

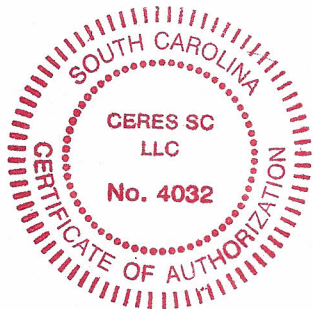


Ceres-SC, LLC
105 Whitsett Street
Greenville, SC 29601

**REQUEST FOR MODIFICATION
OF
SOLID WASTE PROCESSING FACILITY**

VLS PIEDMONT, LLC (dba VLS RECOVERY SERVICES)
305 South Main Street
Mauldin, South Carolina 29662

Facility ID No. 233730-2001



May 2016

Prepared by

Ceres

Ceres-SC, LLC
105 Whitsett Street
Greenville, SC 29601



James E. Clemmer, Ph.D., P.E.
President

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SECTION 1: FACILITY DESCRIPTION

VLS Piedmont, LLC, doing business as VLS Recovery Services (VLS), operates a non-hazardous solid waste consolidation, solidification, and recycling facility in Mauldin, South Carolina (Figure 1). VLS receives non-hazardous waste from a variety of sources including commercial businesses and industrial manufacturing businesses as allowed under the solid waste processing regulations [R.61-107.6]. South Carolina Department of Health and Environmental Control (SC DHEC) regulates the processing and disposal of solid waste under the Solid Waste Management Act as amended. Under their solid waste processing permit (Facility ID No. 233730-2001), VLS employs two general non-hazardous solid waste processes at the Mauldin facility; the consolidation of non-hazardous wastes and the solidification of non-hazardous wastes containing free liquids prior to land disposal at a suitably permitted Landfill. VLS also recycles material primarily by energy recovery at a waste-to-energy facility.

Used oil is managed under a separate used oil processing permit. There is also a centralized waste treatment system that receives, stores, and treats wastewater from off-site sources and discharges the treated wastewater to the local POTW, Renewable Water Resources (ReWa). The treated wastewater goes to the Gilder Creek Treatment plant under an indirect discharge permit for facilities in the Centralized Waste Treatment category.

VLS receives waste in containers. The most common containers arriving at the site are drums (typically 55-gallon capacity each), totes (typically 275-gallon capacity each), pails, over-the-road tankers, vacuum trucks, roll-off boxes, dump trailers, dump trucks, and box trailers.

The VLS facility is currently permitted to process ninety thousand (90,000) tons per fiscal year (July 1- June 30) of solid waste. As treatment agents, VLS employs commercial products, such as sawdust, vermiculite, absorbent polymer, or cement. VLS also employs secondary materials as replacements for the commercial products. The secondary materials that may be used are cement kiln dust, fly ash, limestone from dry scrubbers, and other absorbent secondary materials. Prior to using a secondary material as a replacement VLS gathers information as to the source of the secondary material, the composition of the material, and certification that the secondary material would not be classified as hazardous if it were disposed. Before accepting a secondary material, VLS must have a certified Toxicity Characteristic Leaching Procedure (TCLP) test for the eight RCRA metals on a representative sample. VLS maintains a copy of that analysis at the facility. Most wastes are treated with sawdust, a super-absorbent polymer (SAP), or a combination of the two.

SECTION 2: PROPOSED MODIFICATION

The proposed modification is made up of the following:

- Construction of slurry system, and
- Increase the permitted capacity from 90,000 tons per year to 150,000 tons per year.

A construction permit application (SC DHEC Form 1932) is behind Tab 1.

2.1 Scope of the Modification

VLS proposes to add a slurry system to increase the capacity to process dusty solids, primarily carbon black. The system will employ bag breakers, air lock valves and a slurry tank to prepare a slurry of the dusty solids for further processing in the existing treatment tanks. The system is expected to process about 15,000 tons per year of dusty solids. Adjacent to the solid waste processing area, VLS has a centralized waste treatment facility. Water for the slurry will primarily be treated or untreated wastewater from the centralized waste treatment facility, but potable water is also available for the slurry system.

The process is expected to have uncontrolled emissions below the threshold emission rate that requires a construction permit. A small amount of carbon black emissions produce aesthetic and housekeeping issues; therefore, an emission control device is included. VLS is contacting the Bureau of Air Quality as to the requirement for a construction permit.

The facility was initially given a capacity of 31,200 tons per year. The capacity was quickly determined to be inadequate. Vopak Industrial Services, the owner at the time, obtained an increase to 90,000 tons per year in a permit modification dated December 5, 2002.

When VLS purchased the facility from Vopak Logistic Services in FY 2009, they increased the marketing function, and quickly, the business doubled (Figure 2). Between FY 2010 and FY 2014, the processing rate was between 65,000 and 80,000 tons per year. Due to additional marketing and the rebound of the economy, VLS processed more than 82,000 tons in FY 2015 and are on track to process as much or more in FY 2016. With the addition of the slurry processing unit and increasing strength in the economy, VLS will likely exceed the permitted capacity in FY 2017. Therefore, VLS is requests that the processing capacity be increased to 150,000 tons per year.

Neither of these modifications will affect the quantity of solid waste that VLS is permitted to have on site at the end of the business day.

2.2 Design of the Slurry System

The slurry system will be located at the back of the recently constructed saw dust storage bin (Figure 3). Specifications for the following principal components of the system are behind Tab 2, and Figure 4 is a process flow diagram.

- Two Metalfab Bulk Bag Unloaders
- Two ACS Model MD 10 Rotary Airlock Valves
- One 11,000-gallon stainless steel tank with a 10-horsepower mixer
- Camfil Handte Dual Vortex Wet Scrubber

VLS receives the dusty solids, primarily carbon black, in large bags (super sacks) that are typically about 2,000 pounds. For each batch, ten bags – ten tons – of the solids will be added to water in the slurry tank. The water will typically be treated or untreated wastewater from the centralized waste treatment facility adjacent to the solid waste processing area. The quantity of water may vary, but it will typically be about 7,000 gallons. The water is transferred by a pump in the centralized wastewater area that is rated for 500 gpm.

After the slurry is completed, it will be discharged to one of the treatment tanks through flexible pipe for further processing. Because the carbon black is the primary material to be processed in this system and carbon black has good heating value, the process solids will be included in a waste-to-energy stream. The processed solids may also be sent to a landfill.

Each bag unloader is capable of opening bags up to 4000 pounds, but VLS anticipates that the bags they will receive are around 2000 pounds. Each bag unloader is attached to a rotary air lock valve and sits on a neoprene pressure plate to seal the unit and dampen the vibration. The bag unloaders will be operated sequentially. In the approximately ten minutes that is required to discharge one bag into the mixing tank, the operator is lifting another bag into the other unloader with a hoist.

The discharge throat is pyramidal-shaped to aid in the unloading process. Each bag unloader has a Metalfab Vibrator mounted to it and the vibrator can be adjusted to provide varying levels of force needed to discharge material from the bag. The solids are metered into the tank by a ACS Rotary Air Lock Valves on each unloader. The design discharge rate is 200 pounds per minute.

