

High Priority

CONTRACTOR SUBMITTAL TRANSMITTAL FORM REV. A

Owner: County of Hawaii
Contractor: Nan, Inc.
Project Name: Hilo WWTP Phase 1
Submittal Title:
TO:
From: Nan Inc.

Project No.: WW-4705R
Submittal Number:
For Information Only

Specification No. and Subject of Submittal / Equipment Supplier	
Spec:	Paragraph:
Authored By:	Date Submitted:

Submittal Certification		
Check Either (A) or (B):		
<input type="checkbox"/> (A)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with <u>no exceptions</u> .	
<input type="checkbox"/> (B)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings <u>except</u> for the deviations listed.	
Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.		
General Contractor's Reviewer's Signature: 		
Printed Name and Title:		
In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.		
Firm:	Signature:	Date Returned:

PM/CM Office Use	
Date Received GC to PM/CM:	
Date Received PM/CM to Reviewer:	
Date Received Reviewer to PM/CM:	
Date Sent PM/CM to GC:	

Nan, Inc

PROJECT: HILO WWTP REHABILITATION
AND REPLACEMENT PROJECT - PHASE 1

JOB NO. WW-4705R

THIS SUBMITTAL HAS BEEN CHECKED BY
THIS CONTRACTOR. IT IS CERTIFIED
CORRECT, COMPLETE, AND IN
COMPLIANCE WITH CONTRACT
DRAWINGS AND SPECIFICATIONS. ALL
AFFECTED CONTRACTORS AND
SUPPLIERS ARE AWARE OF, AND WILL
INTEGRATE THIS SUBMITTAL (UPON
APPROVAL) INTO THEIR OWN WORK.

DATE RECEIVED _____
SPECIFICATION SECTION # _____
SPECIFICATION _____
PARAGRAPH _____
DRAWING _____
SUBCONTRACTOR _____
SUPPLIER _____
MANUFACTURER _____

CERTIFIED BY CQCM or Designee : 

Review Comments:

1. Provide pressure gages with 3 1/2" size instead of the submitted 2.5" size.

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2. Fan selection for the I-BOX 5000 is too close at the tip of the curve at 7" w.c. and shutoff head at 7.5". Select the fan with a minimum of 2-3" between the design pressure and shutoff pressure. This is to account for any future pressure drop as the media gets exhausted.

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3. The option with five individual no-loss exhaust stacks, each equipped with a volume control damper, is acceptable in lieu of the one single combined header as shown currently on the drawings. Provide a sample line with isolation valve for each stack.

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Attn: Marshall Rucknagel
NAN, Inc.
636 Laumaka Street
Honolulu, HI 96819

Reference: Section 11395E: Blend Tanks Odor Control System and Section 11395F: Solids Odor Control System for Hilo WWTP Rehab and Replacement Project, Phase 1
Customer Order#: 24077-00049
IMS Project# 40243

Dear Marshall,

We have reviewed the approval with make corrections noted and produced responses:

- 1) NAN Inc. – Provide pressure gages with 3 ½" size instead of the submitted 2.5" size

IMS – Noted, we will provide 3.5" sized pressure gauges for the system. Cutsheet included in this letter.

- 2) NAN Inc. – Fan selection for the I-BOX 5000 is too close at the tip of the curve at 7" w.c. and shutoff head at 7.5". Select the fan with a minimum of 2-3" between the design pressure and shutoff pressure. This is to account for any future pressure drops as the media get exhausted.

IMS – Noted, we will provide the fan with a 3 HP motor to accommodate the predicted static pressure. New fan curve and motor data sheet included in this letter.

- 3) NAN Inc. – The option with five individual no-loss exhaust stacks, each equipped with a volume control damper, is acceptable in lieu of the one single combined header as shown currently on the drawings. Provide a sample line with isolation valve for each stack.

IMS – Noted, we will proceed with the individual exhaust stack option and include the sample lines with isolation valves. Layout drawing included in this letter.

We will consider this submittal approved with the above changes and proceed with our manufacturing stage. A new revision will be made for your information. If there are any questions or concerns regarding the submittal feel free to call or email me.

Thank you for your time,

Trevor Till
Project Engineer
Trevor@integrityms.net
858-435-5225

SECTION 11395F
SOLIDS ODOR CONTROL SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- A. The work specified shall include furnishing all labor, design, materials, equipment, incidentals and testing of all equipment and materials necessary to provide the OWNER with two (2) completely operational 2-stage packaged biological Odor Control Systems of unitary construction, including requirements for system construction, components, materials, functional testing, quality and use for removal of hydrogen sulfide (H_2S) from the solids handling Building as specified herein and indicated on the plans.
- B. All materials, products, or devices shall be new and unused.
- C. Unit responsibility: The contractor shall assign the scope of the odor control systems to an Odor Control Supplier (OCS) who shall have the single source responsibilities for providing the components described herein including design, fabrication, assembly, delivery, supervision of installation, startup and testing of the system and related accessories and appurtenances. However, the contractor shall have overall responsibilities of the odor control system and shall provide any other components and services that are not provided by the OCS but required for a complete operable system as specified and indicated on the drawings.
- D. The OCS scope responsibilities shall include but no limited to the following components for each odor control system:
 1. FRP vessel with extended deck along with associated internal and external appurtenances.
 2. Inorganic biological media (stage 1).
 3. Activated carbon media (stage 2).
 4. Irrigation spray nozzles and associated system assemblies.
 5. FRP fan and associated VFD.
 6. Nutrient system including nutrient pump and tank with piping appurtenances and controls.
 7. Instruments, including pressure gauges, and flowmeter.
 8. Interconnecting FRP ductwork, dampers, flexible connections, and other components from the inlet damper at the odor control fan up to and including the final exhaust stacks.
 9. All interconnecting piping external to the vessel including the piping, valves, supports, and instruments associated with irrigation, and nutrient systems.
 10. Each odor control system shall have One local Vendor Water Control Panel (VWCP), free standing with associated 316 stainless steel supports that house all components necessary for the controls and monitoring of the irrigation and nutrient systems. If the VWCP is located on vessel, then all electrical components and control panel enclosure shall be rated for Class 1, Division 2, Group D meeting NFPA 820 requirements. The VWCP shall include

- instruments, nutrient pump, piping, and equipment components that will provide as a minimum, an irrigation system capable of on/off timing of intermittent once through water system.
11. Each odor control system shall have One Free standing Vendor Master Control Panel (VMCP) with 316 stainless steel supports that houses the PLC, LOI, and the controls related to the processes including but not limited to the fan, vessel, nutrient, and irrigation systems. If the VMCP is located on vessel, then all electrical components and control panel enclosure shall be rated for Class 1, Division 2, Group D meeting NFPA 820 requirements.
 12. All other associated and required accessories as specified herein and elsewhere in these Specifications.
- E. Electrical requirements: See Section 16050 - Common Work Results for Electrical and Division 16, Electrical Requirements, which contains information and requirements that apply to the work specified herein and are mandatory for this project.
- F. Reference Sections:
1. 17050 - Common Work Results for Process Control and Instrumentation Systems.
 2. 17100 - Control Strategies.
 3. 17101E - Specific Control Strategies- Headwords Odor Control.
 4. 17710 - Control Systems: Panels, Enclosures, and Panel Components.
 5. 17712 - Control Systems: Uninterruptible Power Supplies 10kVA and Below.
 6. 17720 - Control Systems: Programmable Logic Controllers.
 7. 17721 - Control Systems: Local Operator Interface (LOI).
 8. 17733 - Control Systems: Network Materials and Equipment.
 9. 17765 - Control Systems: Programming Requirements.
 10. 17950 - Commissioning for Instrumentation and Controls.

1.02 PROCESS DESCRIPTION

- A. Each biological odor control system shall consist of an exhaust fan, FRP vessel, inorganic biological media, activated carbon media, air and irrigation system, control panel, exhaust stacks, dampers, valves, piping and all other equipment and accessories for a complete system.
- B. Each complete odor control system shall be packaged and of unitary construction design. All components of the system shall be mounted on the vessel except for the water control panel and electrical master control panel. No exception to this requirement is allowed.
- C. Each packaged biological odor control system shall be a once-through system. The system is equipped with an exhaust fan that continuously draws the foul air from the process areas into the biological odor control system for treatment. The biological odor control system shall be a two-stage system. Stage 1 shall utilize an inert, porous, mineral, expanded clay material designed to remove hydrogen sulfide (H₂S) and resist compaction and degradation from the acidic sulfates of the biological oxidation of the hydrogen sulfide. Stage 2 shall utilize a pelletized coal

activated virgin carbon media to remove any remaining hydrogen sulfide as well as other odorous organic compounds.

