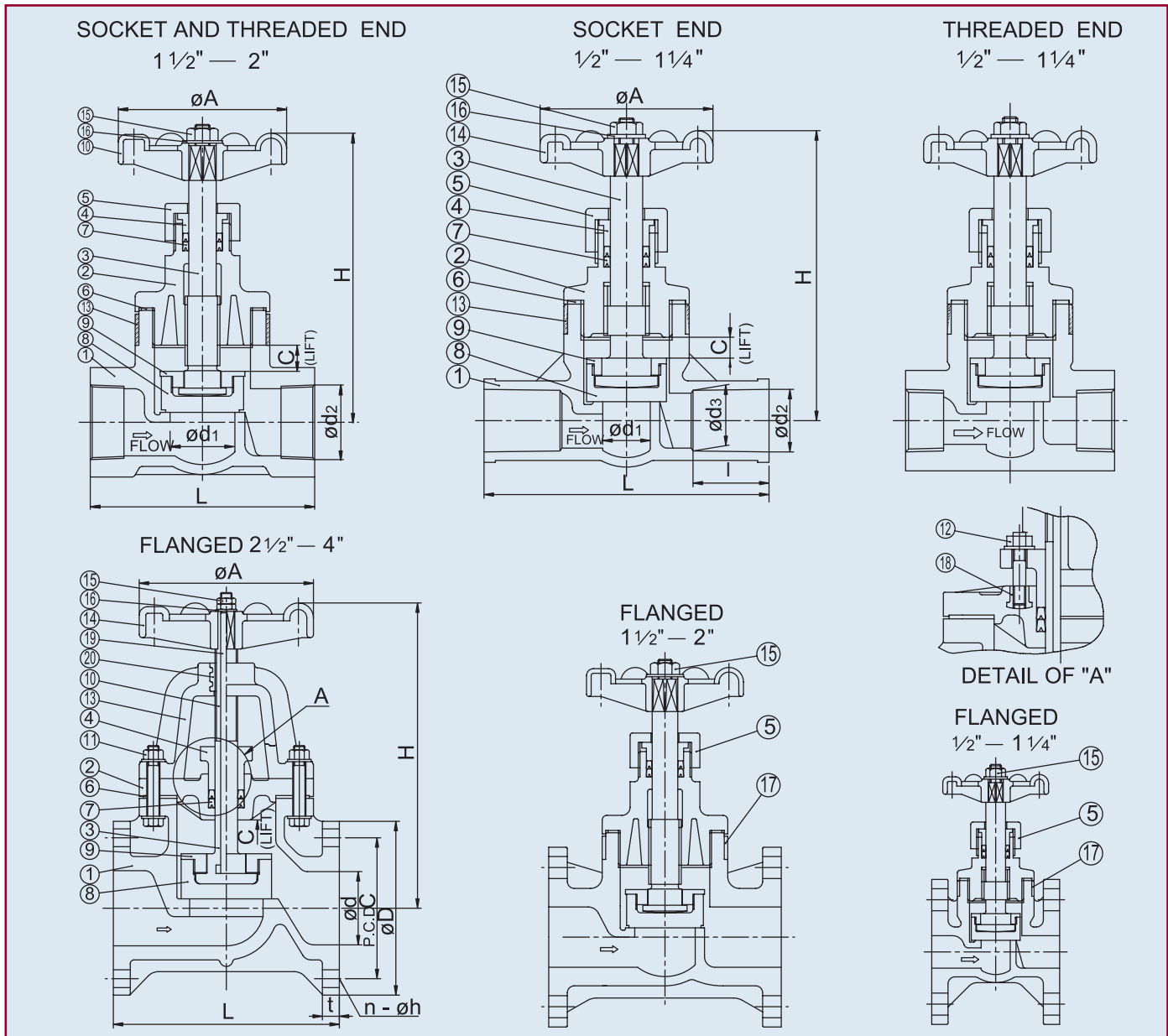
PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC, PP
2	Bonnet	1	PVC, PP
3	Stem	1	PVC, PP
4	Gland	1	PVC, PP
5	Gland Nut	1	PVC, PP
6	Gland Gasket	1	EPDM, FKM
7	Gland Packing	1	EPDM, FKM
8	Disc	1	PP
9	Stem Holder	1	PVC, PP
10	Stem with Trapezoid Screw Seat	1	Copper Alloy
11	Bolt, Nut, Washer	8	Stainless Steel 304
12	Stud Bolt, Nut	2	Stainless Steel 304
13	Stem Support	1	PP
14	Hand Wheel	1	PP
15	Nut [A]	1	PVC (1/2" - 2")
		2	Stainless Steel 304
16	Washer	1	PVC (1/2" - 2")
		1	Stainless Steel 304
17	Reinforcing Ring	1	Stainless Steel 304
18	Inserted Nut	1	Copper Alloy
19	Stem Metal Insert	1	Steel
20	Inserted Metal	1	Bronze

\* PVC nut and washer on sizes 1/2" through 2"

### Pressure vs. Temperature (psi. water. non-shock)

NOMINAL SIZE		PVC			PP		
		30° F 70° F	71° F 105° F	106° F 120° F	- 5° F 70° F	71° F 120° F	121° F 175° F
INCHES	mm						
1/2 -1-1/2	15-40	150	150	110	110	95	65
2	50	150	150	95	110	75	45
2-1/2 - 3	65-80	110	110	95	110	60	35
4	100	110	80	65	110	60	35

# Globe Valves



## Dimensions (in.)

## Cv Values

NOMINAL SIZE		FLANGED									SOCKET AND THREADED									Cv
		WT. (LBS)	d	C	D	L	t	LIFT	C (open)	H	WT. (LBS)	THREADED			SOCKET			LIFT C	d1	
d2	L											H	d2	L	L					
1/2	15	0.88	0.71	2.38	3.50	3.35	0.47	0.31	5.20	0.66	NPT 1/2	3.35	0.85	4.33	1.18	0.32	0.59	5.20	4.1	
3/4	20	1.10	0.94	2.75	3.88	3.74	0.55	0.31	5.51	1.10	NPT 3/4	3.74	1.06	5.12	1.38	0.32	0.71	5.51	6.4	
1	25	2.20	1.10	3.12	4.25	4.33	0.55	0.43	6.34	1.10	NPT 1	4.33	1.33	5.91	1.58	0.43	0.98	6.34	9.7	
1-1/4	32	2.90	1.46	3.50	4.62	5.31	0.63	0.51	6.57	1.30	NPT 1-1/4	5.32	1.67	5.32	0.98	0.51	1.38	6.58	18.0	
1-1/2	40	4.41	1.61	3.88	5.00	7.48	0.63	0.79	9.06	2.70	NPT 1-1/2	5.51	1.91	5.51	0.98	0.79	1.61	9.06	22.0	
2	50	5.30	2.05	4.75	6.00	7.87	0.63	0.94	9.92	3.50	NPT 2	7.09	2.38	7.09	1.06	0.95	2.05	9.92	29.0	
2-1/2	65	13.25	2.64	5.50	7.00	8.66	0.71	1.38	13.58	-	-	-	-	-	-	-	-	-	57.0	
3	80	15.00	3.07	6.00	7.50	9.45	0.71	1.38	14.13	-	-	-	-	-	-	-	-	-	78.0	
4	100	22.00	3.94	7.50	9.00	11.42	0.71	1.57	16.50	-	-	-	-	-	-	-	-	-	115.0	



## Sediment Strainers

### Standard Features (Sizes 1/2" - 4")

- True union design facilitates installation or repair without expanding the pipeline
- Large filtration capacities and low pressure drops
- Transparent PVC strainer body permits easy evaluation of filter screen's condition
- Complete thermoplastic construction
- Pressure rating: 1/2" - 2", 150psi; 3" and 4", 85psi
- Sizes 1/2" - 2" supplied with two sets of end connectors (socket and threaded)

### Options

- FKM seals for corrosive media
- Stainless steel 316 screens available in 20, 40 and 60 mesh
- In line cleaning (clean out valve)

### Tips on Sediment Strainers

- Clean screen regularly.
- Union nut of screening section can be removed for quick and easy maintenance (no need to remove body from pipeline).
- Sediment strainers protect pipeline's important and costly components, such as pumps and meters, by removing suspended particles and impurities.
- Filtering section must face downward when installed.
- You must identify flow direction, shown by molded arrow on the body, before installation.