The design of the bag unloader reduces the amount of dust that is emitted from the slurry operation. Each bag unloader is vented to the wet scrubber to capture any solids that would go into the air. Water to the wet scrubber is potable water added in batches. When the scrubber water is spent, the recovered solids are discharged into the slurry tank and processed.

The 14-foot diameter stainless steel tank has a total volume of about 11,400 gallons. The tank is totally enclosed with a flat top and flat bottom. A conventional mechanical agitator with a

VLS Recovery Services, Mauldin, SC

May 2016; Revision 0

10-horsepower motor is used to mix the slurry. The head space of the tank vented to the wet scrubber to collect any carbon black that is displaced by filling the tank. After the batch of slurry is completed, the slurry will be transferred to one of the treatment tanks through a pump under the tank. The pump is rated at 500 gpm.

The slurry system will be assembled in place at the site. The bag unloaders will be installed over the tank and the wet scrubber will be installed near the tank. (Figure 5) The footprint is expected to be about 18 feet by 20 feet. (Figure 6)

The total batch time is expected to be about two hours. The quantity processed annually is expected to be a maximum of 15,000 tons per year.

SECTION 3: CONSTRUCTION

In order to continue operation in compliance with their Solid Waste Processing Permit during construction, VLS and its contractors have carefully planned the construction.

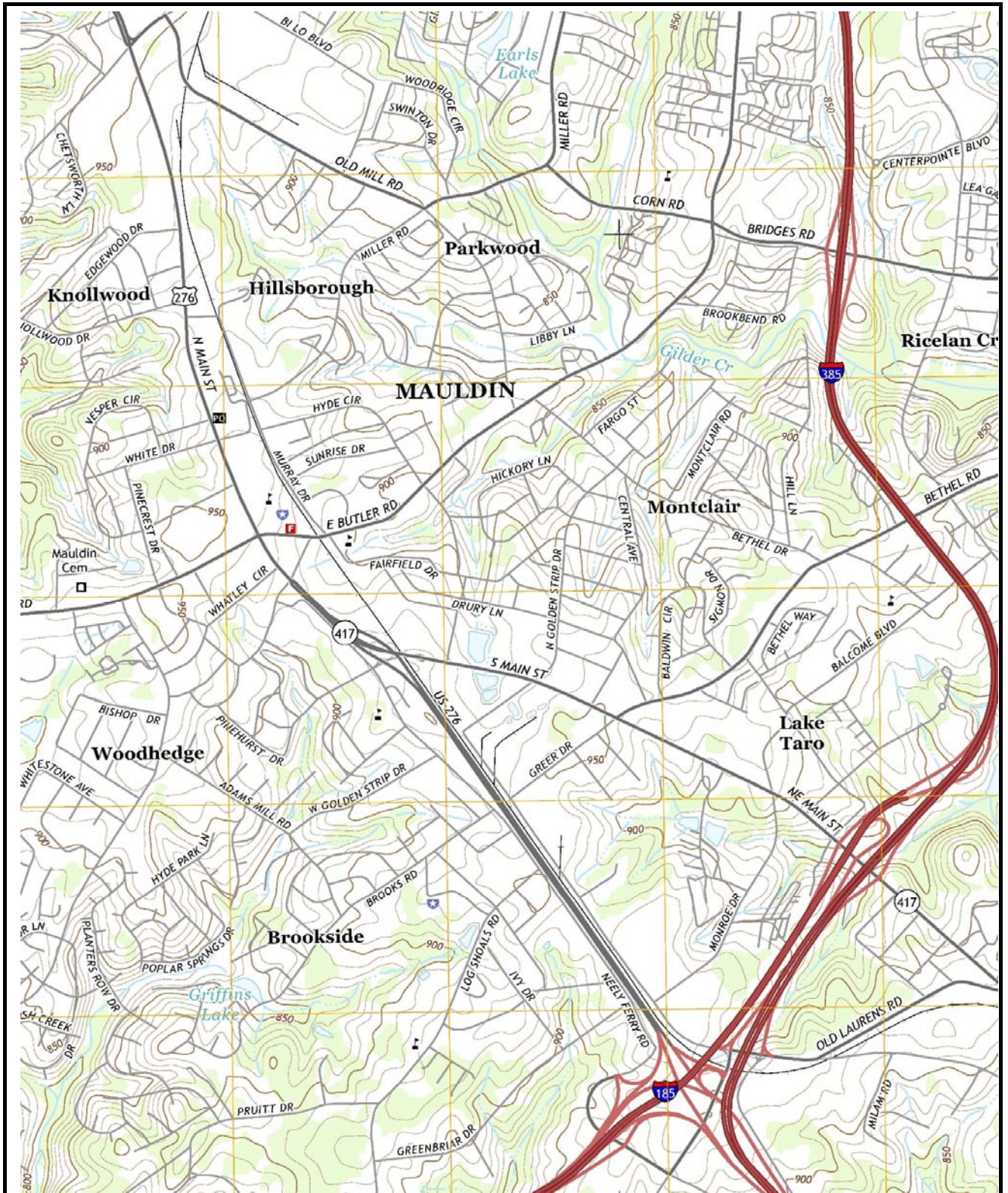
3.1 Construction Plan

The slurry system and the necessary supports, scaffolding, stairs, pumps and piping will be constructed will be constructed at the back of the sawdust storage area. The construction is not expected to have a significant impact on VLS operations or compliance with the current permit.