- D. The first stage shall operate with an independently controlled irrigation process to provide Stage 1 media with adequate moisture to sustain bacterial growth and to remove toxic byproducts. The irrigation process shall be controlled by a programmed timing sequence that actuates a solenoid valve located on the water supply piping. Nutrients shall trickle down over the media to enhance and sustain the biological activity. The nutrients shall be housed in a tank and shall be dosed into the system by a nutrient pump. A pre-wired control panel shall be provided to ensure proper control and operation of the system. The cleaned air is discharged to the atmosphere through the stack (s) at the top of the unit.

1.03 REFERENCES

- A. ASTM International (ASTM):
1. ASTM D-883: "Definition of Terms Relating to Plastics."
 2. ASTM D-2583: "Test for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor."
 3. ASTM D-2563: "Recommended Practice for Classifying Visual Defects in Glass Reinforced Plastic Laminate Parts."
 4. ASTM D-4097-82: "Standard Specifications for Contact Molded Glass Fiber Reinforced Thermoset Resin Chemical Resistant Tanks."
 5. ASTM E679: "Standard Practice of Odor and Taste Thresholds By a Forced-Choice Ascending Concentration Series Method of Limits."
 6. ASTM C582: "Revision of C582-02 Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment."
 7. ASTM D-3299: "Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks."
 8. ASTM D-3982: "Standard Specification for Contact Molded Fiberglass Ducts."
- B. National Fire Protection Association (NFPA):
1. The system and its components shall meet the requirements of NFPA 820 and other relevant codes and standards.

1.04 SUBMITTALS

- ✓ A. Submit shop drawings and literature describing the equipment and associated components for evaluation and approval. Fabrication of odor control system shall not begin until a written approval and notice to proceed is provided. If the selected manufacturer's equipment layout, configuration, and/or piping requires changes from the bid documents, it is the responsibility of the manufacturer to clearly submit all proposed changes in the submittals at no additional cost to OWNER or Engineer. All exceptions and/or deviations shall be fully identified and described.
- B. General: Provide Shop Drawings, samples, administrative, quality control, and contract closeout submittals in accordance with the requirements of Section 01330 - Submittal Procedures, and as listed below.



- C. Provide shop drawings and items as specified herein for review prior to approval:
1. Detailed structural and mechanical layout drawings showing system fabrication, dimensions, size, and locations of connections to other work.
 2. Complete basis of design calculations for the FRP vessels, ladders, and media supports. Structural calculations and drawings for the vessel, shall include wind and seismic load calculations and anchor bolt sizing. The design of structural and wind calculations shall be according to the current Hawaii Building code, Section 01850 - Design Criteria of the specifications, and shall be sealed by applicable registered Professional Engineer in the state of Hawaii.
 3. Description of the laminate and the type of reinforcing to be used and a letter from the manufacturer stating the laminate reinforcing material used will provide chemical resistance at least equal to the published chemical resistance for the resin for the intended application, and the resin will meet the performance requirements stated and is suitable for the service conditions specified herein and the fabrication technique proposed. Manufacturer shall also submit certification of applicable wind load design in accordance with current edition of the Hawaii Building Code and applicable specifications.
 4. Furnish a list of recommended spare parts for each piece of equipment in the scope of supply.
 5. Process control narrative. Include irrigation system summary of the operation mode of irrigation.
 6. Description of control system operation to demonstrate compliance with the Specifications.
 7. Equipment offloading and installation instructions with enough detail to allow the Contractor to complete the mechanical and electrical installation of all System components.
 8. Annual utility and nutrient usage calculations.
 9. Information on hazards associated with the System and appropriate safety precautions, including applicable Material Safety Data Sheets (MSDS).
 10. Installation guidelines for the Contractor.
 11. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction. Provide a detailed bill of materials.
 12. Manufacturer's Information on the biological and activated carbon media such as:
 - a. Pressure drop data through media.
 - b. Media physical characteristics, including:
 - 1) Media volume.
 - 2) Media depth for each bed/layer.
 - 3) Specific surface area.
 - 4) Void ratio.
 - 5) Media sieve analysis (if applicable).
 - 6) Carbon H₂S removal capacity.
 - 7) Weight per cubic foot.
 - c. Information on expected settling rates of the media per year (if applicable).
 - d. Odor control system pressure drop calculations to include from suction ductwork connection at fan to the final discharge of the odor unit.
 - e. Operating data from previous installations to substantiate media performance claims.

- 13. Manufacturer's information on spray nozzle, mist eliminator and all other mechanical components as applicable.
 - 14. External utility requirements.
 - 15. Complete instrumentation, control, logic, and power wiring diagrams in sufficient details to allow installation of the instrumentation, controls, and electrical components.
 - 16. VWCP and VMCP external layouts, internal layouts, bill of materials, logic diagrams, HMIs, power and control wirings, PLC I/O, network connections, calculations, thermal management including air conditioners and heaters.
 - 17. Coating systems: Including manufacturer's descriptive technical catalog literature and Specifications per Section 09960 - High-Performance Coatings.
 - 18. Field-testing plan for meeting system performance requirements.
- D. Provide quality control submittals per Sections 01330 - Submittal Procedures and 01756 - Commissioning, and as follows:
- 1. Manufacturer's Certification of Compliance that the factory finish system is identical to the requirements specified herein.
 - 2. Manufacturer's Certificate of Installation and Functionality Compliance.
 - 3. Manufacturer's training program.
 - 4. Equipment Testing and Field Start-Up Report.
- E. Submit certification indicating the quality control, testing, and inspection has been completed and standards specified herein have been met prior to shipment to the jobsite.
- F. Furnish three (3) bound copies and two (2) electronic copies of the Operation and Maintenance instructions for each odor control unit. The information shall be sufficient to instruct personnel who are unfamiliar with such equipment in the operation and maintenance of the system. It shall include diagnostic procedures to be used in the event of system shutdown or malfunction. Comply also with Section 01782 - Operation and Maintenance Manuals.
- G. Submit the performance guarantee and warranty for the system.
- H. Submit results of all performance testing procedures and results.

1.05 WARRANTY AND PERFORMANCE GUARANTEE

- A. As specified in Section 01783 - Warranties and Bonds.
- B. Special Warranty: The biological odor control system and all associated components shall carry a 3-year "Full Replacement Warranty" that shall begin once the unit has been started, accepted by OWNER, and met all performance requirements. The synthetic/inert biological media, vessels, and support gratings shall carry a 10-year non-pro-rated full replacement warranty. Cost of removal and replacement of media shall be by OWNER.
- C. Performance guarantee: The contractor and OCS shall guarantee the performance of each biological odor control system for 2 years from the final acceptance by the owner. If, within the 2-year guarantee period, the system fails to meet the performance requirements specified herein, the contractor and OCS shall make all

corrective actions necessary to improve system performance at no additional cost to the OWNER. The corrective actions may include replacing equipment or parts, making operational adjustments, or replacing the entire system and all associated components.

1.06 SHIPPING, DELIVERY, STORAGE, AND HANDLING

- A. As specified in Section 15050 - Common Work Results for Mechanical Equipment.

PART 2 PRODUCTS

2.01 APPROVED MANUFACTURERS

- A. The odor control systems manufacturer referred herein as the Odor Control Supplier (OCS) shall be experienced in the design, fabrication, construction, and successful operation of biological odor control systems for the removal of hydrogen sulfide gas and other odor producing compounds from air ventilated from wastewater treatment systems. All equipment shall be furnished by a single manufacturer/OCS with single-source responsibility.
- B. Systems utilizing organic, lava rock, or stone media shall not be accepted.
- C. Manufacturers: The following or approved equal.
 - 1. Evoqua Water Technologies, LLC, ZABOCS series, San Diego, California.
 - 2. Integrity Municipal Systems, I-Box series, Poway California.