### Specifications

**Sizes:** 1/2" - 4"  
**Models:** Socket, Threaded, Flanged (ANSI)  
**Body:** PVC  
**Screens:** Standard: 20 mesh PVC  
 Optional: PVC - 30 and 40 mesh  
 Stainless Steel - 20, 40 and 60 mesh

**Seals:** EPDM, FKM

**Sizes 1/2" - 4" PVC/EPDM/FKM  
 Models NSF-61 Certified**

### Parts List (Sizes 1/2" - 4")

PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC
2	Filter Screen	1	PVC, Stainless Steel 316
3	Screen Support	1	PVC
4	End Connector	2	PVC
5	Union Nut	3	PVC
6	Retaining Ring	1	PVC
7	Split Ring	1	PVC
8	O-Ring (A)	1	EPDM, FKM, Others
9	O-Ring (B)	2	EPDM, FKM, Others
10	Stop Ring	2	PVDF **

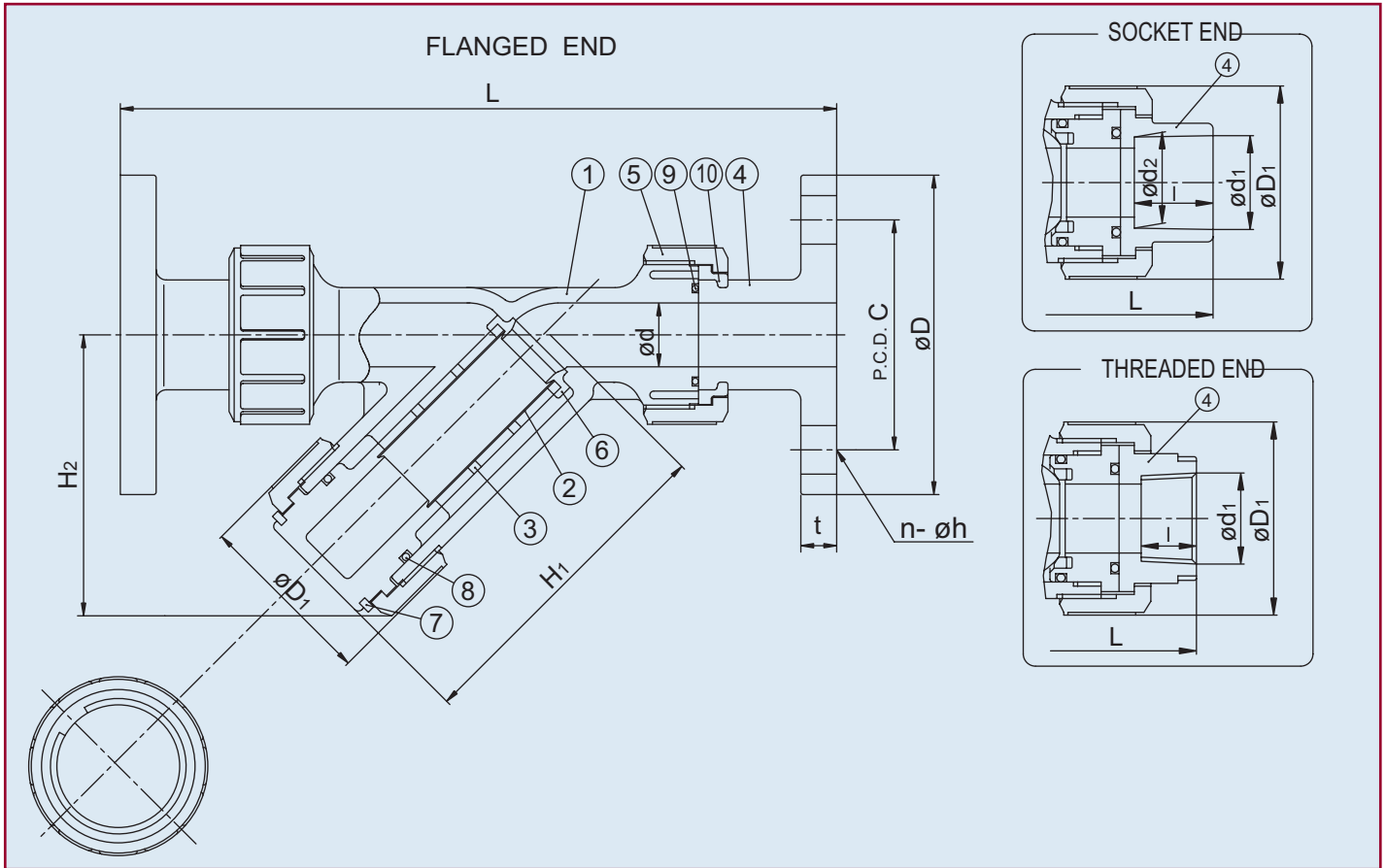
\*\* Used for flanged end

### Sample Specification

All true union sediment strainers, sizes 1/2" - 4", shall be of true union design and shall be constructed of transparent PVC. All O-rings shall be EPDM or FKM. Screens shall be 20, 30 and 40 mesh PVC or 20, 40 and 60 mesh 316 stainless steel. Filter maintenance is achieved without removing strainer from the pipeline. PVC shall conform to ASTM D1784 Cell Classification 12454-A. Valves shall be rated to 150psi sizes 1/2" through 2" and 85psi sizes 3" and 4" at 70° F, as manufactured by Asahi/America, Inc.



# Sediment Strainers



## Dimensions (Sizes 1/2" - 4") (in.)

NOMINAL SIZE		FLANGED						SOCKET				THREADED			d	D1	H1	H2
		ANSI CLASS 150						ASTM CLASS 40										
INCHES	mm	D	C	n	h	L	t	d1	d2	l	L	d1	l	L				
1/2	15	3.50	2.38	1	0.62	8.11	0.47	0.848	0.836	0.87	6.93	1/2 - 14 NPT	0.59	6.50	0.59	1.89	3.82	3.07
3/4	20	3.88	2.75	1	0.62	10.00	0.55	1.058	1.046	1.00	8.30	3/4 - 14 NPT	0.67	7.95	0.79	2.36	4.72	3.86
1	25	4.25	3.12	1	0.62	11.02	0.55	1.325	1.310	1.12	9.37	1 - 11-1/2 NPT	0.79	8.82	0.98	2.76	5.24	4.37
1-1/4	32	-	-	-	-	-	-	1.670	1.655	0.94	11.28	1 1/4 - 11-1/2 NPT	0.87	11.30	1.57	3.94	6.97	5.87
1-1/2	40	5.00	3.88	1	0.62	13.23	0.63	1.912	1.894	1.38	12.13	1 1/2 - 11-1/2 NPT	0.98	11.30	1.57	3.94	6.97	5.87
2	50	6.00	4.75	1	0.75	14.20	0.63	2.387	2.369	1.50	13.31	2 - 11-1/2 NPT	1.10	12.76	2.07	4.17	7.48	6.29
3	80	7.50	6.00	1	0.75	18.78	0.71	3.516	3.492	1.87	17.83	3 - 8 NPT	1.38	17.17	3.07	5.98	10.67	9.21
4	100	9.00	7.50	8	0.75	23.94	0.71	4.518	4.491	2.25	23.54	4 - 8 NPT	1.77	23.47	3.94	8.27	14.21	12.44

## Weight (lbs.)

NOMINAL SIZE		SOCKET THREADED	FLANGED
INCHES	mm		
1/2	15	0.66	1.10
3/4	20	1.32	2.20
1	25	1.76	3.31
1-1/2	40	4.41	5.51
2	50	5.51	8.82
3	80	15.43	18.74
4	100	40.78	45.19

## Cv Values

NOMINAL SIZE		Cv
INCHES	mm	
1/2	15	5.2
3/4	20	7.5
1	25	14
1-1/2	40	34
2	50	50
3	80	110
4	100	165

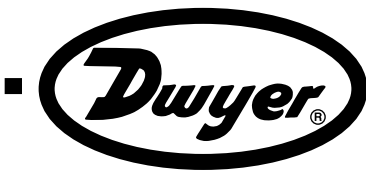
## Filter Screen Sizes\*

MESH (HOLES PER LINEAR INCH)	20	30	40
MAXIMUM PARTICLE SIZE (INCH)	.033	.023	.011
MICRON PARTICLE SIZE (10-30 µ)	840	595	420

\* For 60 mesh consult factory

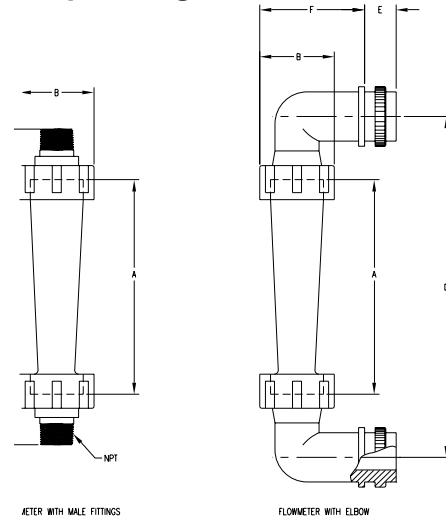
## Caution

- Never remove strainer from pipeline under pressure.
- Always wear protective gloves and goggles.



## Series LFM In-Line and Panel Mount Flowmeter

### Specifications - Installation and Operating Instructions



The Series LFM In-Line Flowmeter measures the flow of water and other compatible media. Models possess dual GPM and LPM scales. Various size ranges and connections are available to satisfy your application.