3.2 Construction Schedule

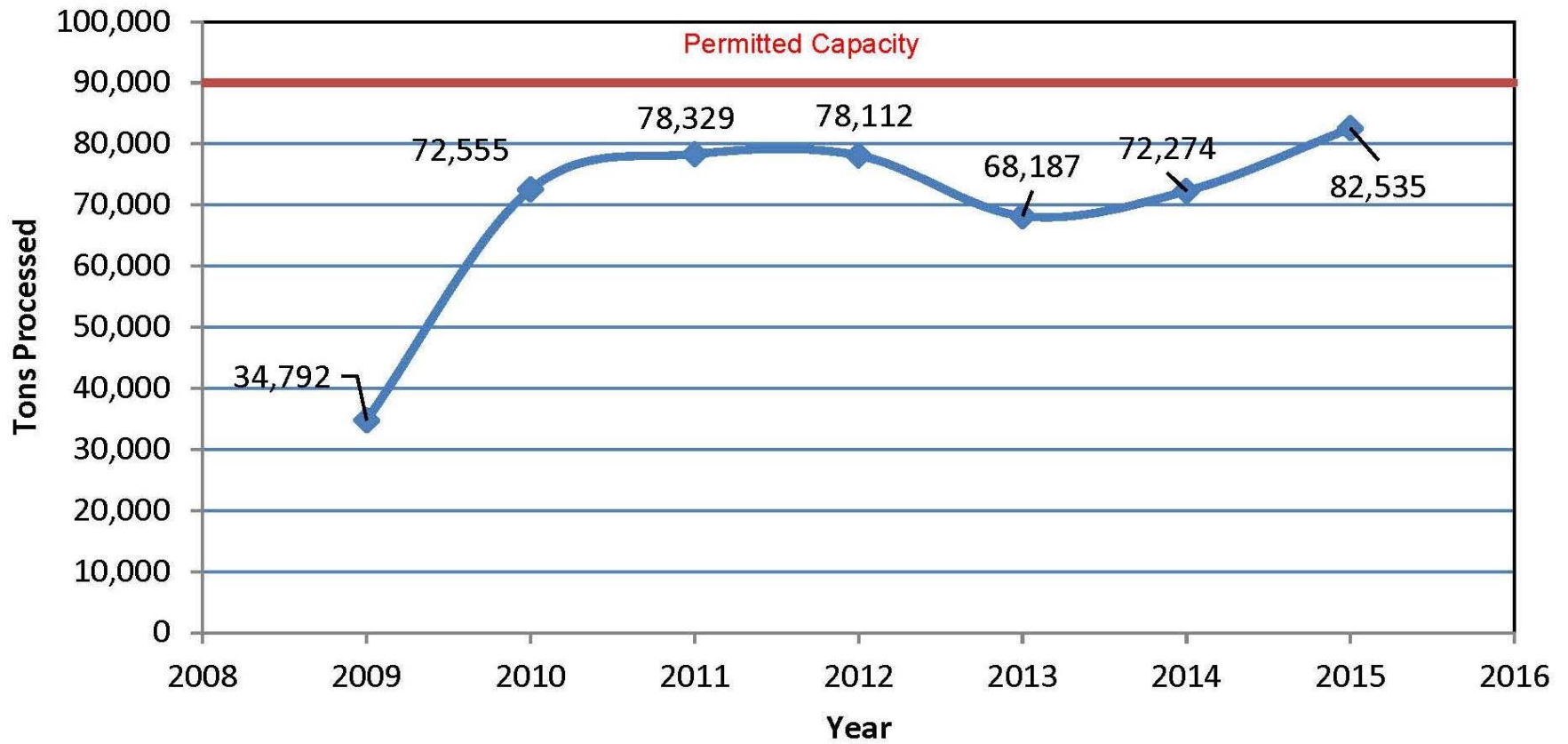
The construction is expected to be completed in about six weeks after the construction activities begin.

FIGURES



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FIGURE 1
SITE LOCATION
VLS RECOVERY SERVICES
MAULDIN, SOUTH CAROLINA
USGS MAULDIN QUADRANGLE, SOUTH CAROLINA