2.02 DESIGN CRITERIA

- A. Each facility odor control system shall be designed to meet the following criteria and shall meet or exceed the minimum performance requirements listed. Systems not meeting minimum EBRT (Empty Bed Residence Time) will not be accepted.
- B. Design Criteria

Solids Odor Control System		
Bioscrubber Tags	14-BIS-2610	14-BIS-2620
Each Vessel configuration Minimum Dimensions (not including stack and overall dimensions)	Rectangular Horizontal Upflow 31ft-6in L X 9 ft-0in W X 8ft-10in SSH	Rectangular Horizontal Upflow 31ft-6in L X 9 ft-0in W X 8ft-10in SSH
Number of local water control panels, also referred to as solids Water Control Panel (VWCP)	1 Tag: 14-VCP2-2610	1 Tag: 14-VCP2-2620
Number of master electrical control panels, also referred to as solids Odor Control Master Control Panel (VMCP)	1 Tag: 14-VCP1-2610	1 Tag: 14-VCP1-2620

Solids Odor Control System		
Total design air flow rate per vessel	4300 cfm	4300 cfm
Solids odor control fans	14-FAN-2610	14-FAN-2620
Maximum pressure loss per vessel including mist eliminator	5.0-inch w.c.	5.0-inch w.c.
Total number of media beds per vessel	2 Inorganic media (Stage 1) Carbon media (Stage 2)	2 Inorganic media (Stage 1) Carbon media (Stage 2)
Minimum biological media EBRT per vessel	12 seconds	12 seconds
Minimum carbon media EBRT per vessel	3.7 seconds	3.7 seconds
Inlet hydrogen sulfide Average Peak	5 PPM 10 PPM	5 PPM 10 PPM
Minimum H ₂ S removal performance/24 hrs Average	99% or 0.1 ppm for inlet H ₂ S between 1-10 ppm, 99% or 0.5 ppm for inlet H ₂ S >10 ppm	99% or 0.1 ppm for inlet H ₂ S between 1-10 ppm, 99% or 0.5 ppm for inlet H ₂ S >10 ppm

2.03 SYSTEM COMPONENTS

A. Vessel:

1. The Bioscrubber vessel shall be made of fiberglass reinforced plastic (FRP) material. Vessel and accessories shall be contact molded manufactured in accordance with NBS PS15-69, ASTM 4097 for contact molding. Resin used in fabrication shall be a premium vinyl ester resin fire retardant such as Hetron 922 or Derakane 411 by Ashland Chemical, Vipel F010 by AOC or approved equal. The resin shall be reinforced with an inner veil of suitable synthetic organic fiber such as Nexus 111-00010. Any material of construction other than FRP with premium grade resin shall not be acceptable.
2. Reinforcement: Glass fiber reinforcement used shall be commercial grade corrosion resistant borosilicate glass.
3. Fabrication: General: Fabrication shall be in accordance with NBS PS 15-69, ASTM D3299 and ASTM D4097. All non-molded surfaces shall be coated with resin incorporating paraffin to facilitate a full cure of the surface. All cut edges, bolt holes, secondary bonds shall be sealed with a resin coat prior to the final paraffinated resin coat.
4. Corrosion Liner: The inner surface of all laminates shall be resin rich and reinforced with one NEXUS 111-00010 with a minimum thickness of 10 mils. The interior corrosion layer shall consist of two layers of 1 1/2 oz. per sq. ft. chopped strand mat. The total corrosion liner thickness shall be a minimum of 100 mils.
5. Structural Laminate: Structural laminates shall consist of alternating layers of 1-1/2 oz per sq. ft mat of chopped glass and 24 oz per sq. yard woven roving

- applied to reach a designed thickness. The exterior shall be surface coated with white gel coat containing ultraviolet light inhibitors.
6. Access Manways: The vessel shall be provided with access manways to allow access to the internals of the odor control system. As a minimum, access manways shall be provided between stages.
 7. Media support and screen: The system vessel shall be provided with an HDPE and FRP support system with polypropylene screen to accommodate the biological media and carbon media beds.
 8. Vessel Accessories: The system shall be provided with all piping, valves and internals. Air inlet, air outlet, spray headers, drain and all vessel fittings shown on the drawings shall be provided by the Manufacturer.
 9. Hardware and Gaskets: All hardware and anchor lugs shall be 316 stainless-steel. All bolts shall be designed for the specified loads. Gaskets shall be a minimum of 1/8-inch thick, full face, EPDM, suitable for the intended service.
 10. Neoprene Pad: A 1/4-inch thick, 60 durometer neoprene pad must be placed underneath the scrubber vessel during installation.
- B. Vessel components shall be preassembled at the point of fabrication. Preassembly will not require all joints to be factory assembled, but all joints shall be prepared for field fabrication and square. Assemble the components at the factory to the extent possible to minimize and facilitate installation in the Field.
- C. Odor Control Media:
1. The media in stage 1 shall be one of the followings:
 - a. Inorganic expanded clay biological media as the support substrate for selectively growing sulfur-oxidizing autotrophic bacteria. The media shall be randomly dumped in the vessel to allow a low pressure drop. The media shall be porous and is resistant to hydrogen sulfide (H_2S) and acidic conditions. The media shall be non-proprietary and commercially available.
 - b. A lightweight foamed glass media of minimum 50 percent porosity manufactured from recycled glass, highly resistant to sulfuric acid (e.g., Evoqua Bioglas). The system supplier must have a minimum 5 years proven installation experience with the proposed media.
 2. The system shall use in stage 2 a coconut based granular activated carbon media to adsorb residual H_2S and other odor compounds. This stage shall provide final removal of odors to specified level.
 3. Overall media depth shall be a minimum of 60 inches. Minimum biological media depth shall be 48 inches. Minimum carbon media depth shall be 18 inches.
 4. Provide each vessel with differential pressure gages sized and selected and mounted on the vessel or remotely by the OCS to measure the differential pressure across vessel. Provide FRP or 316 SS supports for the sample and instrumentation piping as required whether shown or not on the drawings.
- D. Exhaust Fan:
1. General. Fan shall be centrifugal design manufactured of FRP with airfoil blade backward inclined or radial blade wheel. No other material of construction is acceptable. The wheel shall be statically and dynamically balanced. The fan inlet shall be slip type or flanged type and the fan outlet

- shall have a flanged nozzle. The fan will be provided with a double lip type shaft seal.
2. Provide pressure gages for the fan as shown on the drawings.
 3. Fan shall be supplied with a TEFC motor rated for Class 1, Division 2 with 1.15 service factor suitable for 3ph/60Hz/480V service. The fan shall be direct driven. The motor shall be inverter-duty driven by a variable frequency drive supplied by the OCS.
 - a. All variable frequency drives shall comply with 16262 - Variable Frequency Drives 0.50 - 50 horsepower and 16265 – Reduced Harmonic Variable Frequency Drives
 - 1 4. Performance. The fan shall be tested and rated in accordance with AMCA and shall bear the AMCA seal.
 5. The fan shall be New York Blower, Hartzell or equal.
 6. The fan shall be designed for the following specifications:
 - a. Airflow Rate: 4300 cfm.
 - b. Total Pressure Drop: 11.5 in w.c.
 - c. Motor: 20 hp, 460v, 3ph.
 - d. VFD: Vendor supplied.
- E. The scrubber system shall be provided with ~~exhaust stacks~~no-loss exhaust stacks^{AD9} manufactured of FRP as indicated on the drawings.
- F. The exhaust stacks shall be contact molded and manufactured in accordance with NBS PS15-69 and ASTM D-4097 for contact molding. The resin used in the fabrication of the exhaust stacks shall be fire retardant and of the same as that used for the main vessel such as Hetron 922 or Derakane 411 by Ashland Chemical, Vipel F010 by AOC or approved equal.
- G. An independent media irrigation system for each odor control system is incorporated into Stage 1 to provide the biological media with adequate moisture. The system shall be designed to irrigate the top of the first media bed with complete and even coverage via spray nozzles. Potable water or plant effluent water can be used provided that residual chlorine concentrations are less than 3 ppm. Vessel spray bars shall be easily removed from the outside of the vessel for cleaning and descaling. Minimum of 2 each, 8" sight ports shall be provided to view the even distribution of spray water.
- H. Piping: All make-up water, sample, and drain piping shall be SCH 80 PVC, unless noted otherwise on the drawings. OCS and shall provide sample piping for sampling and for the instruments as specified and shown on the drawings. Piping that run along vessel walls shall be supported from vessel walls whether shown or not on drawings. Sample and instrument piping shall run along vessel and be located at 4 feet of the ground for accessibility and legibility.
- I. Integrated Nutrient Reservoir and Nutrient Pump:
 1. Nutrient Addition: Each packaged biological odor control system uses a non-proprietary, commercially available liquid fertilizer to provide essential nutrients to optimize the growth of sulfur-oxidizing bacteria. Nutrients supplied as a coating to the support media or proprietary nutrients shall not be allowed. The system shall be equipped with a nutrient addition system that provides a