#### INSTALLATION

1. Select an indoor (only) location that is free from excess vibration, within the specified temperature limits, and away from direct sunlight.
2. Handle carefully. Hand-tighten flange nut connection rings. O-Rings will seal if hand tightened only. Do not overtighten the adapters and fittings.
3. Install the flowmeter in an exact vertical plane, one that is in proper alignment with the existing plumbing. Use wall or other structural supports at the top and bottom of the unit. Do not allow the instrument to support the weight of pipes or tubing.
4. Use plumbers tape thread sealant. Do not use pipe dope compounds, which can craze and crack housing. Hand tighten system pipe fitting to adapter fitting. If additional torque is needed to seal pipe joint, use strap wrench on adapter fitting.
5. If using solvent-based glues like PVC cement, in the piping system, do so with the meter's body removed until glue has cured, then purge the system before re-installing. Do not solder brass fittings with the body installed, because the heat generated to solder the brass fittings will damage the flowmeter.

**CAUTION:** Ball valves and solenoid valves can have a "water cannon" effect on opening, creating pressure that exceeds the warranted ratings and will damage the flowmeter.

Model	A	B	C	D	E	F	NPT
LFMA	3-15/16 (100.01)	ø1-21/32 (ø42.07)	6-45/64 (170.26)				1/2 NPT
LFMB	6-5/16 (160.34)	ø1-63/64 (ø50.40)	8-55/64 (225.03)	8-55/64 (225.03)	63/64 (25)	2-15/64 (56.75)	1/2 NPT
LFMC	5-9/32 (134.14)	ø1-63/64 (ø50.40)	8-9/32 (210.34)	7-11/16 (195.26)	63/64 (25)	2-15/64 (56.75)	1/2 NPT
LFMD	6-45/64 (170.26)	ø2-21/64 (ø59.13)	9-27/32 (250.03)	10-41/64 (270.27)	63/64 (25)	51/64 (20.24)	3/4 NPT
LFME	8-55/64 (225.03)	ø2-27/32 (ø72.23)	12-19/64 (312.34)	12-51/64 (325.04)	1-15/64 (31.35)	63/64 (25)	1 NPT
LFMF	11-27/64 (290.12)	ø3-15/16 (ø100.01)	15-3/4 (400.05)				2 NPT

#### SPECIFICATIONS

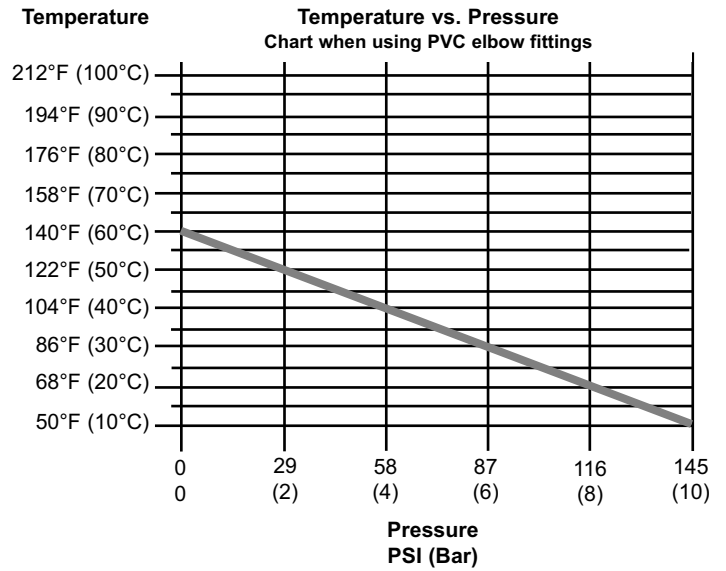
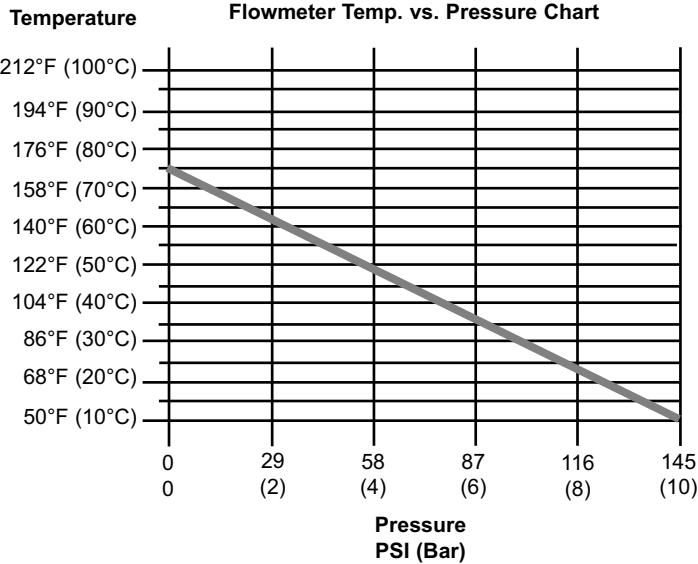
- Service:** Compatible liquids.
- Wetted Materials:** See chart.
- Temperature Limits:** See chart. Varies with pressure.
- Pressure Limit:** See chart. Varies with temperature.
- Accuracy:** ±5% full scale.
- Process Connections:** Various male and female NPT, metric union connectors, and 90° male NPT elbow fittings available depending on model series.

#### OPERATION AND MAINTENANCE

Once installed, the Series LFM In-Line and Panel Mount Flowmeter is self-operating and requires no maintenance other than an occasional cleaning with mild soap and a bottle brush. For this purpose, the unit has been designed so that its body can be removed quickly and easily while leaving all fittings intact.

When removing float for cleaning, note the floats "up" position. The float is a precision part and must be reassembled without adverse treatment, i.e. dropping, denting, and surface abrasion.

The standard technique for reading a Variable Area Flowmeter is to locate the of greatest or widest diameter on the float, and then align that with the theoretical center of the scale graduation. In the event that the float is not aligned with a grad, an extrapolation of the float location must be made by the operator as to its location between the two closest grads.



**Wetted Materials vs. Series**

Model	Body	Flange Nut	Float Stop	Float	O'ring	Female Thread	Male Thread	90 Male NPT Elbow	Metric Union
LFMA	Polycarbonate	ABS	ABS	S.S.316	Fluoroelastomer	/	ABS	PVC	ABS
LFMB	Polycarbonate	ABS	ABS	S.S.316	Fluoroelastomer	/	ABS	PVC	ABS
LFMC	Polycarbonate	ABS	ABS	S.S.316	Fluoroelastomer	/	ABS	PVC	ABS
LFMD	Polycarbonate	ABS	Polypropylene	S.S.316	Fluoroelastomer	PA66 (nylon)	PA66 (nylon)	PVC	PVC
LFME	Polycarbonate	ABS	Polypropylene	S.S.316	Fluoroelastomer	PA66 (nylon)	PA66 (nylon)	PVC	PVC
LFMF	Polycarbonate	ABS	Polypropylene	S.S.316	Fluoroelastomer	PA66 (nylon)	PA66 (nylon)	/	ABS



## Series RM Rate-Master® Flowmeters

### Specifications - Installation and Operating Instructions



Fig. 1

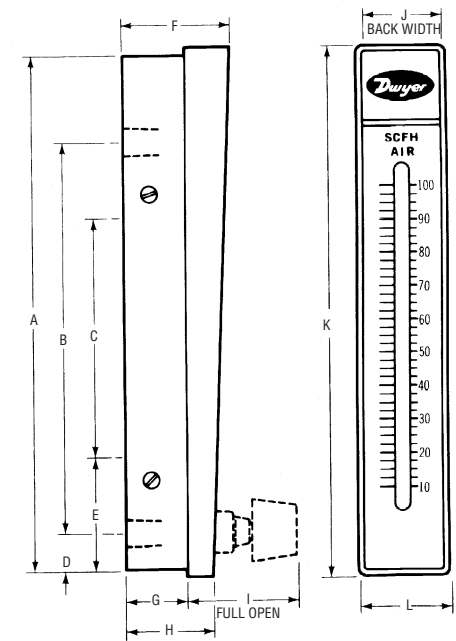


Fig. 2

	Dimensions in Inches (Centimeters)		
	Model RMA	Model RMB	Model RMC
A	4 -9/16 (11.59)	8-1/2 (21.59)	15 -1/8 (38.42)
B	3 (7.62) 1/8 NPT CONN.	6-7/16 (16.35) 1/4 NPT CONN.	12 -1/4 (31.12) 1/2 NPT CONN.
C	1-5/8 (4.13) 10 - 32 Thds.	3-15/16 (10.00) 1/4 - 20 Thds.	8-3/4 (22.23) 3/8 - 24 Thds.
D	3/8 (.95)	5/8 (1.59)	1 (2.54)
E	1-1/16 (2.70)	1-7/8 (4.76)	2-3/4 (6.99)
F	1-3/16 (3.02)	1-3/4 (4.45)	2-1/2 (6.35)
G	11/16 (1.75)	1 (2.54)	1-7/16 (3.65)
H	61/64 (2.42)	1-7/16 (3.65)	1-31/32 (5.00)
I (OPEN)	1-3/8 (3.49)	1-13/16 (4.60)	2-1/2 (6.35)
J	3/4 (1.91)	1-1/4 (3.18)	2 (5.08)
K	4-13/16 (12.22)	8-3/4 (22.23)	15-3/8 (39.05)
L	1 (2.54)	1-1/2 (3.81)	2-1/4 (5.72)

#### Panel Cutout For Flush Mounting

High	4-5/8 (11.75)	8-9/16 (21.75)	15 -3/16 (38.58)
Wide	7/8 (2.22)	1-5/16 (3.33)	2-1/16 (5.24)

#### Panel Hole Sizes for Surface Mounting

Pipe	7/16 (1.11)	5/8 (1.59)	15/16 (2.38)
Bolt	1/4 (0.64)	9/32 (0.71)	13/32 (1.03)

The Series RM Rate-Master® Flowmeters are furnished in three models (see Fig. 2), each available in a broad array of flow ranges with direct reading scales for air, gas or water. Installation, operation and maintenance are very simple. Only a few common-sense precautions must be observed to assure long, trouble-free service.