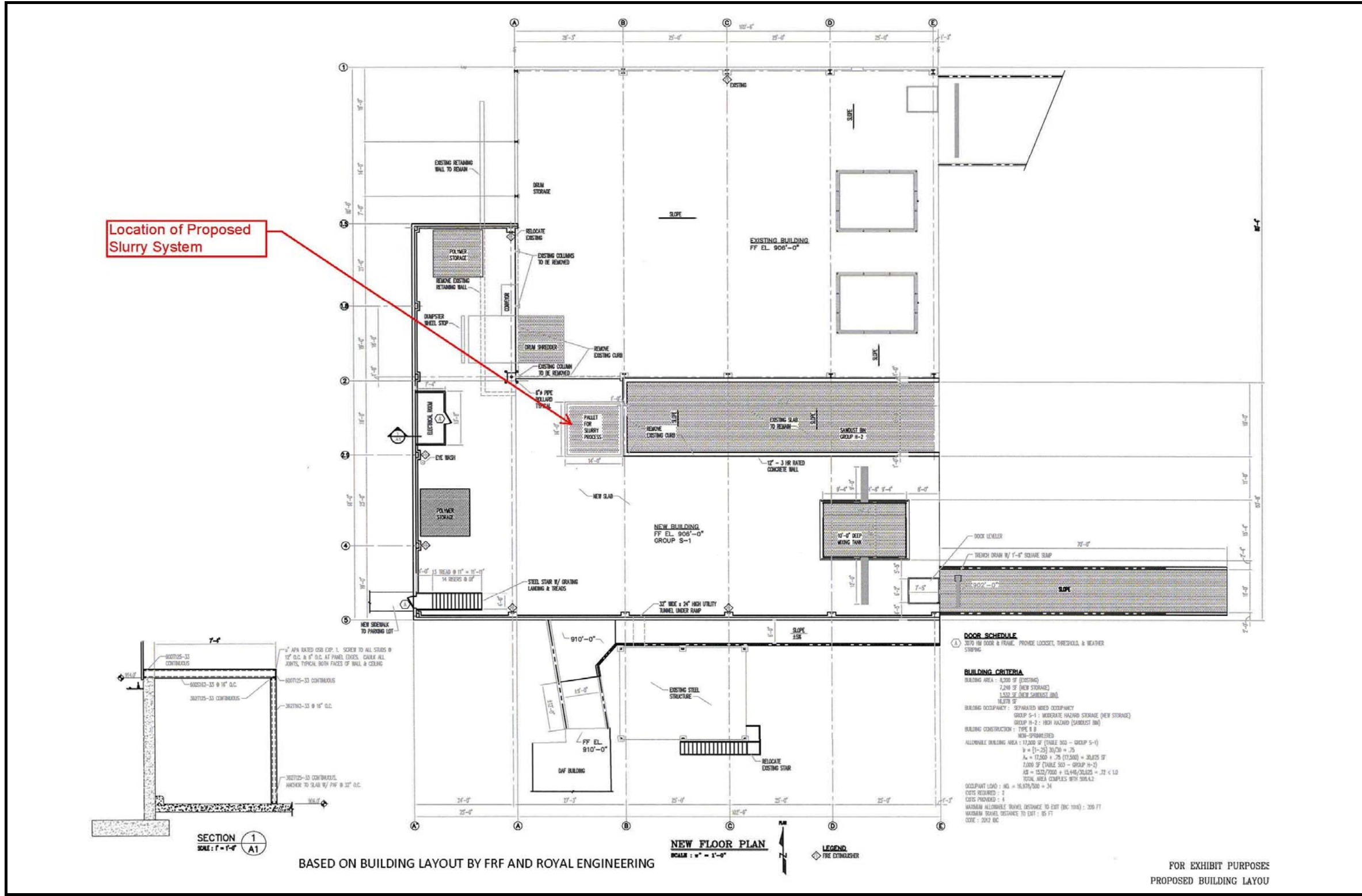


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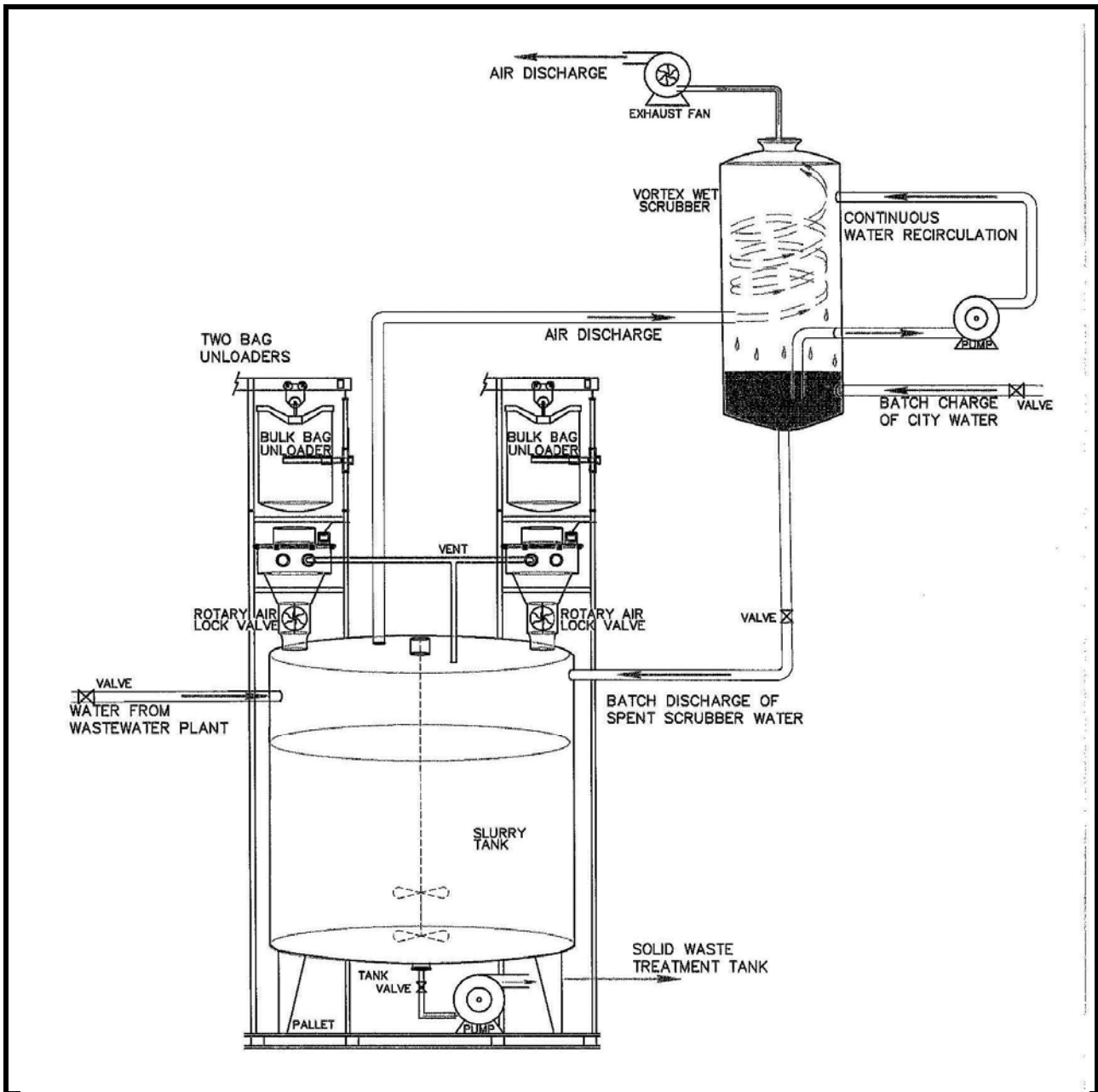
Greenville, SC

FIGURE 2
HISTORICAL QUANTITY PROCESSED
VLS RECOVERY SERVICES
MAULDIN, SOUTH CAROLINA



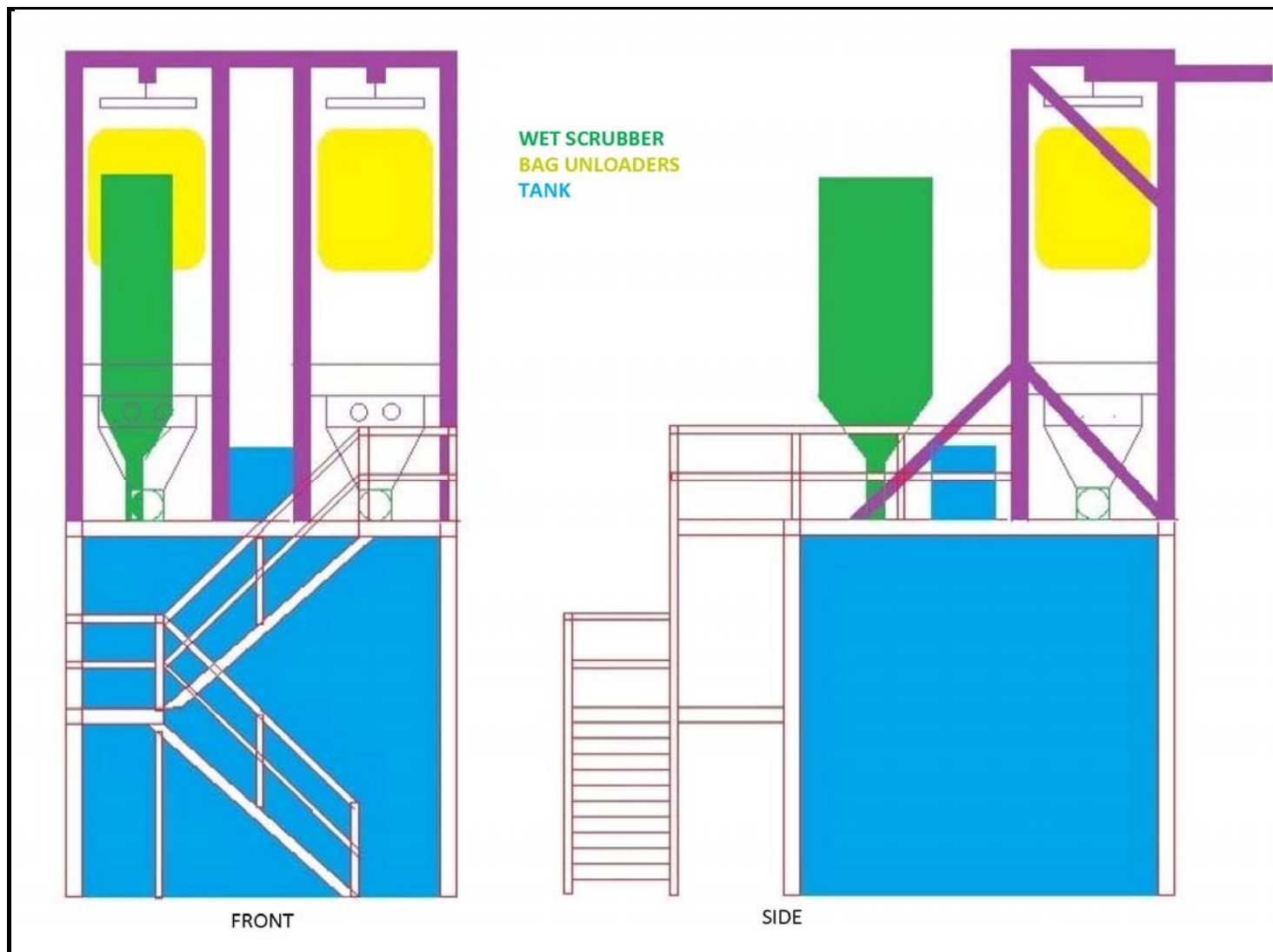
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FIGURE 3
SLURRY PROCESS LOCATION
VLS RECOVERY SERVICES
MAULDIN, SOUTH CAROLINA