- controlled dosage of nutrients that is automatically fed to the irrigation water during each irrigation cycle with the help of a nutrient pump.
2. The Nutrient reservoir shall be integral to the system and mounted on the system deck. The nutrient reservoir shall be made of FRP. The nutrient reservoir shall have a float-type level switch to detect a low level. Loose nutrient tanks shall not be acceptable.
 3. The Nutrient pump shall be corrosion resistant metering type and shall be mounted in the water cabinet, sized and selected by the vendor.
- J. NFPA 820:
1. The system shall be designed and fabricated in compliance with National Fire and Protection Agency Code 820. As a minimum, all equipment installed on the system shall be rated for Class 1, Division 2, Group D.
 2. All motors and equipment within 3 feet of the foul airstream shall be rated for Class 1, Division 2, Group D.
 3. The local control panels shall be remote as shown on the plans. The installation and wiring of the control panels to the fan, nutrient pump and solenoid valve shall be the responsibility of the contractor and supplier. Use of intrinsic safety barriers shall be as needed for instrumentation sending signals back to master control panel.
- K. Vessel shall be provided with a permanently attached, 16-gauge stainless steel equipment identification plate or label laminated into the final fiberglass coat. The label shall state the following in 1/4-inch die-stamped lettering for the plate or 1-inch letter for the laminated label:
1. Equipment identification (tag) number shown on submittals and vessel name.
 2. Manufacturers' name and address.
 3. Model number and serial number.
 4. Date of manufacture.
 5. Material of construction.
 6. Design pressure (vacuum).
 7. Operating weight.
 8. Vessel dimensions.

2.04 CONTROL SYSTEM

- A. General:
1. Refer to the electrical and P&IDs drawings for additional information as well as specified herein.
 2. The OCS shall provide one (1) Vendor Master/Local Control Panel (VMCP) and one (1) Vendor Local Water Control Panel (VLCP) for each odor control unit. Refer to the tag numbers in the design criteria table of section 2.02 of this specification. Components for a complete package control system include but are not limited to OITs, PLCs, Motorized Valves and Actuator Controls, Timers, Relays, Nutrient Feed Pump Controls, Odor Control Fan Controls, level control interlocks in the Nutrient Tank, Local Operators, and Indicators, and as specified to meet the requirements and operational functionality of the vendor system.
 3. Control panels shall carry a UL label certifying the assembled industrial control panel complies with UL 508A.

4. Labels shall be fixed to the face of the panel in such a manner that the function of each component shall be easily ascertained. Label terminal strips shall be provided to facilitate wiring of external devices such as switches, sensors, meters, and controllers. No more than two conductors shall be located in each termination point.
5. All conductors shall be labeled with wire numbers and those numbers shall correspond with those provided in a wiring and panel layout diagram. All components shall be labeled with the same symbol reference shown in the electrical wiring and instrument list.
6. Provide panel components suitable for the installed site conditions including, but not limited to, material compatibility, site altitude, humidity, and process and ambient temperatures. Operating relative humidity range: 60 to 95 percent.
7. Vendor Master Control Panel:
 - a. The VMCP shall house all required controls for the entire system, pre-assembled and pre-wired at the factory, and shipped loose to be remote mounted as a free standing on a concrete pad with 316 Stainless steel supports. Provide anchoring calculations meeting the local and state seismic zone requirements.
 - b. The VMCP enclosure shall be rated NEMA 4X and shall be made of FRP or 316 Stainless steel. However, if the VMCP is located on vessel, then all electrical components and control panel enclosure shall be rated for Class 1, Division 2, Group D meeting NFPA 820 requirements. The VMCP shall be factory tested to full operation with all other components prior to shipment.
 - c. Power supply to the VMCP shall be 480 V, 3ph.
 - d. Communicate with the plant control system over EtherNet/IP.
 - e. An Ethernet Switch shall be provided in accordance with Section 17733 - Control Systems: Network Materials and Equipment. A fiber patch panel shall be provided and accept the incoming 12 strand multimode fiber optic cable, for communicating back to the Plant PLC/SCADA system.
 - f. Provide a surge protection device for incoming power. Provide surge protection for all power and control signals that are connected to devices outside a building.
 - g. The VMCP shall provide electrical control for the entire system with a minimum the following switches, alarms, and accessories:
 - 1) "On-Off" switch for Exhaust Fan.
 - 2) "Exhaust Fan Running" indicator light.
 - 3) VFD for exhaust fan.
 - 4) "Hand-Off-Auto" switch for Nutrient Pump.
 - 5) "Nutrient Pump Running" indicator light.
 - 6) "Nutrient Tank Low" indicator light.
 - 7) Push button switch with status lights for water valve.
 - 8) Timer relay for on/off control of water valve.
 - 9) Control Transformer (480V to 120V).
 - 10) The power supply shall be 480V, 3 ph, 60 Hz.
 - 11) Control panel shall be provided with terminal strip as required for easy wiring connections by the contractor.

8. Instrumentation and water controls:
 - a. The VLCP shall house all required controls for the water and nutrient system, pre-assembled and pre-wired ad piped at the factory and shipped loose to be remote mounted as a free standing on a concrete pad.
 - b. Power supply: 120 V, 1ph from the VMCP.
 - c. The VLCP controls and equipment enclosure shall be FRP NEMA 4X or 316 Stainless Steel and shall consist of the following components:
 - d. Ball valves.
 - e. Pressure reducing valve.
 - f. Pressure gauge.
 - g. Solenoid valve.
 - h. Gate control valve.
 - i. Rotameter- Variable area type with a Teflon float, EPR O-rings and PVC fittings. The rotameter shall have a direct reading scale.
 - j. Nutrient injection connection.
 - k. Water fill piping for nutrient.
 - l. Nutrient pump.
- B. System Control Philosophy:
1. General:
 - a. Hardwired interlocks to shut down the equipment in all modes of operation and activates Fail Alarms. Refer also to the P&IDs and electrical drawings for additional information.
 2. Operating Modes:
 - a. Odor Control fan:
 - 1) The fan is started and stopped manually at the VMCP via the on-off switch. Once started the fan runs continuously until it is stopped by the off switch.
 - 2) The speed of the fan will be manually adjusted via the speed potentiometer at the VMCP.
 - b. Once-Through intermittent irrigation mode system operation:
 - 1) The solenoid makeup or supply water valve will open and close the valve intermittently based on adjustable time cycle to irrigate the media periodically as programmed by the PLC.
 - 2) If the nutrient pump HOA selector switch is set to Auto position, the controls will interlock the nutrient feed pump with the water supply valve to feed nutrient into the irrigation pipe when the makeup water supply valve opens.
 - 3) If the nutrient pump HOA selector switch is set to Hand position, the nutrient pump will continuously run until it is manually stopped by the off switch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Refer to Section 15050 - Common Work Results for Mechanical Equipment.

3.02 FIELD FINISHING

- A. Coat equipment and piping per Section 09960 - High-Performance Coatings.
- B. Field touch up in accordance with Section 09960 - High-Performance Coatings.
- C. Damage to pigmented gel coat and/or exterior laminate on any FRP component shall be repaired in accordance with equipment fabricator's recommendations. Exposed surfaces will be restored to a uniform texture and color-matched appearance. Color selection shall be subject to the Owner's approval.