**CAUTION:** Rate-Master® Flowmeters are designed to provide satisfactory long-term service when used with air, water or other compatible media. Refer to factory for information on questionable gases or liquids. Avoid solutions of acids, bases or salts having a pH below 5.0 or above 8.5. Caustic solutions, antifreeze (ethylene glycol) and aromatic solvents should definitely not be used.

#### Calibration

Each Rate-Master® Flowmeter is calibrated at the factory. If at any time during the meter's life, you wish to re-check its calibration, do so only with devices of certified accuracy. DO NOT attempt to check a Rate-Master® Flowmeter with a similar flowmeter, as seemingly unimportant variations in piping and back pressure may cause noticeable differences in the indicated reading. If in doubt, return your Rate-Master® Flowmeter to the factory. Before proceeding with installation, check to be sure you have the Rate-Master® flowmeter model and flow range you require.

**LOCATION: Temperature, Pressure, Atmosphere and Vibration:** Rate-Master® Flowmeters are exceptionally tough and strong. They are designed for use at pressures up to 100 psi (6.89 bar) and temperatures up to 130°F (54°C).

DO NOT EXCEED THESE LIMITS! The installation should not be exposed to strong chlorine atmospheres or solvents such as benzene, acetone, carbon tetrachloride, etc. The mounting panel should be free of excessive vibration, as it may prevent the unit from operating properly.

**Inlet Piping Run:** It is good practice to approach the flowmeter inlet with as few elbows and restrictions as possible. In every case, the inlet piping should be at least as large as the connection to the flowmeter; i.e., 1/8" Iron Pipe Size for RMA models 1/4" IPS for RMB models, 1/2" IPS for RMC models. Length of inlet piping makes little difference for normal pressure-fed flowmeters.

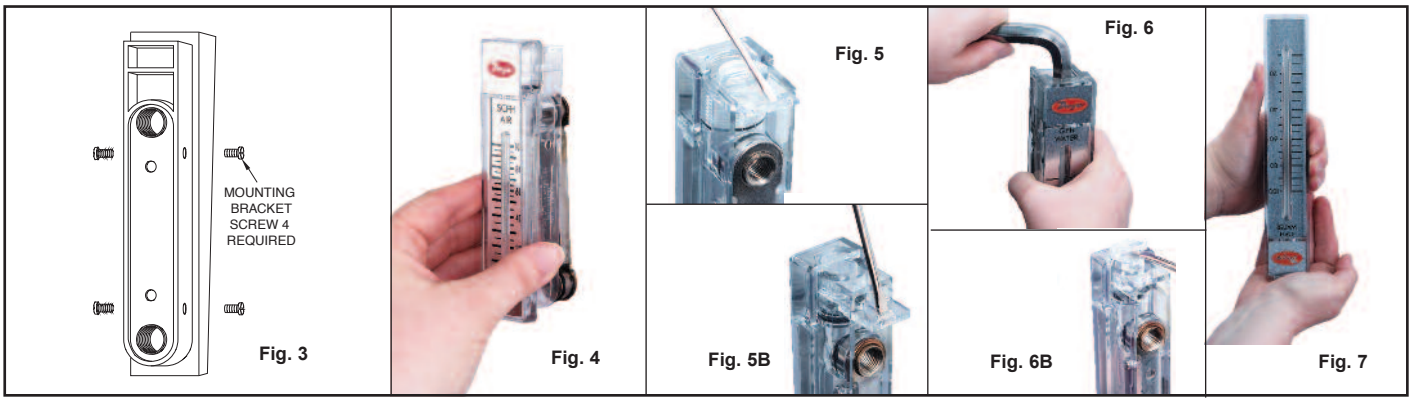
For flowmeters on vacuum air service, the inlet piping should be as short and open as possible. This will allow operation near atmospheric pressure and thereby insure the accuracy of the device. (**Note:** for vacuum air service, the flow control valve, if any, should be on the discharge side of the flowmeter. Either the TMV unit or a separate in-line valve may be applied.)

**Discharge Piping:** As on the inlet, discharge piping should be at least as large as the flowmeter connection. Also, for pressure-fed flowmeters on air or gas service, the discharge piping should be as short and open as possible. This will allow operation of the flow tube at near atmospheric pressure and insure the accuracy of the device. This is of less importance on water or liquid flowmeters, as the flowing medium is generally incompressible and moderate back pressure will not affect the accuracy of the instrument as calibrated.

#### POSITIONING AND MOUNTING

All Rate-Master® Flowmeters must be mounted in a vertical position with inlet connection at the bottom rear and outlet at the top rear.

**Bezel or Through-Panel Mounting:** Make panel cutout using appropriate dimensions from Fig. 2. Flowmeter must fit into panel freely without forcing or squeezing. Insert the flowmeter from the front of the panel and install the mounting clamps from the rear. Insert and tighten the clamp bolts in the locations shown in Fig. 3. Do not exceed 5 in./lbs. Make connections to inlet and outlet ports using pipe thread sealant tape to avoid leakage. Avoid excess torque, which may damage the flowmeter body.



**Surface Mounting:** Drill appropriate holes in panel, using the dimensions shown in Fig. 2. Hold the flowmeter in position in front of the panel and install the clamp bolts from the rear. (The mounting clamps may be used as washers, if desired, by installing them backwards or straightening them out.) Pipe up inlet and discharge following the directions in the previous sections.

**Surface Mounting on Piping Only:** An alternate method of surface mounting, omitting the clamp bolts and supporting the flowmeter solely on the connecting piping, is possible. For this method, extra-long or straight pipe threads should be used so that nuts may be run onto the pipe and later tightened against the back of the panel to retain the unit in proper position. Use appropriate hole layout in formation from Fig. 2, but omit the small holes.

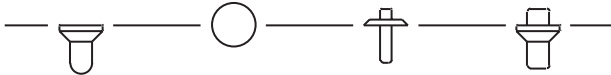
**Surface Mounting on Piping Only Without Panel:** For a temporary or laboratory type installation, the panel may be omitted altogether and the flowmeter installed directly in rigid piping. Its light weight permits this without difficulty.

#### OPERATION

To start system, open valve slowly to avoid possible damage. Control valves on BV and SSV models are turned clockwise to reduce flow, counter-clockwise to increase flow (valve is designed for flow adjustment only, not intended to be used as an open/shut-off valve). A nylon insert is provided in the threaded section of the valve stem to give a firm touch to valve and to prevent change of setting due to vibration.

The performance of low range units used in air or gas applications may be affected by static electricity. Excessive static charge may cause the ball float to behave erratically or provide a false reading. To ensure the proper function of the unit, the application should be designed to minimize or dispel static electricity.

The standard technique for reading a Variable Area Flowmeter is to locate the highest point of greatest diameter on the float, and then align that with the theoretical center of the scale graduation. In the event that the float is not aligned with a grad, an extrapolation of the float location must be made by the operator as to its location between the two closest grads. The following are some sample floats shown with reference to the proper location to read the float.