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FIGURE 4
PROCESS FLOW DIAGRAM
VLS RECOVERY SERVICES
MAULDIN, SOUTH CAROLINA

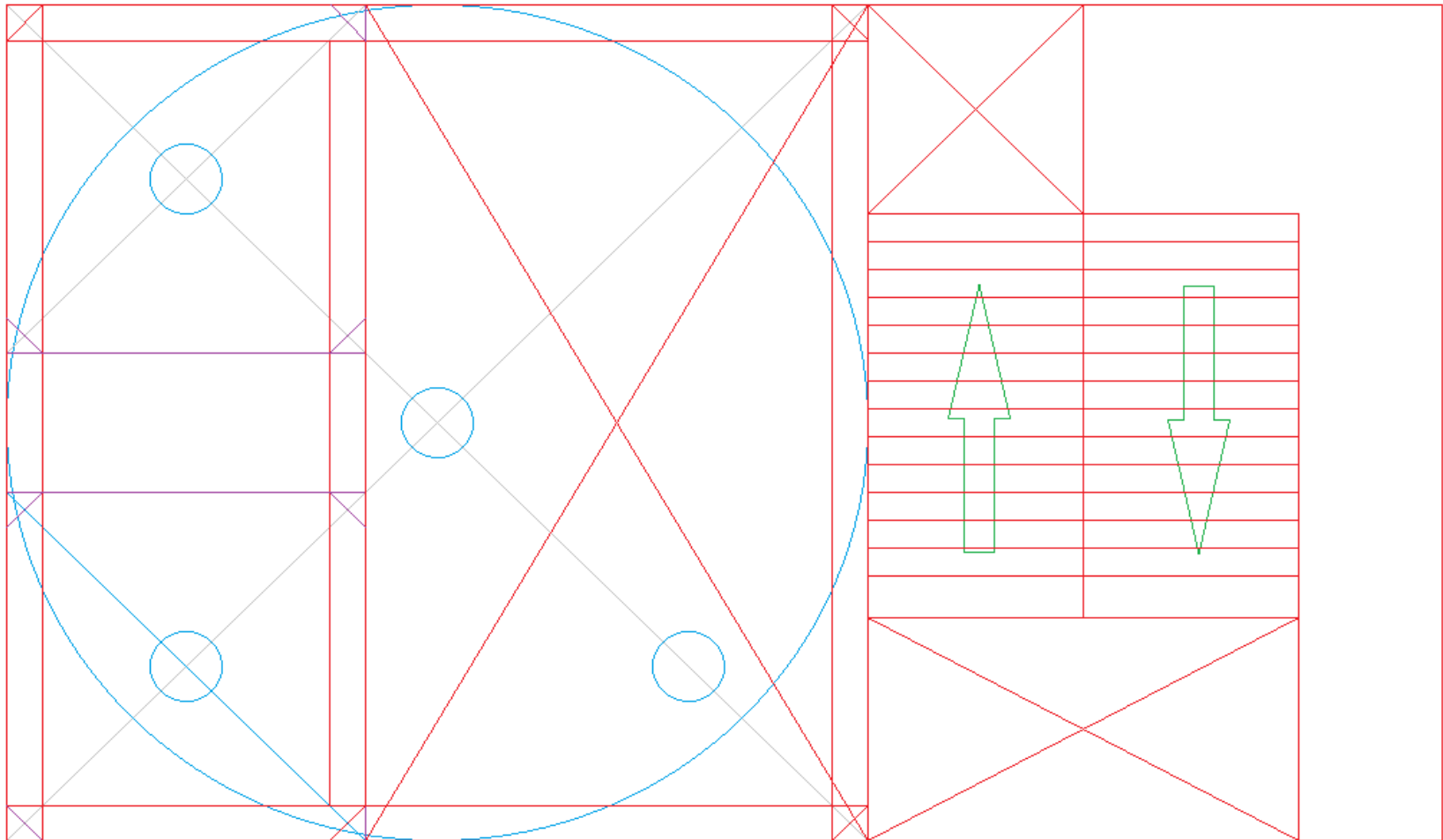


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FIGURE 5
SLURRY SYSTEM PROFILE
VLS RECOVERY SERVICES
MAULDIN, SOUTH CAROLINA



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FIGURE 6
SLURRY SYSTEM FOOTPRINT
VLS RECOVERY SERVICES
MAULDIN, SOUTH CAROLINA

TAB 1
CONSTRUCTION PERMIT APPLICATION



**Application for Permit to Construct a Solid Waste Management System
Bureau of Land and Waste Management**

Submit to: Division of Mining and Solid Waste Permitting, Bureau of Land and Waste Management
SC Department of Health and Environmental Control, 2600 Bull Street, Columbia, SC 29201-1708
(Please Print or Type)

I. Name of project: VLS Solid Waste Processing Permit Modification

II. Physical location (Directions to project - use street names, county road numbers, etc.): Intersection of SC HWY 417
(South Main St.) and Bon Air Street, Mauldin, SC County: Greenville

Latitude and longitude (nearest 15 seconds) or UTM coordinates: _____
Latitude 34° 46' 24" Longitude 82° 17' 57"

III. In accordance with Title 44, Chapter 96 of the Code of Laws of South Carolina, 1976, as amended, I hereby make application, on behalf of the party(ies) whose name(s) appears below, for a permit to construct and operate the following type of solid waste management project (describe): Modification of a solid waste processing facility. Construction

of a slurry system for processing dusty solids such as carbon black. The added equipment will be two bag unloaders with air lock valves, a slurry tank and ancillary pumps and piping. Increase the capacity from 90,000 TPY to 150,000 TPY.

IV. Facility name, mailing address: VLS Piedmont, LLC (dba VLS Recovery Services)
305 South Main Street Mauldin, SC 29662 Telephone number: (864) 962-9953

V. Operator's name, mailing address (if different from name of facility owner): Same
Telephone number: _____

VI. Landowner's name, mailing address (if different from name of facility or operator): VLS Piedmont, LLC
17020 Premium Drive, Hockley, TX 77447 Telephone number: (936) 372-0464

VII. I have placed my signature and seal upon the documents submitted with this application signifying that I accept responsibility for the information and/or design contained therein. Additional submittals where required will also bear my signature and seal, signifying that I accept responsibility for the information and/or design contained therein.

Engineer's name (print): James E. Clemmer Signature: [Signature]
S.C. Registration No.: 11773 Registered Professional Engineer

VIII. I have read this application and all attached documents. I agree to the requirements and conditions that are contained in it. Also, I agree to the admission of properly authorized persons at all reasonable hours for the purpose of sampling and inspection.