3.03 INSTALLATION

- A. General: Follow manufacturer's written instructions for installation and adjustment of components.
- B. FRP fans and duct: Airflow to each biological odor control system shall be dynamically tested and balanced in accordance with ASTM D-4167. Field balancing shall be done by the Contractor by qualified and certified air balancing contractor and in accordance with the air testing and balancing specifications.
- C. As far as is reasonably possible, all equipment should be pre-assembled prior to shipment, to minimize the need for on-site assembly. Media can be pre-installed by the Manufacturer and certified to meet the specified performance requirements.
- D. Installation of all equipment will be performed by the Contractor and must be in accordance with OCS/Manufacturer's written installation and startup instructions and by workers experienced in the handling of fiberglass vessels, electrical work, plumbing, and instrumentation. The final installation must be certified by the Manufacturer/OCS as complete and correct.
- E. The Manufacturer/OCS shall provide the Contractor with required clearances, tolerances, and limitations, such as smoothness/flatness of concrete pad and shall be available to answer questions prior to and during the installation of the equipment.
- F. It is the contractor's (or owner's) responsibility to provide:
 1. FRP inlet ductwork from pick-up point source to fan inlet connection.
 2. Wiring to/from system control panel to remote-mounted equipment, plant SCADA, etc.
 3. Power to system control panel (480V, 3 ph, 60 Hz, 25 Amps minimum).
 4. Suitable concrete mounting pads and other incidentals as necessary to complete the installation.
 5. Drain - a minimum of 3 inches PVC gravity drain to sewer with a 12-inch seal water depth barometric trap.
 6. Water Supply - a water supply with backflow preventer is required. The nominal water requirements are at a rate of 6.0 gpm and a pressure of 30 psi. Hardness shall not exceed 200 mg/L as calcium carbonate. Free chlorine concentration shall not exceed 3 ppm.

3.04 FACTORY ACCEPTANCE TEST

- A. Odor Control System:
 - 1. The odor control system shall have been inspected and tested at the factory prior to shipping for conformance to the following:
 - a. Damage or imperfections to paint or fiberglass work, including cracking/crazing are minimal and in accordance with FRP specifications.
 - b. VMCP and VLCP shall be inspected prior to shipping for conformance to the following:
 - 1) NEMA rating and UL508A label.
 - 2) PLC program and LOI shall be tested for proper communication and functionality between VLCP and PLC/SCADA as appropriate.
 - 3) All wiring between panel components and terminal strips shall be checked for proper labeling and connection.
 - 2. Engineer and/or Owner reserve the right to be present at the manufacturer's testing facility to witness the factory functional testing. Engineer and/or Owner shall provide intent to witness functional testing at the time of the design submittal review and approval, and manufacturer shall provide notice to Engineer and/or Owner regarding the scheduled time of the functional testing at least five business days in advance of the proposed functional testing.
 - 3. Factory testing shall include visual inspection of all equipment, complete assembly and functional operating testing of components including piping and equipment check, and verification of control panel wiring and operation.

3.05 FIELD TEST AND START-UP

- A. OCS System's services:
 - 1. The OCS system's representative for the equipment specified shall be present at the jobsite and/or classroom designated by the Owner for the minimum man-days listed for the following services, travel time excluded:
 - a. Provide 2 man-day for installation assistance, inspection, and certification of the installation.
- B. Functional testing:
 - 1. Test all system components for proper adjustment and operation in both the manual and automatic operating modes. Also, the air balancing contractor shall be present on site and shall have made any necessary corrections for proper air flow rates and pumping flows.
 - 2. Allow the bioscrubber irrigation system to operate for a 48-hour period with the moisture control system in AUTO mode and adjust as necessary for proper irrigation moisture system operation.
 - 3. All testing, adjusting, and balancing of the fan and VFD shall have been completed and approved.
- C. Performance testing:
 - 1. Performance testing shall not commence until the entire air conveyance system has been properly tested and balanced and the air flow rate to the vessel is confirmed. Also, the odor control system has been satisfactorily

- started up and enough time has been allowed for the acclimation of the bacteria.
2. After the odor control system has been satisfactorily started-up and switched to normal operation, the Odor Control Supplier shall conduct a performance test to verify that the system meets or exceeds the performance criteria. The testing shall be witnessed by the Owner and Engineer.
 3. The Contractor shall provide the Owner with a written test protocol for review by the Owner and Engineer.
 4. The Contractor shall supply, install, and operate all equipment, sensors, and instrumentation required to complete the performance test.
 5. H₂S Testing procedure:
 - a. Measure airflow to the odor control unit and, if necessary, adjust dampers and fan speed to obtain the specified design airflow in each scrubber vessel (+/- 10 percent). Airflow shall be measured at the beginning of the test period. The set position on the damper(s) will be marked or noted. Airflow should not change if damper(s) remain in position.
 - b. Measure pressures drop across each bioscrubber at beginning of test period.
 - c. Measure temperature and humidity of the inlet, outlet, and ambient air.
 - d. Performance test period to begin at a noted time and last for 24 hours. H₂S data from the inlet location of unit and from the outlet of each bioscrubber will be measured and logged once every 10 minutes to demonstrate performance during test period. Performance test shall be conducted using the naturally occurring H₂S provided by the plant processes.
 - e. The inlet H₂S data will be logged with a pre-calibrated OdaLog or acrulog gas data logger with appropriate range and accuracy for the inlet air stream (0.0 to 200.0 ppmv range, 0.1 ppmv display resolution).
 - f. The outlet H₂S data will be measured with a recently calibrated Acrulog PPB H₂S Low-range monitor/ Analyzer with appropriate range and accuracy for the outlet air stream. Outlet readings shall be measured at 10-minute intervals.
 - g. Include in the bid a minimum of 2 Tedlar bag tests where 1 bags test shall be collected at the inlet and 1 Tedlar bag samples shall be collected at the outlet of each odor control vessel. The Tedlar bag samples shall be sent to approved independent test lab for the analysis of 20 reduced sulfur compounds. The Tedlar bags samples shall be taken at 2 different time intervals during the 24 -hour testing period as directed by Engineer and Owner.

D. Odorous compounds removal Acceptance criteria:

1. The odor control system's removal efficiency shall be determined by calculating the average inlet concentration and the average outlet concentration using the following formula: Removal efficiency (percent) = (1 – average outlet concentration/average inlet concentration) x 100. The system shall have passed the odorous compounds performance test if the removal efficiency meets or exceeds the specified removal criteria listed in Article 2.02.

3.06 TRAINING

- A. Require manufacturer's representative to perform the following services in a minimum of two separate trips as described below and as specified in Section 01756 - Commissioning. Specified durations are the minimum required time on the job site. Additional services and/or longer durations shall be provided as needed at no cost to Owner to meet the required quality of work: Work to be done in a minimum of 2 trips:
 1. Installation assistance: As required.
 - a. Advise/observe the Contractor on the installation of the equipment.
 - b. Provide additional assistance as required.
 2. Installation inspection: 2 workdays.
 3. Start-up/performance testing assistance: 2 workdays:
 - a. Prior to start-up, the equipment shall be inspected for proper alignment, operation, and satisfactory performance.
 - b. Provide additional start-up/testing assistance as required.
 - c. Provide Certificate of Installation and Functionality Compliance per Section 01756 - Commissioning.
 4. Training: As defined in Specification Section 01756 - Commissioning. Provide training as follows for each facility odor control system:
 - a. Operations Training: 2-hour class, 2 sessions.
 - b. Mechanical Maintenance Training: 4 hours, 1 session.
 - c. Electrical and Controls Maintenance Training: 4 hours of training, 1 session.
 5. Final acceptance checkout: 1 workday (trip may be combined with training).
 6. Specified durations are the minimum required time on job site and do not include travel time.

END OF SECTION

AD9 Addendum No. 9 - August 2024

Type 1009SW Stainless Case Gauge with Stainless Steel System

FEATURES

- Patented PowerFlex™ movement
- All stainless steel welded construction
- True Zero™ pointer indication
- NEW ventable plug
- NEW patent pending through-dial calibration
- NEW MSL helium leak tested to 1×10^{-6} ATM cc/sec
- Meets ASME B40.100 standard
- RoHS Compliant
- CRN Approved
- 5 year limited warranty

Ashcroft is pleased to reintroduce the 1009SW Duralife® pressure gauge. This gauge has been upgraded with many new features outlined above while maintaining the tried and true performance and quality you have come to expect.