Variable Area Flowmeters used for gases are typically labeled with the prefix "S" or "N", which represents "Standard" for English units or "Normal" for metric units. Use of this prefix designates that the flowmeter is calibrated to operate at a specific set of conditions, and deviation from those standard conditions will require correction for the calibration to be valid. In practice, the reading taken from the flowmeter scale must be corrected back to standard conditions to be used with the scale units. The correct location to measure the actual pressure and temperature is at the exit of the flowmeter, except when using the Top Mounted Valve under vacuum applications, where they should be measured at the flowmeter inlet. The equation to correct for nonstandard operating conditions is as follows:

$$Q_2 = Q_1 \times \sqrt{\frac{P_1 \times T_2}{P_2 \times T_1}}$$

Where:  $Q_1$  = Actual or Observed Flowmeter Reading  
 $Q_2$  = Standard Flow Corrected for Pressure and Temperature

$P_1$  = Actual Pressure (14.7 psia + Gage Pressure)  
 $P_2$  = Standard Pressure (14.7 psia, which is 0 psig)  
 $T_1$  = Actual Temperature (460 R + Temp °F)  
 $T_2$  = Standard Temperature (530 R, which is 70°F)

Example: A flowmeter with a scale of 10-100 SCFH Air. The float is sitting at the 60 grad on the flowmeter scale. Actual Pressure is measured at the exit of the meter as 5 psig. Actual Temperature is measured at the exit of the meter as 85°F.

$$Q_2 = 60.0 \times \sqrt{\frac{(14.7 + 5) \times 530}{14.7 \times (460 + 85)}}$$

$Q_2 = 68.5$  SCFH Air

**CAUTION:** Do not completely unscrew valve stem unless the flowmeter is unpressurized and drained of any liquid. Removal while in service will allow gas or liquid to flow out the front of the valve body and could result in serious personal injury. For applications involving high pressure and/or toxic gases or fluids, please contact factory for details.

#### MAINTENANCE

The only maintenance normally required is occasional cleaning to assure reliable operation and good float visibility.

**Disassembly:** The flowmeter can be disassembled for cleaning simply as follows:

1. Remove valve knob from RMB or RMC -BV or -SSV units by pulling the knob forward. It is retained by spring pressure on the stem half-shaft so that a gentle pull will remove it. On RMA-BV or -SSV models, turn the valve knob counter-clockwise until the threads are disengaged. Then withdraw the stem from the valve by gently pulling on the knob.
2. Remove the four mounting bracket screws located in the sides of the flowmeter. See Fig. 3. Pull the flowmeter body gently forward away from the back plate to avoid undue strain on the body. Leave the piping connections intact. There is no need to disturb them. See Fig. 4.
3. Threaded body style flowmeters - Remove the slip cap with a push on a screwdriver as shown in Fig. 5. Remove the plug ball stop as shown in Fig. 6 using allen wrench sizes as follows: Model RMA - 1/4", Model RMB - 1/2" and Model RMC - 3/4" Threadless body style flowmeters - Release the plastic retaining clip with a screw driver (Figure 5B), it will unclip from the valve body (TMV Option) or the plug ball stop, slide the clip back until the valve body or ball stop can be removed. The clip will remain in the body for convenience. Using a screwdriver gently lift up on the plug in the groove as shown in Figure 6B until the o-ring seal is released and remove the plug. For the TMV option gently pull up on the valve knob to release the valve body seals and remove the valve.
4. Take out the ball or float by inverting the body and allowing the float to fall into your hand, as shown in Fig. 7. (Note: It is best to cover the discharge port to avoid losing the float through that opening.)

**Cleaning:** The flow tube and flowmeter body can best be cleaned with a little pure soap and water. Use of a bottle brush or other soft brush will aid the cleaning. Avoid benzene, acetone, carbon tetrachloride, alkaline detergents, caustic soda, liquid soaps (which may contain chlorinated solvents), etc. Also, avoid prolonged immersion, which may harm or loosen the scale.

**Reassembly:** Simply reverse steps 1 through 4 and place the flowmeter back in service. A little stopcock grease or petroleum jelly on the "O" rings will help maintain a good seal as well as facilitate assembly. No other special care is required.

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## SERIES SG1 & SG3 | 1.5" INDUSTRIAL PRESSURE GAGES

### FEATURES/BENEFITS

- Stainless steel housing to resist ambient corrosion for longer service life in harsh environments
- Good accuracy gage for value-sensitive applications requiring more precise measurement and where vibration is a concern
- Back or bottom mounting and compact size provides for mounting with dimensional limitations

### APPLICATIONS

- Vacuum in pneumatic conveying lines
- Positive pressure in compressed air headers
- Corrosive ambient environments

### DESCRIPTION

The **Series SG1 1.5" Industrial Pressure Gages** are perfect for applications where resistance to corrosion is necessary. The stainless steel case and ring offer excellent protection from harsh processes. The SG1 gages are an economical choice where ambient corrosion and vibration are a concern. Gages are suitable for all fluids that are compatible with brass and bronze, and are available with bottom or back connections.

The **Series SG3 1.5" Industrial Pressure Gages** have dual psi and bar (x100 kPa) scales with  $\pm 2.5\%$  full-scale accuracy. The Series SG3 gages are designed with 304 SS housings and 316 SS wetted parts for excellent chemical compatibility. These gages cover a wide variety of ranges from full vacuum to 300 psi. Units can withstand ambient temperatures up to 140°F (60°C). Bottom or back 1/8" NPT connection options available.



SG1 Bottom



SG1 Back



SG3 Bottom



SG3 Back

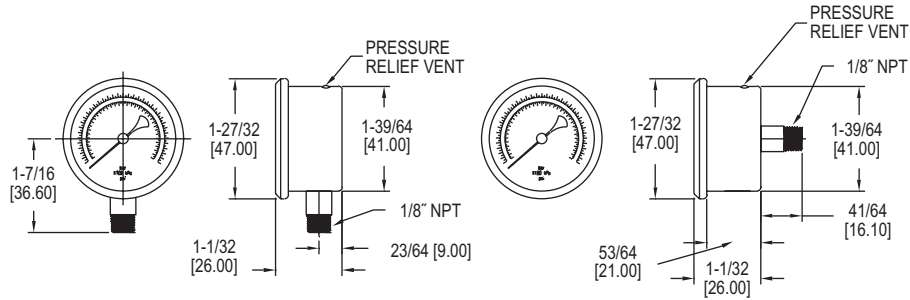
### SPECIFICATIONS

<b>Service</b>	Compatible liquids and gases.
<b>Wetted Materials</b>	SG1: Brass connector, bronze tube; SG3: 316 L SS tube, 316 SS connector.
<b>Housing</b>	304 SS.
<b>Lens</b>	Polycarbonate.
<b>Accuracy</b>	$\pm 2.5\%$ FS.
<b>Pressure Limit</b>	FS range.
<b>Temperature Limits</b>	-4 to 140°F (-20 to 60°C).
<b>Size</b>	1.5" (40 mm).
<b>Process Connections</b>	1/8" male NPT.
<b>Weight</b>	SG1: 2.2 oz (63 g) bottom, 2.3 oz (65 g) back; SG3: 2.4 oz (70 g) bottom, 2.5 oz (72 g) back.



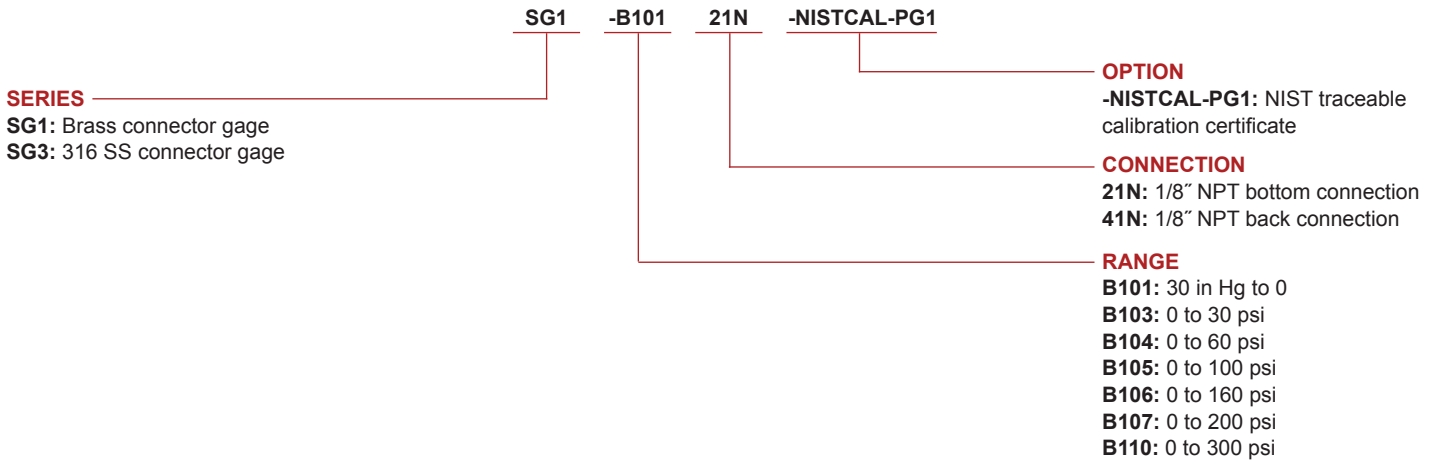


## DIMENSIONS



## HOW TO ORDER

Use the **bold** characters from the chart below to construct a product code.