Name of Facility Representative (print): J. Lance Creasman Signature: [Signature]
Facility Representative's title: Plant Manager Date: May 26, 2016

Name of Operator Representative (print): Same Signature: _____
(If different from facility representative)

Operator Representative's title: _____ Date: _____

Name of Landowner (print): Same Signature: _____
(if different from facility or operator representative) Date: _____

TAB 2
EQUIPMENT SPECIFICATIONS



Metalfab, Inc.

Bulk Bag Unloaders

Metalfab...Bulk Bag Unloaders

The Best Available Value and Choice of Models for Complete and Positive Discharge of Dry Bulk Materials

Here's Why:

Rugged, Durable Construction for Years of Reliable Service

Metalfab Bulk Bag Unloaders are engineered to provide a safer, dependable, low cost, dust free means for emptying a wide variety of powders and other difficult to handle dry bulk materials from bulk bags. They are designed to accommodate lined, reusable, and disposable (one way) bags weighing up to 4000 lbs. plus, and will empty an entire bag of product into bins, hoppers, feeders, and conveyors on demand.

To assure discharge of product, the ruggedly built pyramidal-shaped unloader is mounted on wear resistant rubber isolators that eliminate transmission of vibration to the support stand or plant floor. A time tested, field proven Metalfab Vibrator is mounted to the unloader and can be adjusted to provide varying levels of force needed to discharge product from the bag. All Metalfab vibrators are ruggedly built and are available in TENV and explosion-proof enclosures.

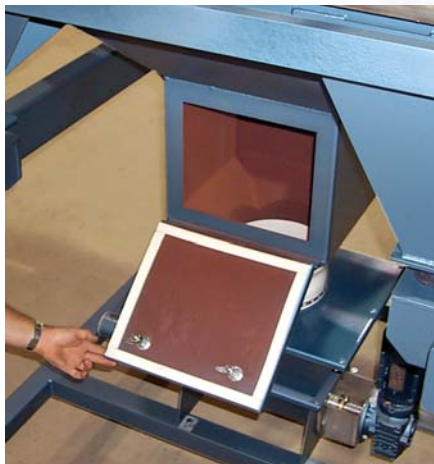


Bulk Bag Unloader

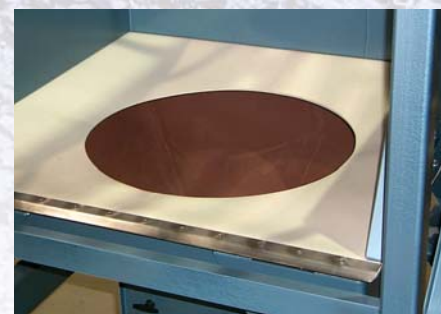
Simple, Safe, and Dust Free Operation

Metalfab Bulk Bag Unloaders are easily operated by one person—saving on labor and operating costs. Each unloader also features a thick elastomer inlet seal that accommodates different size bags. This flexible seal—unique to Metalfab Unloaders—contracts as the bag empties to ensure a dust free operation.

To start the unloading process, the operator lowers the bag containing the product onto the unloader, opens the door to the access chamber, reaches up and unties the bag drawstring. The operator then pulls the bag spout down before untying the spout and closing the access door. An in-house dust collector can be attached to a 4" diameter open dust port to provide additional assurance of a dust free atmosphere while the access door is open. The door is gasketed and easily closes with two T-handle vice closures. Activation of the vibrator allows the discharge process to begin—ensuring safe, dust free operation with no product waste.



Dust Tight Bag Access Door



Unique Flexible Inlet Seal

A Choice of Models to Meet Virtually Any Unloading Requirement



Basic Model

Metalfab Bulk Bag Unloaders are available in three standard models to suit varying application requirements and budgetary needs. Three 18" tall side guides attached to the unloader frame are available for each model and help the operator locate the bag during the loading procedure. They also help maintain the bag in proper position during discharge.

Basic Models are used for relatively free flowing materials. These vibrated or nonvibrated units include an access chamber with door, side guides, and unique flexible inlet seal. Contact parts are available in carbon steel, epoxy-coated carbon steel, and 304 or 316 stainless steel. The external structure is carbon steel that is primed and painted in blue enamel. If a dedicated plant hoist or forklift is used to position bags for emptying, the unloader can be supplied less the support frame and with four pedestals to mount the isolators to the customer supports.



Mid Level Model Shown with Optional MetaTech™ Feeder

Mid Level Models are offered with the unloader, inclusive of an access chamber and door, a complete support structure for the equipment and bulk bag, vibrator and isolators, and adjustable bag rack. The support structure holds the bag rack and can be adjusted vertically to accommodate any bag height. The bag rack holds the bag by its straps for loading, unloading and during discharge with a forklift or overhead plant hoist. Materials of construction and finish are the same as the standard model.



Top Level Model

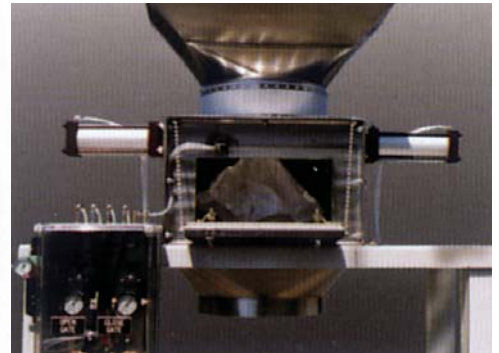
Top Level Models include the unloader with access chamber and door, support structure for the equipment and bulk bag, vibrator and isolators, and an extended overhead I-beam at the top of the unloader to support an integrated hoist and trolley. Hoists are normally electric with pneumatic hoists optional. Trolleys can be manual or electrically powered. All frames are structurally modified to support the added weight of the trolley and hoist. Materials of construction and finish are the same as the Basic and Mid Level Models. Metalfab also offers other unloader designs to handle smaller, larger or heavier bulk bags.

Accommodation of a Wide Range of Bag Styles and Sizes

Metalfab Bulk Bag Unloaders are also engineered to accommodate the wide range of bag styles and sizes found in today's marketplace. Several optional devices are available to accommodate the following type of bags and/or process operating conditions:

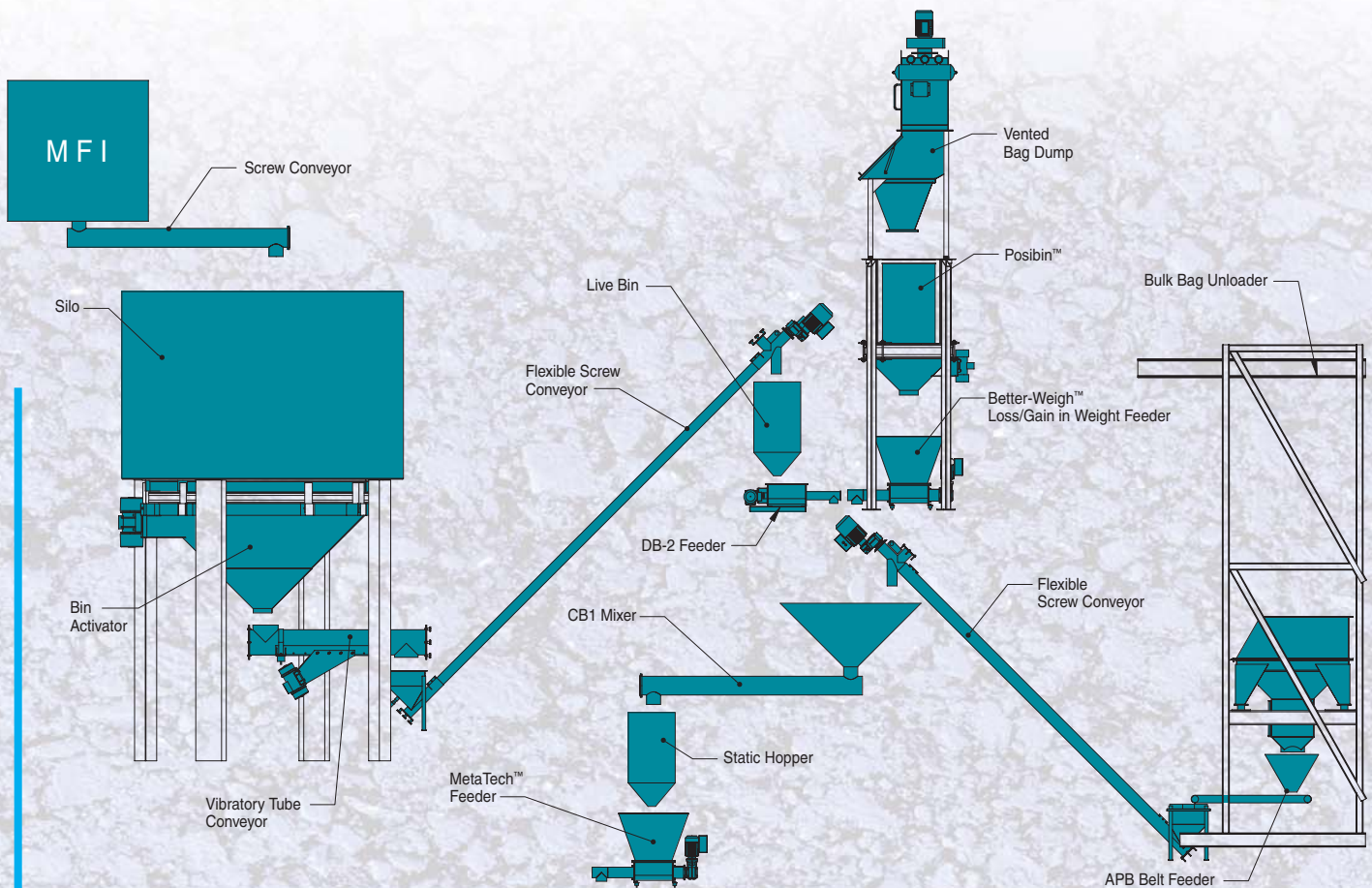
Disposable (One Way) Spoutless Bags are safely handled with Metalfab's integrated Four-Bladed Knife. Two designs—one bolted in place and the other vertically adjustable—are available. As a spoutless, nonrefillable bag is lowered into place, the knife blades symmetrically cut the bag into a four-sided flap opening through which product flows freely.

Bag Liners are easily handled with a pneumatically-powered, rubber covered pulley assembly held in bearings and fixed to the center of the bag rack with two "quick action" clamps. When the lined bag is placed into proper position for discharge, the bag is suspended from the bag rack while the liner is clamped to the pulley. In operation, the pulley's air powered rotary actuator maintains a constant "pull" on the liner to prevent it from exiting the bag along with product. It also retracts the liner into the bag when it is empty. A four-way manual valve, air filter, and regulator are supplied by Metalfab and are mounted in the area of the unloader.



Partially Empty Bags occasionally need to be removed from the unloader. The bag spout often contains product that is difficult to tie off manually. To deal with this problem, Metalfab offers a closure device that has two horizontally-opposed, pneumatically-operated cylinders with semicircular shutoff blades which rest on horizontal guides. These blades are housed in a dust tight enclosure with an inlet equal in diameter to the bag spout and an outlet of the same size or larger. During operation, the bag spout extends 12"-16" below the shutoff blades and can be closed off within seconds when the operator activates the pneumatic closure device while product is flowing from the bag. The access chamber is then opened, allowing the operator to tie off the spout manually. The Metalfab closure device also features an integral, door-mounted safety switch, which is activated when the door is open to prevent the "locked" blades from advancing or retracting while the door is open. All these optional devices are available in the same product contact parts as the unloader to eliminate product contamination.





A Versatile Design that Accommodates Other Metalfab Downstream Equipment

Looking for a dedicated system to handle batching operations or a complete system designed to regulate flow or meter the discharge of product into a continuous process? Metalfab has the engineering experience and downstream equipment to meet most dry bulk material handling applications.

Should batching by weight be a requirement, Metalfab Bulk Bag Unloaders can be mounted on a specially designed counter-balanced weigh platform designed to match the unloader. Its counter balanced feature and digital weight resolver enable the operator to discharge batches as low as 40 lbs. with accuracies of $\pm 1/4$ – $1/2\%$ at two sigma. Many control options are available with the system to suit specific customer needs.

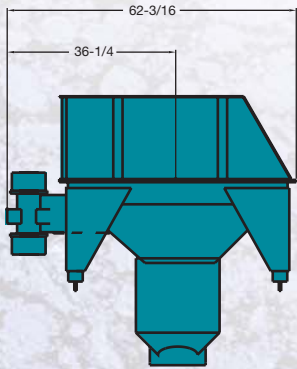
In continuous operations, Metalfab Bulk Bag Unloaders can discharge product directly into a trouble-free Metalfab MetaTech™ Feeder, with only two moving parts.

A hopper on the feeder can be sized for an approximate ten minute supply to permit bag changes without interruption of product feed.

Metalfab also offers a wide range of other dry bulk material handling equipment—bin activators, Convey-All™ FSC-Flexible Screw Conveyors and VTC-Vibratory Tube Conveyors, Posibins™, and hoppers—that can be integrated into a system to meet exact customer requirements.