Duralife 1009SW gauges provide significant features and benefits. New features include a ventable plug that can be sealed or vented depending on your environment and a patent pending through-dial recalibration that reduces recalibration time.

The combination of features including the patented PowerFlex™ movement and optional PLUS!™ Performance dampening system in the 1009SW is the finest gauge technology for vibration, shock and pulsation applications. Available in pressure ranges from vacuum to 15,000 psi, including compound and metric ranges.



PRODUCT SPECIFICATIONS

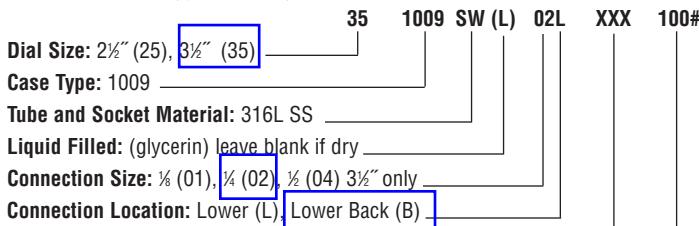
Ashcroft	
Type No.:	1009SW
Sizes:	2½, 3½"
Case:	304SS
Ring:	304SS polished bayonet
Window:	Polycarbonate
Dial:	Black figures on white background, aluminum
Pointer:	Friction adjust, black, aluminum
Bourdon Tube:	316L stainless steel C-Shaped (Vacuum-600 psi and compound) Helical (1000-15,000 psi)
Socket:	316L Stainless Steel
Movement:	300 series stainless steel, PowerFlex™, polyester segment, overload/underload stops
Connections:	½ and ¼ NPT, lower or [] lower back, $\frac{1}{8}$ NPT lower (3½") only.
Ranges:	Vac-15,000 psi and compound
Accuracy:	1% full scale. ASME Grade 1A ⁽¹⁾
Fill Plug:	Ventable
Protection:	Nema 4X / IP65 plug sealed Nema 3 / IP54 plug vented
Ambient Temperature:	-40°F to 200°F dry +20°F to 150°F glycerin filled
Limitations:	-40°F to 150°F silicone filled (based on standard polycarbonate window)

OPTIONAL FEATURES

Liquid fill:	Glycerin, Silicone, Halocarbon (includes throttle plug)
Dampening:	PLUS!™ Performance (LL) (includes throttle plug)
Window:	Safety Glass (SG)
Pointer:	Micrometer (MP)
Connections:	Metric and SAE on request
Mounting:	U-clamp (UC), Front flange (FF), Back flange (FW)
Dials:	Receiver ranges, refrigerant ranges. Custom dials

⁽¹⁾When these gauges are liquid filled the total gauge accuracy may be as much as 1.5%

HOW TO ORDER (Typical example)



Range: 0/100 psi

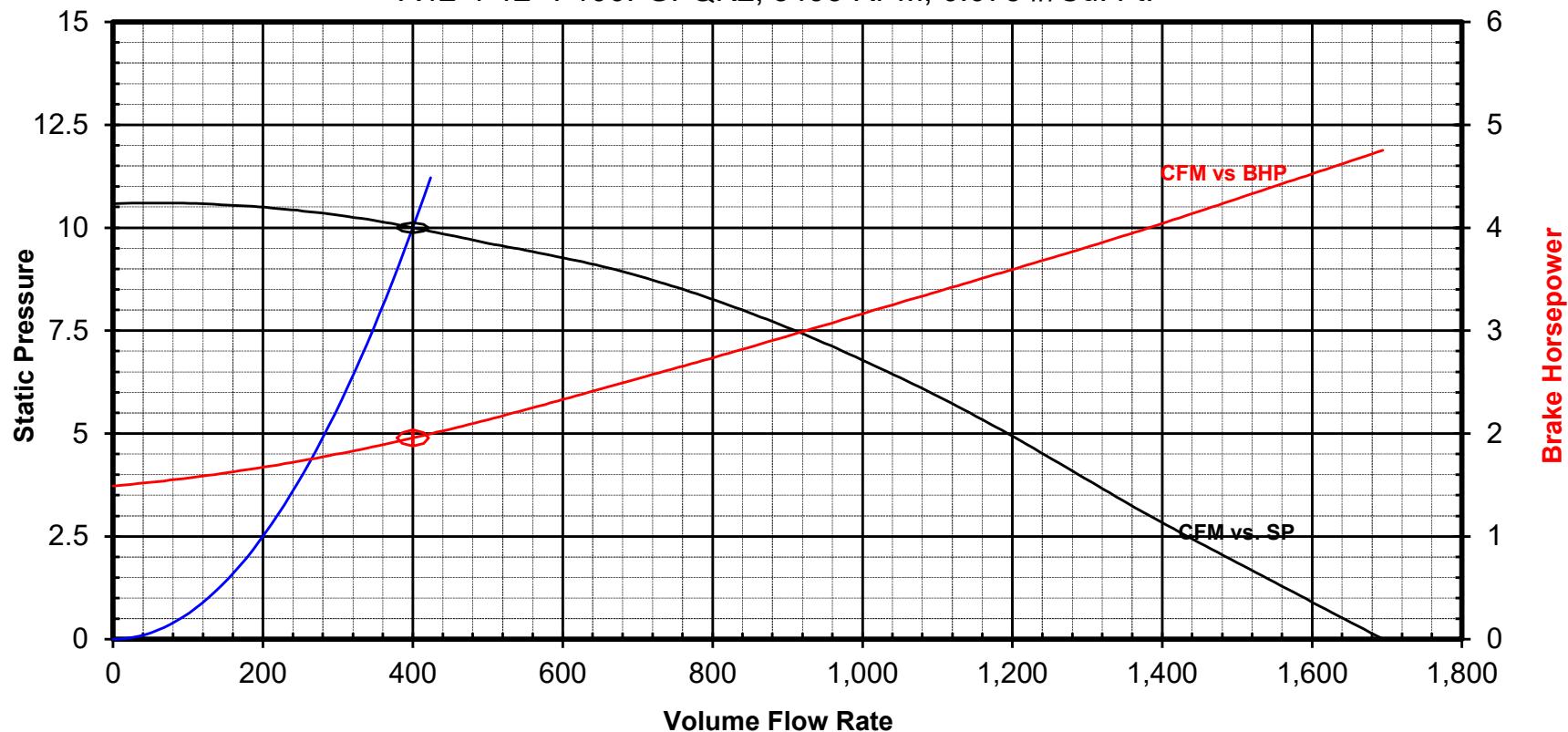
All specifications are subject to change without notice.
All sales subject to standard terms and conditions.
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Ashcroft Inc., 250 East Main Street, Stratford, CT 06614 USA
Tel: 203-378-8281 • Fax: 203-385-0408
email: info@ashcroft.com • www.ashcroft.com



Hartzell Air Movement Performance Curve

A42-4-12--F100FGFQK2, 3493 RPM, 0.075 #/Cu. Ft.



Model	ACFM	SP Actual	SP 0.075	BHP Actual	BHP 0.075	Density	Temp.	Elevation	11-Sep-251. Curve All ryan.xlsmVS81.23
A42-4-12--F100FGFQK2	400	10.00	10.00	1.96	1.96	0.075	70°F.	0'	TA20494S7101CSstandard, V05363, N/A
Std 300 Fig:	3	Installation Type:	D	No Of Blades	8				
Octave Band	1	2	3	4	5	6	7	8	dBA at 5.0 feet
Center Freq., f (Hz)	63	125	250	500	1000	2000	4000	8000	Q = 2
Sound Power	110	109	105	102	94	87	83	84	91

Values shown are based on specific laboratory test setup and installation types, and are not indicative or guaranteed in field installations. Sound power levels are in decibels, referred to 10^{-12} watts, calculated per AMCA Standard 301. A-weighted values are sound pressure, calculated assuming a free-field condition.