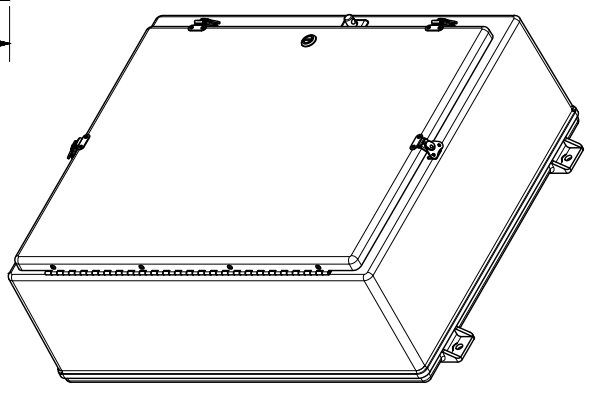
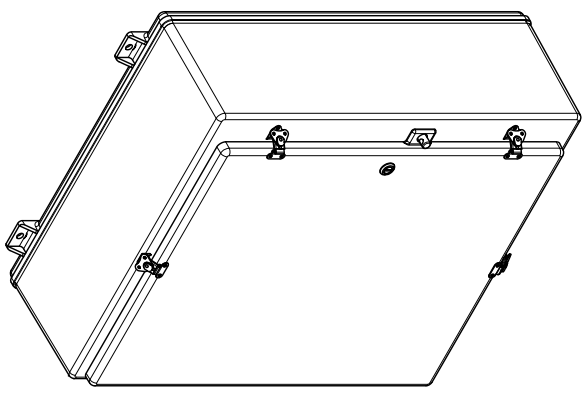
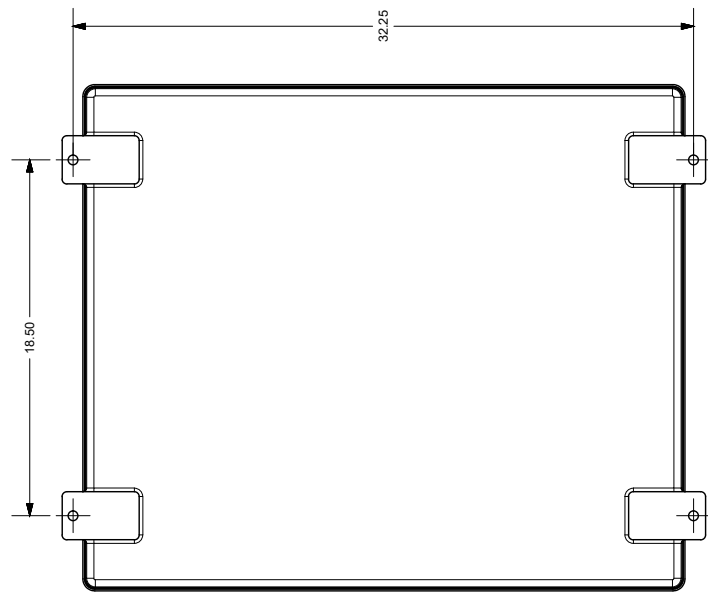
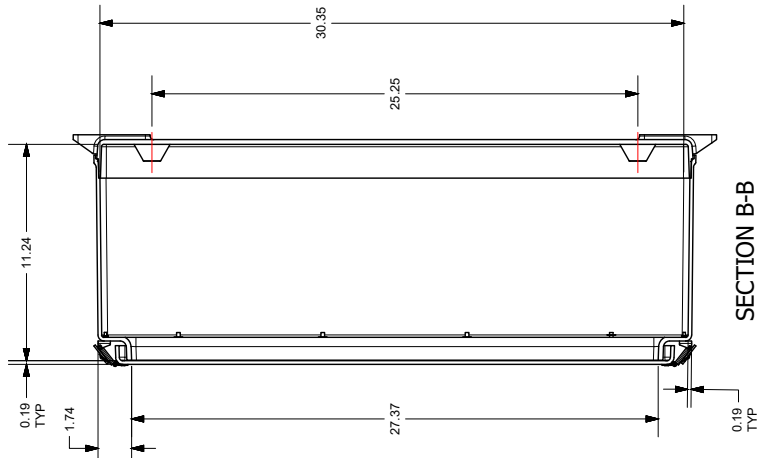
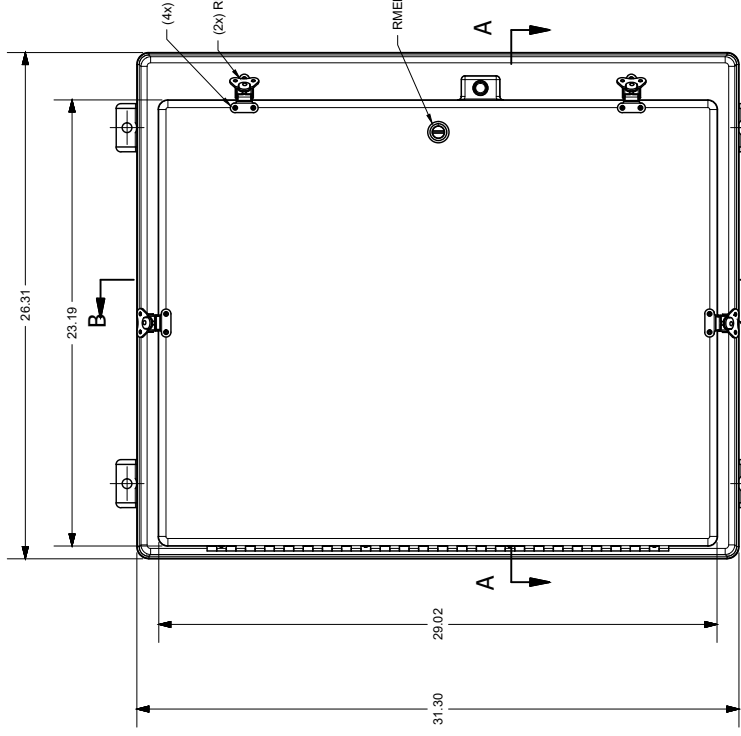
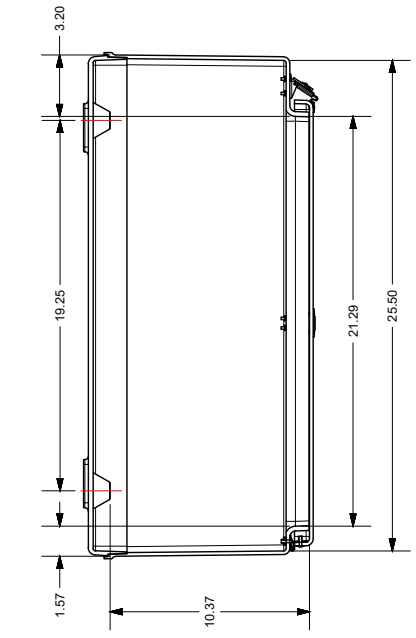
## ACCESSORIES

Model	Description
<b>A-445B</b>	U-bracket mounting kit for 1.5" and 2.5" gage
<b>NISTCAL-PG1</b>	NIST traceable pressure calibration certificate for pressure gages over 1% accuracy. <b>NOTE: EQUAL CERTS WILL BE CHARGED PER UNITS PURCHASED</b>

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# Water Panel Cabinet Details



**SPECIAL REQUIREMENTS**  
 1. CONTACT ENGINEERING FOR FIRST RUN INSPECTION  
 2. ON COVER USING (10) RIVET (RMR1460) PER STANDARD PROCESS

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NEMA 250, TYPE 1, 3, 3R, 4X, 12 ENCLOSURE, GLASS (FR30T3) COLORS STANDARD, PANTONE 428 C		STANDARD PIN: T302410HWTSL	ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED	TOLERANCES UNLESS SPECIFIED	XX ± 0.03 XXX ± 0.010
MATERIAL: FIBERGLASS REINFORCED POLYESTER (FRP)		CUSTOMER DWG:	ROBROY ENCLOSURES 500 Maple Street Bellevue, Michigan 48609 Phone: 616-794-0700 Fax: 616-749-3378		
REVISION HISTORY		DATE	ENG	DATE	DWG
REV	DESCRIPTION				
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DO NOT SCALE		SCALE	AA	8/17/20	DATE
PART NUMBER		T302410HWTSL	DRAWN BY		
STANDARD ENCLOSURE		ATT302410HWTSL	CUSTOMER		
DESCRIPTION		ATT302410HWTSL	CUSTOMER		







# pro<sup>sense</sup>® Float Level Switches, Horizontal Side-Mount

## Float Level Switch Specifications

Part No.	Price	Float Material	Stem Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
<b>FLS-HS-100</b>	\$13.50	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.6	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	Dual 1/2 in MNPT	cURus, CSA, CE (See Approvals table for details)	0.1

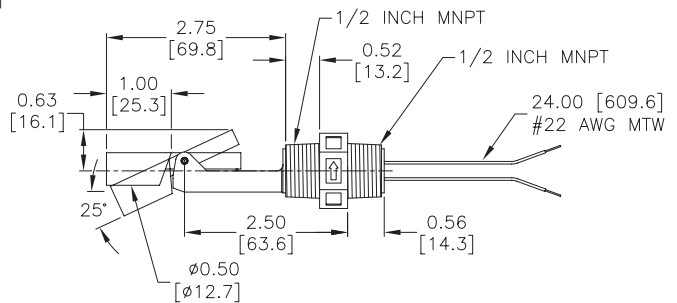
\* Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.