DATA SHEET

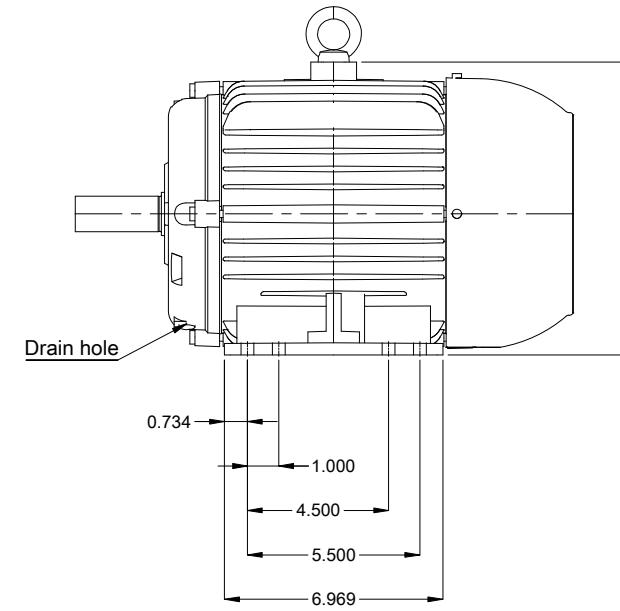
Three Phase Induction Motor - Squirrel Cage



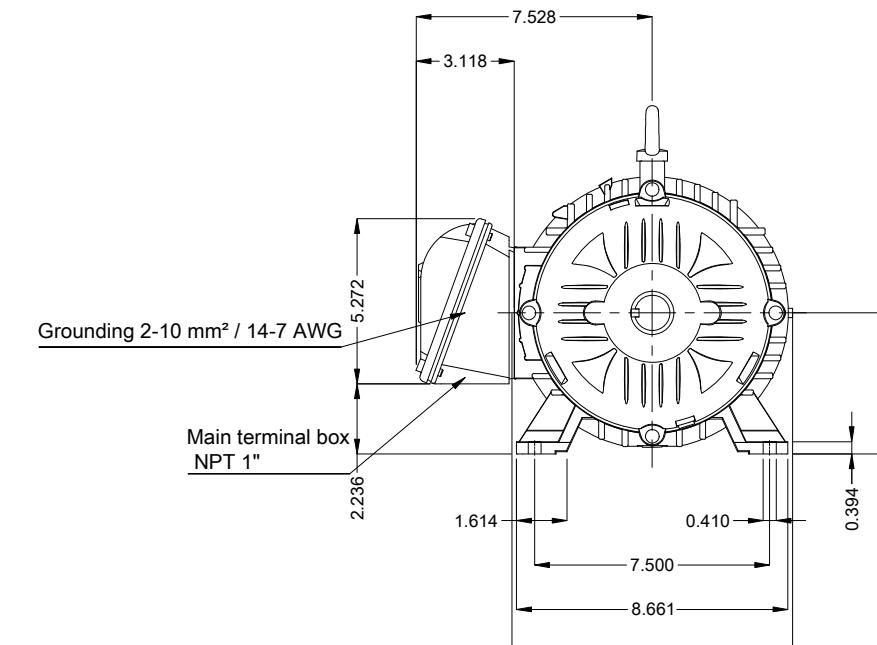
Customer :							
Product line	: W22 NEMA Premium Efficiency Three-Phase			Product code :	12378662		
				Catalog # :	00336ET3E182T-W22		
Frame	: 182/4T	Locked rotor time	: 46s (cold) 26s (hot)				
Output	: 3 HP (2.2 kW)	Temperature rise	: 80 K				
Poles	: 2	Duty cycle	: Cont.(S1)				
Frequency	: 60 Hz	Ambient temperature	: -20°C to +40°C				
Rated voltage	: 230/460 V	Altitude	: 1000 m.a.s.l.				
Rated current	: 7.52/3.76 A	Protection degree	: IP55				
L. R. Amperes	: 64.7/32.3 A	Cooling method	: IC411 - TEFC				
LRC	: 8.6x(Code K)	Mounting	: F-1				
No load current	: 3.20/1.60 A	Rotation ¹	: Both (CW and CCW)				
Rated speed	: 3515 rpm	Noise level ²	: 66.0 dB(A)				
Slip	: 2.36 %	Starting method	: Direct On Line				
Rated torque	: 4.48 ft.lb	Approx. weight ³	: 79.1 lb				
Locked rotor torque	: 250 %						
Breakdown torque	: 380 %						
Insulation class	: F						
Service factor	: 1.25						
Moment of inertia (J)	: 0.1889 sq.ft.lb						
Design	: B						
Output	25%	50%	75%	100%	Foundation loads		
Efficiency (%)	81.1	79.6	82.0	81.0	86.0	84.5	86.5
	79.1	77.9	80.6	79.7	84.5	84.1	85.8
	83.6	83.7	84.0	84.0	85.5	85.5	85.9
	83.7	84.0	85.5	85.5			
Power Factor	0.44	0.39	0.70	0.63	0.80	0.75	0.85
	0.35	0.33	0.58	0.55	0.71	0.67	0.78
	0.51	0.46	0.76	0.71	0.84	0.81	0.88
	0.43	0.68	0.79	0.84			
Losses at normative operating points (speed;torque), in percentage of rated output power							
Losses (%)	P1 (0,9;1,0)	14.6	14.6	14.6	14.6	14.6	14.6
	P2 (0,5;1,0)	10.7	10.7	10.7	10.7	10.7	10.7
	P3 (0,25;1,0)	9.4	9.4	9.4	9.4	9.4	9.4
	P4 (0,9;0,5)	8.3	8.3	8.3	8.3	8.3	8.3
	P5 (0,5;0,5)	4.5	4.5	4.5	4.5	4.5	4.5
	P6 (0,5;0,25)	3.1	3.1	3.1	3.1	3.1	3.1
	P7 (0,25;0,25)	1.8	1.8	1.8	1.8	1.8	1.8
Drive end							
Bearing type	:	6207 ZZ	Non drive end				
Sealing	:	V'Ring	6206 ZZ				
Lubrication interval	:	-	V'Ring				
Lubricant amount	:	-	-				
Lubricant type	:	Mobil Polyrex EM					
Rev.	Changes Summary			Performed	Checked	Date	
Performed by							
Checked by						Page	Revision
Date	11/09/2025					1 / 2	

1 2 3 4 5 6

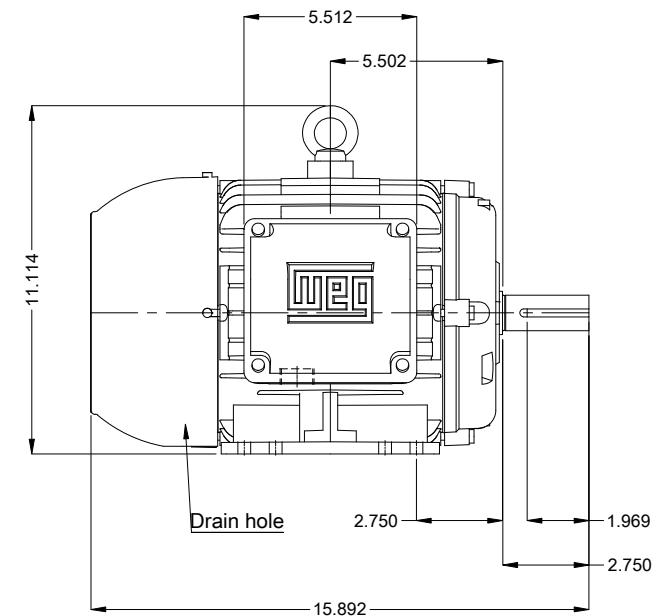
A



B



C



D

Color RAL 5009	
Painting plan 207A	
Mounting B3R(D)	

3 HP 02 Poles 60 Hz

Dimensions in inches

A Scale 1 : 6

HYBRISUSER 00

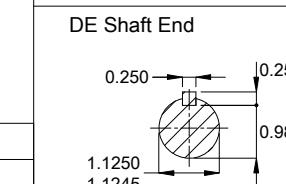
EXECUTED HYBRISUSER LOC SUMMARY OF MODIFICATIONS EXECUTED CHECKED RELEASED DATE VER