## Dimensions

inches [mm]



## Float Level Switch Specifications

Part No.	Price	Float Material	Stem Material	Gasket Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Hole	Approvals	Weight (lbs)
<b>FLS-HS-200</b>	\$16.00	Polypropylene (PP)	Polypropylene (PP)	Silicone	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.6	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	Ø 0.625 in [16 mm]	cURus, CSA, CE (See Approvals table for details)	0.1

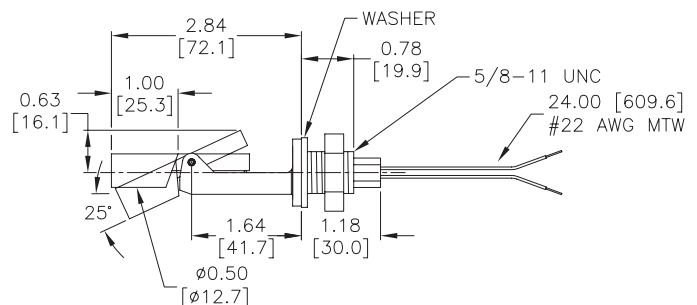
\* Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.



## Dimensions

inches [mm]



# pro<sup>sense</sup>® Float Level Switches

Agency Approvals					
Part Number	cURus (E320431)	UR Class I, Group A,B,C,D / Class II, Group E, F, G / Class III (E366154)	CSA (2679134)	CSA Class I, Group A,B,C,D / Class II, Group E, F, G / Class III (2685021)	CE
FLS-VS-100	✓				✓
FLS-VS-200					✓
FLS-VM-100	✓		✓		✓
FLS-VM-200	✓		✓		✓
FLS-VM-300	✓		✓		✓
FLS-VM-400	✓		✓		✓
FLS-VM-500	✓				✓
FLS-VM-600					✓
FLS-VL-010	✓		✓		✓
FLS-VL-020	✓		✓		✓
FLS-VL-030	✓		✓		✓
FLS-VL-040			✓		✓
FLS-VL-100	✓		✓		✓
FLS-VL-200	✓		✓		✓
FLS-VL-300	✓		✓		✓
FLS-VL-400		✓		✓	✓
FLS-VL-500					✓
FLS-VL-600					✓
FLS-VL-900					✓
FLS-HS-100	✓		✓		✓
FLS-HS-200	✓		✓		✓
FLS-HS-300					✓
FLS-HM-100	✓		✓		✓
FLS-HM-200	✓	✓		✓	✓
FLS-HM-300	✓				✓
FLS-HL-010					✓
FLS-HL-200	✓				✓
FLS-BM-100					✓
FLS-BM-200					✓
FLS-BM-300	✓		✓		✓
FLS-BL-100					✓
FLS-VK-100	✓				✓
FLS-VK-200	✓				✓
FLS-VK-300	✓				✓
FLS-HT-100					✓
FLS-HT-200					✓





## ProSense Float Level Switches

ProSense float level switches provide a low-cost general purpose solution for single point monitoring of liquid level in a variety of applications. Powerful permanent magnets within the float actuate a highly reliable and repeatable hermetically sealed reed switch as the float rises and lowers with liquid level. These switches are available in several different material constructions for compatibility with many types of liquids, a wide temperature range, and system pressure requirements. Vertical and horizontal mounting styles with several mounting thread variations are offered for ease of installation. Reed switches carry electrical ratings for both AC and DC voltage for adaptability to many control interface applications. Although these switches come configured for normally closed operation, most models can be easily converted to normally open operation in the field. Designed to be shock and vibration resistant, ProSense float level switches ensure long and trouble-free service.

### Features

- Low-cost solution for general purpose single point liquid level monitoring
- Magnetically operated, highly reliable and repeatable hermetically sealed reed switch
- Vertical and horizontal mounting styles with a variety of mounting threads
- Several material constructions for compatibility with different liquids
- Electrical ratings for AC and DC voltage
- Most switches easily converted in the field from normally closed to normally open operation
- Made in the USA



Click on the thumbnail or go to <https://www.automationdirect.com/VID-LE-0001> for a short video on ProSense Level Switches.

## Operation

ProSense float level switches are shipped configured for normally closed switch operation. Except where noted, most models can be easily converted to normally open operation in the field.

### Vertical Mount Switches

For Vertical Mount switches, normally closed is defined as the switch mounted in a vertical position with the mounting threads above the float (top mount) and the float in the "dry" position at the bottom of the stem (Figure 1). When the liquid raises the float, the switch will open.

To change the operation of the switch to normally open, remove the C-clip, remove the float from the stem, flip the float 180 degrees, re-install the float on the stem and replace the C-clip. Now the switch will be normally open in the "dry" position and will close when the liquid raises the float.

Normally Closed Installation (Dry)

To Change Operation To Normally Open

- Step 1: Remove C-Clip
- Step 2: Flip Float On Stem 180°
- Step 3: Reinstall C-Clip

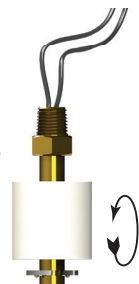


Figure 1: Vertical (Top) Mount Switch Operation

Vertical Mount switches can also be mounted with the mounting threads below the float (bottom mount) as in the bottom of a tank. If bottom mounted, switch operation will be the opposite of top mounted installation described above.

### Horizontal Mount Switches

For Horizontal Mount switches installed in the side of a tank (side-mounted), normally closed is defined as when the float arm is below and parallel with the stem in the "dry" position (Figure 2). When the liquid raises the float, the switch will open.

To change the operation of the switch, rotate the installed position of the switch 180 degrees so the float arm is above and hanging at an angle with the stem. Now the switch will be normally open in the "dry" position and will close when the liquid raises the float.

Normally Closed Installation (Dry)



Normally Open Installation (Dry)

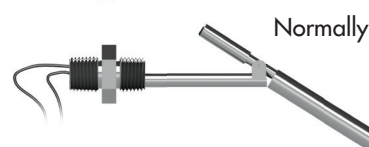


Figure 2: Horizontal Mount Switch Operation



# TF

## Wide Range of Flows and Angles

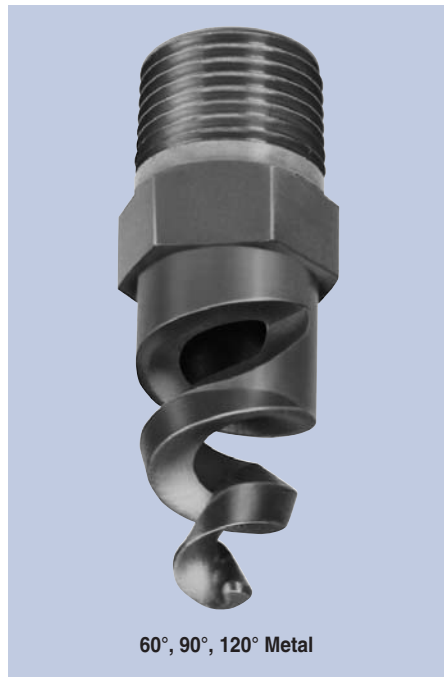
### DESIGN FEATURES

- The original spiral nozzle invented by BETE and continuously improved!
- High energy efficiency
- One-piece/no internal parts
- Clog-resistant performance
- High discharge velocity
- Male connection standard; female connection available by special order

### SPRAY CHARACTERISTICS

- Wide range of flow rates and spray angles
  - Fine atomization
- Spray patterns:** Full Cone.  
**For Hollow Cone, see page 45**  
**Spray angles:** 50° to 180°  
**Flow rates:** 0.5 to 3320 gpm  
 (Higher flow rates available)

**Available with FM approval:** N series (page 102), 1/4" TF8 NN, FCN in brass, 1/2" TF24-150 in multiple materials



60°, 90°, 120° Metal



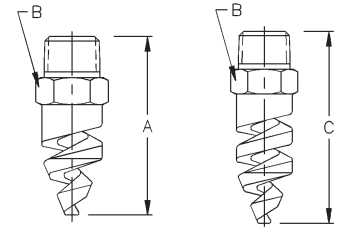
Full Cone 60° (NN)



Full Cone 90° (FCN)



Full Cone 150°/170°



90°, 120°

150°, 170°

Dimensions are approximate. Check with BETE for critical dimension applications.