CHECKED FRAME 182/4T IP55 TEFC PREVIEW

RELEASED REL. DATE WDD 00

REL. DATE SHEET 1 / 1

WEG



WEG
W22

NEMA®
Premium

MADE IN MEXICO
12378662

MODEL 00336ET3E182T-W22

Inverter Duty Motor
Severe Duty



Class I, Div 2, Gr A, B, C, D, 1.15SF - T3
Class II, Zone 2, IIC, 1.15SF - T3
Class III, Div 2, Gr F, G - T5
60Hz: For use on PWM: Gr. A, B, C, D, F,
G, VT 1000:1, CT 20:1, 1.00SF - T4A



FOR SAFE AREA
Mod. TE1BFOXON
CC029A

PH3 60Hz Fr. 182/4T 1000m.a.s.l. IP55 TEFC 79lb

V 230//460 A 7.52/3.76

HP 3.0 kW 2.2

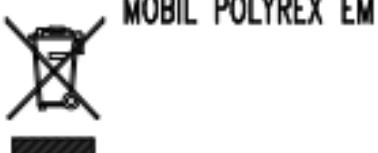
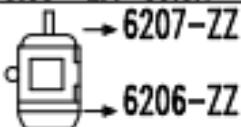
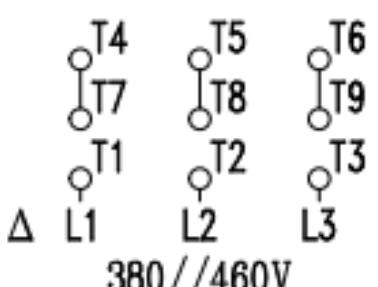
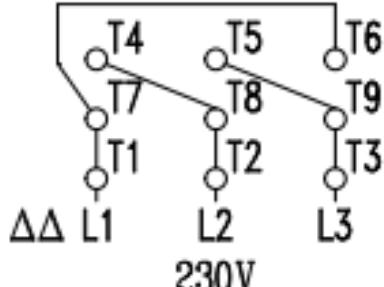
SF 1.25 SFA 9.40/4.70

RPM 3515 PF 0.85

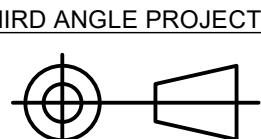
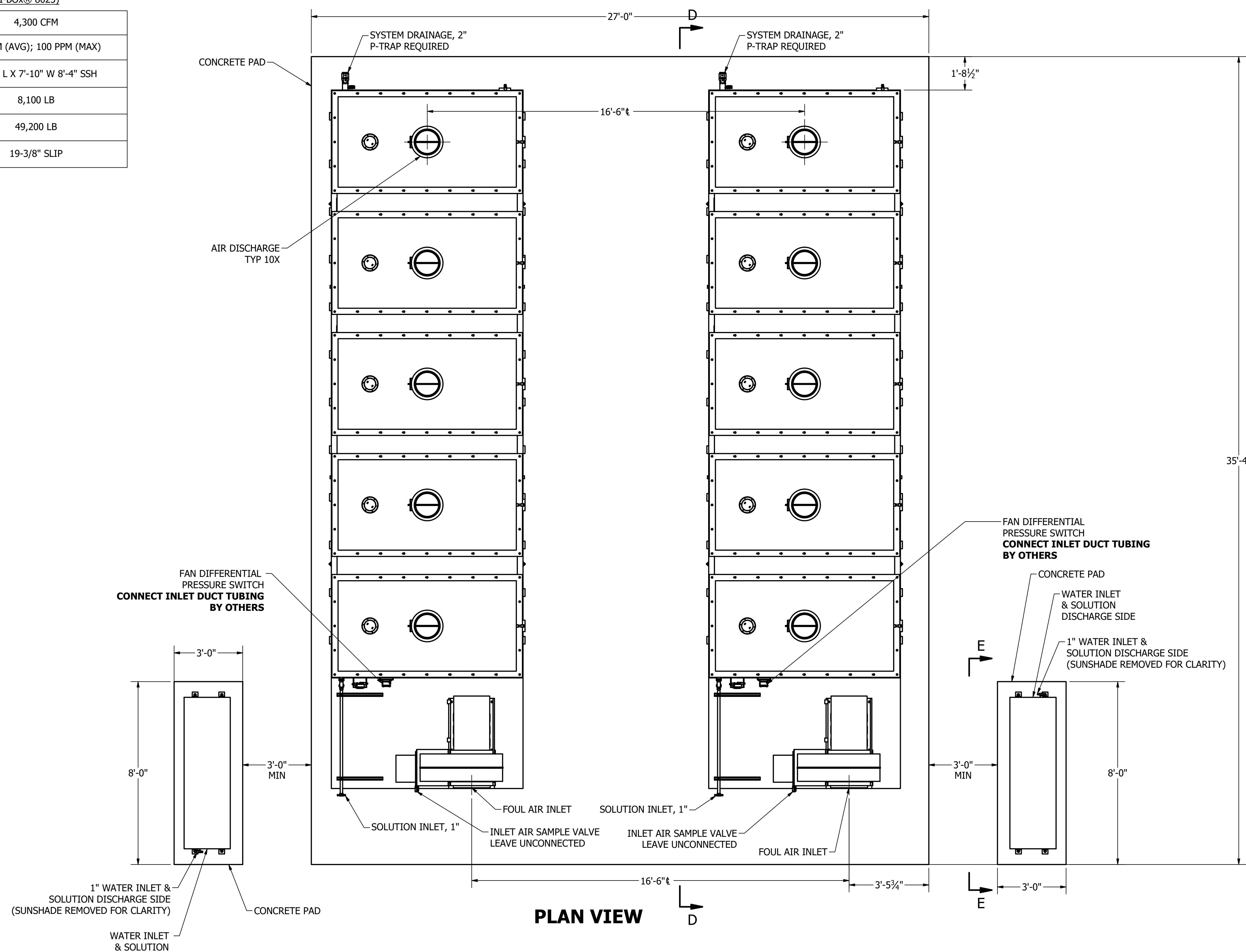
AMB 40°C INS cl. F DT80K NEMA NOM EFF 86.5%

DUTY CONT. DES B Code K

3.0HP 2.2kW 50Hz 380V 4.44A 2890RPM SF 1.25 SFA 5.55 EFF 85.5% (IE2)



AIR FLOW RATE	4,300 CFM
H2S CAPACITY	50 PPM (AVG); 100 PPM (MAX)
DIMENSIONS	30'-0" L X 7'-10" W 8'-4" SSH
VESSEL APPROX. SHIPPING WEIGHT	8,100 LB
MEDIA APPROX. SHIPPING WEIGHT	49,200 LB
INLET DUCT DIA.	19-3/8" SLIP



ALL WELD SYMBOL DIMENSIONS
ARE MINIMUM.
DIMENSIONS IN [mm] ARE MILLIMETER.
DO NOT SCALE DRAWING

DRAWN PER ASME Y14.5M
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
AND TOLERANCES TO BE AS FOLLOWS

.XX +/- .06	.XXX +/- .005
.X +/- .13	.XX +/- .01
[X +/- .25]	.X +/- .03
< +/- .5	[X +/- .05]

STD BORDER 11X17

PAD = 1" AT PLOT SCALE

A RELEASE FORM

OR SUBMIT TAL

VALVE	9/23/25	TT	
	7/18/25	TT	
	RATE	DWN	CLKD

SECTION	DATE	PWNL	CH

COMPANY CONFIDENTIAL

EREIN , LLC. ATION CIPAL Y ARE POSE THEY USED TEN EVENT EREST S ARE , THIS LATED CIPAL CIPAL IMENT IONS.	DESIGNER	DATE	TITLE CLIE
	TrevorTill	7/17/2025	
	CHECKER	DATE	
	ENGINEER	DATE	
MANAGER	DATE		
FILE:	40243_L1.iam		
SCALE:	NTS		

E	HILO WWTP BIOLOGICAL ODOR CONTROL SYSTEM OPTION B GENERAL LAYOUT DRAWING			
NT	NAN, INC. HILO, HI			
	13135 DANIELSON ST., SUITE 204 SAN DIEGO, CA 92064, USA TEL: 858-486-1620			
PROJECT 40243	CODE	DRAWING 40243_L1	SHEET 1 OF 2	REV B