### TF Full Cone Flow Rates and Dimensions

Full Cone, 60° (NN), 90° (FCN or FFCN), 120° (FC or FFC), 150° and 170° Spray Angles, 1/8" to 4" Pipe Sizes

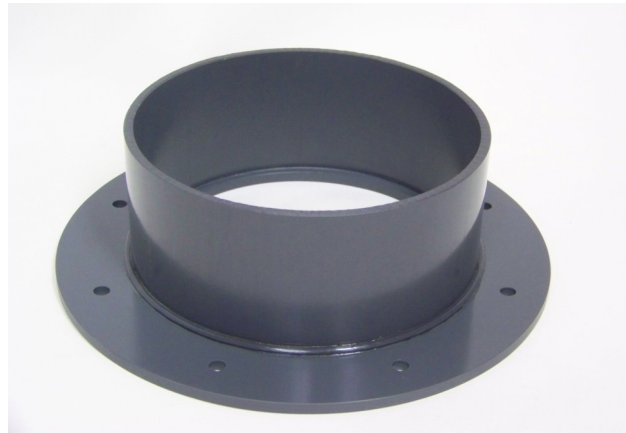
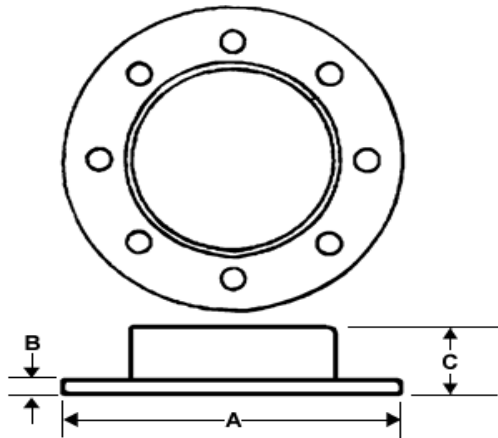
Male Pipe Size	Nozzle Number	Available Spray Angles				K Factor	GALLONS PER MINUTE @ PSI										Approx. (in.)		Dim. (in.) for Metal Only*			60° 90° 120°		
		60°	90°	120°	150° 170°		5 PSI	10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI	Free Orif. Dia.	Pass. Dia.	A**	B	C	Metal Plas.	
1/8	TF6	60°	90°	120°	150° 170°	0.221	0.495	0.70	0.99	1.21	1.40	1.57	1.71	1.98	2.21	3.13	4.43	0.09	0.09	1.69	0.56	1.69	1.00	0.20
	TF8	60°	90°	120°	150° 170°	0.411	0.919	1.30	1.84	2.25	2.60	2.91	3.18	3.68	4.11	5.81	8.22	0.13	0.13	1.69	0.56	2.19		
	TF10	60°	90°	120°	150° 170°	0.632	1.41	2.00	2.83	3.46	4.00	4.47	4.90	5.66	6.32	8.94	12.6	0.16	0.13	1.88	0.56	2.38	1.25	0.20
1/4	TF6	60°	90°	120°		0.221	0.495	0.70	0.99	1.21	1.40	1.57	1.71	1.98	2.21	3.13	4.43	0.09	0.09					
	TF8	60°	90°	120°	150° 170°	0.411	0.919	1.30	1.84	2.25	2.60	2.91	3.18	3.68	4.11	5.81	8.22	0.13	0.13	1.88	0.56	2.38	1.25	0.20
	TF10	60°	90°	120°	150° 170°	0.632	1.41	2.00	2.83	3.46	4.00	4.47	4.90	5.66	6.32	8.94	12.6	0.16	0.13	1.88	0.56	2.38		
3/8	TF6	60°	90°	120°		0.221	0.495	0.70	0.99	1.21	1.40	1.57	1.71	1.98	2.21	3.13	4.43	0.09	0.09					
	TF8	60°	90°	120°		0.411	0.919	1.30	1.84	2.25	2.60	2.91	3.18	3.68	4.11	5.81	8.22	0.13	0.13					
	TF10	60°	90°	120°		0.632	1.41	2.00	2.83	3.46	4.00	4.47	4.90	5.66	6.32	8.94	12.6	0.16	0.13					
1/2	TF12	60°	90°	120°	150° 170°	0.949	2.12	3.00	4.24	5.20	6.00	6.71	7.35	8.49	9.49	13.4	19.0	0.19	0.13	1.88	0.69	2.38	1.63	0.25
	TF14	60°	90°	120°	150° 170°	1.28	2.86	4.05	5.73	7.01	8.10	9.06	9.92	11.5	12.8	18.1	25.6	0.22	0.13					
	TF16	60°	90°	120°	150° 170°	1.68	3.75	5.30	7.50	9.18	10.6	11.9	13.0	15.0	16.8	23.7	33.5	0.25	0.13					
3/4	TF20	60°	90°	120°	150° 170°	2.61	5.83	8.25	11.7	14.3	16.5	18.4	20.2	23.3	26.1	36.9	52.2	0.31	0.13					
	TF24	60°	90°	120°	150° 170°	3.81	8.52	12.1	17.0	20.9	24.1	26.9	29.5	34.1	38.1	53.9	76.2	0.38	0.19	2.50	0.88	3.06	3.00	0.50
	TF28	60°	90°	120°	150° 170°	5.22	11.7	16.5	23.3	28.6	33.0	36.9	40.4	46.7	52.2	73.8	104	0.44	0.19					
1	TF32	60°	90°	120°	150° 170°	6.64	14.8	21.0	29.7	36.4	42.0	47.0	51.4	59.4	66.4	93.9	133	0.50	0.19	2.75	1.13	3.50	5.50	0.88
	TF40	60°	90°	120°	150° 170°	10.6	23.7	33.5	47.4	58.0	67.0	74.9	82.1	94.8	106	150	212	0.63	0.25	3.63	1.38	4.38	8.50	2.50
	TF48	60°	90°	120°	150° 170°	15.0	33.6	47.5	67.2	82.3	95.0	106	116	134	150	212	300	0.75	0.25					
1 1/2	TF56	60°	90°	120°	150° 170°	20.4	45.6	64.5	91.2	112	129	144	158	182	204	288	408	0.88	0.31				5.38	
	TF64	60°	90°	120°	150° 170°	26.7	59.7	84.5	120	146	169	189	207	239	267	378	534	1.00	0.31	4.38	2.00	5.38	22.0	4.25
	TF72	60°	90°	120°	150° 170°	30.4	67.9	96.0	136	166	192	215	235	272	304	429	607	1.13	0.31				5.63	
2	TF88	60°	90°	120°	150° 170°	44.3	99.0	140	198	242	280	313	343	396	443	626	885	1.38	0.44	5.63	2.50	5.88	46.0	8.00
	TF96 <sup>1</sup>	60°	90°	120°	150° 170°	55.9	125	177	250	306	354	395	433	500	559	791	1120	1.50	0.44	6.88	2.50	7.00	54.0	9.00
3	TF112 <sup>1</sup>	60°	90°	120°	150° 170°	81.0	181	256	362	443	512	572	627	724	810	1150	1620	1.75	0.56	8.63	3.50	9.25	114	20.0
	TF128 <sup>1</sup>	60°	90°	120°	150° 170°	107	239	339	480	588	679	759	831	960	1070	1510	2150	2.00	0.56					
4	TF160 <sup>1</sup>	60°	90°	120°		166	371	525	742	909	1050	1170	1290	1480	1660	2350	3320	2.50	0.63	10.1	4.50		169	27.0

Flow Rate (GPM) = K √PSI \*Dimensions are for bar stock, cast sizes may vary. \*\*60° nozzles slightly longer, consult BETE. <sup>1</sup> Three turn nozzles

Standard Materials: Brass, 316 Stainless Steel, PVC, Polypropylene, Cobalt Alloy 6, and PTFE (Poly. not available for TF6 thru TF10).

Spray angle performance varies with pressure. Contact BETE for specific data on critical applications.

TO ORDER: specify pipe size, connection type, nozzle number, spray angle, and material.



**PVC FLANGE**

Part Number	Size	Socket ID	A	B	C	No. Bolt Holes	Bolt Circle Dia.
PVCF04	4"	4-1/2"	8-1/2"	1/4"	2-1/4"	4	6-3/4"
PVCF06	6"	6-5/8"	10"	1/4"	3-1/4"	8	8-1/2"
PVCF08	8"	8-5/8"	12"	1/4"	3-1/4"	10	10-1/2"
PVCF10	10"	10-3/4"	14"	1/4"	3-1/4"	12	12-1/2"
PVCF12	12"	12-3/4"	16"	1/4"	3-3/4"	16	14-3/8"
PVCF14	14"	14"	18"	1/4"	3-3/4"	16	16-1/2"
PVCF16	16"	16"	20"	1/4"	3-3/4"	18	18-1/2"
PVCF18	18"	18"	22"	1/4"	3-3/4"	20	20-1/2"
PVCF20	20"	20"	24"	1/4"	3-3/4"	22	22-1/2"
PVCF24	24"	24"	28"	1/4"	3-3/4"	24	26-1/2"

Bolt Hole Diameter on all Flanges is 5/16"