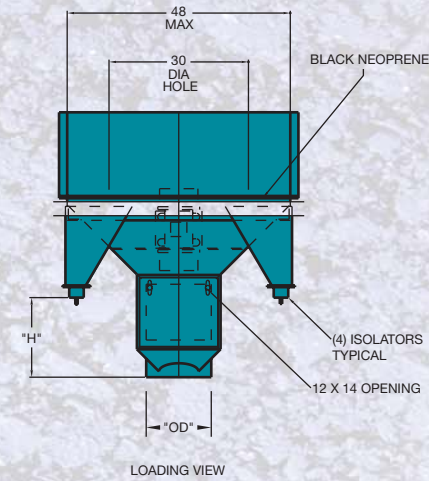


Specifications/Dimensions

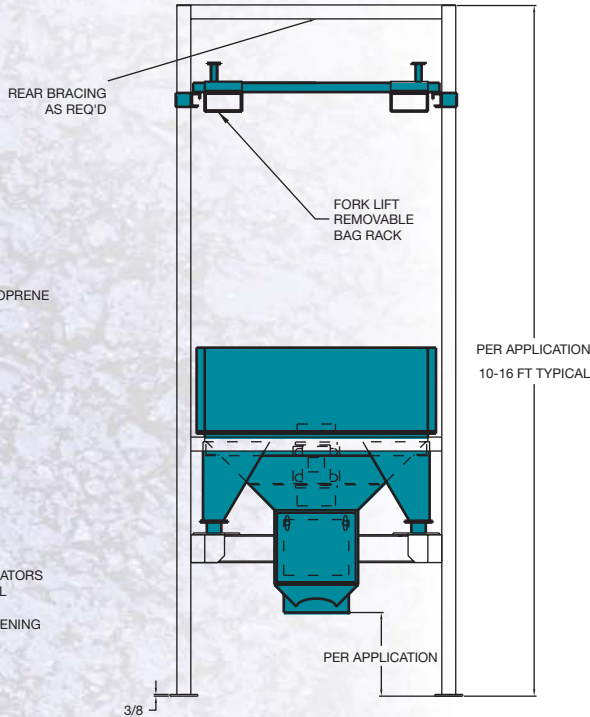


SIDE VIEW

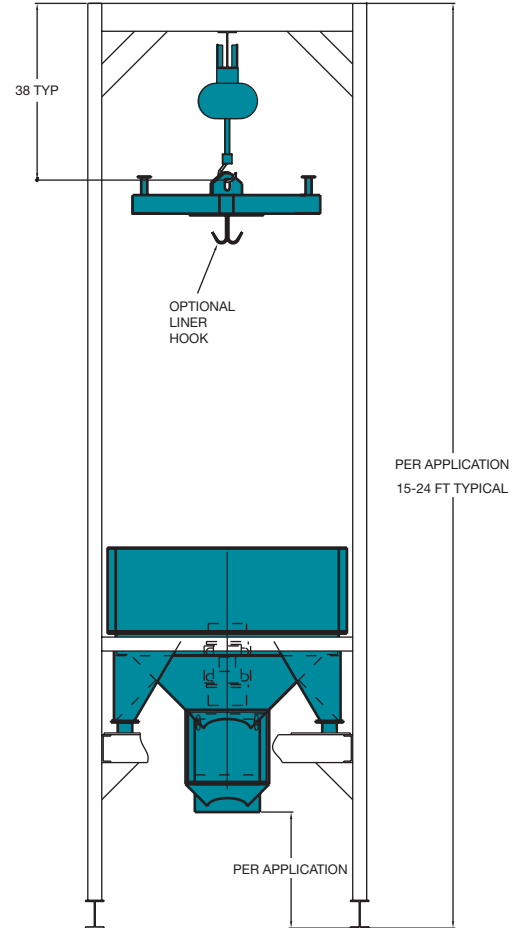
"OD"	"H"
8	16
10	16-1/2
12	17-1/4
14	18
16	18-1/2



Basic Model



Mid Level Model



Top Level Model

Contact Parts: Carbon steel, epoxy-coated carbon steel, 304 or 316 stainless steel

External Structure: Carbon steel that is primed and painted blue enamel

For more information and a quotation on Metalfab Bulk Bag Unloaders

call 800-764-2999, in NJ 973-764-2000, Fax: 973-764-0272, or e-mail: sales@metalfabinc.com

Visit our web site at www.metalfabinc.com for PDF downloads of literature and/or PDF/CAD drawings or write:



Dry Solids Processing Made Better by Design

P.O. Box 9, Prices Switch Road

Vernon, NJ 07462

E-mail: sales@metalfabinc.com

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Bulk Bag Unloaders

Overview

Metalfab Bulk Bag Unloaders are designed and engineered to provide a dependable, low cost means for emptying a wide variety of powders and other difficult to handle dry bulk materials. Metalfab also manufactures other special units for heavier bags, larger bags, or smaller bags.

To assure discharge of product, the ruggedly built 48" sq. pyramidal shaped Unloader is mounted on wear-resistant rubber isolators that eliminate any transmission of vibration to the support stand or surroundings. Solidly mounted to the Bulk Bag Unloader is a time-tested, field-proven, Metalfab Vibrator. This Vibrator can be adjusted to provide varying levels of vibration, as needed, to discharge product from the bag. All of our Unloader Vibrators are ruggedly built to withstand the rigors of vibration and all are totally enclosed, non-ventilated and are also available in an explosion proof enclosure.

While voltage can vary by request, all vibrators are three (3) phase. They provide years of maintenance-free operation and come with a Metalfab guarantee for 30 months.

Metalfab bulk bag unloaders are not only dependable but versatile as well. They are available as a standard model with support and bag rack, a hoist rack model with hoist hook and for stationary posts to hold bag straps with volumetric screw or belt feeders, liner retractors, special closure gates and many other options.

Features/Benefits

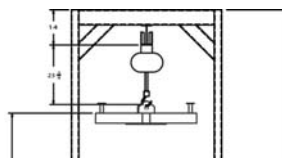
- **Rugged, Durable Construction:** field proven over hundreds of applications with virtually no downtime
- **Forklift or Hoist Rack Models:** accept any size or style bags and loads whether using a forklift or overhead hoist
- **Reliable Integral Vibrator:** induces the product to flow and is isolated from the frame by wear resistant, rubber bushings
- **Thick Inlet Seal:** seals the bag to prevent dust particles from escaping
- **Simple One-Man Operation:** empties up to 4000 lbs. Of bulk material where and when you need it.
- **Versatile Design:** accommodates other Metalfab downstream feeders, bin activators, Covey-All™ FSC-Flexible Screw Conveyors, VTC-Vibratory Screw Conveyors, Posibins™, and hoppers

Operating Characteristics

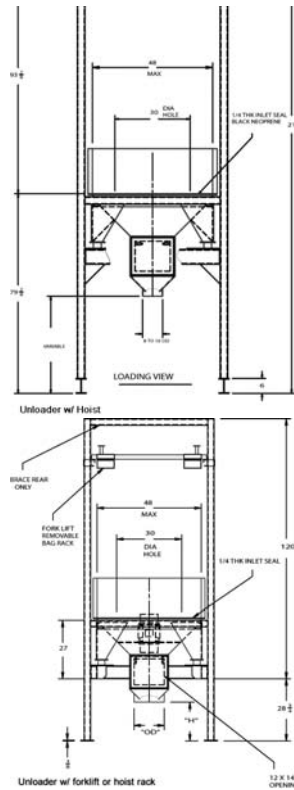
- Handles powders and difficult to handle dry bulk materials from lined and unlined bags and flexible, interchangeable bulk containers up to 3,300 lbs.

Specifications

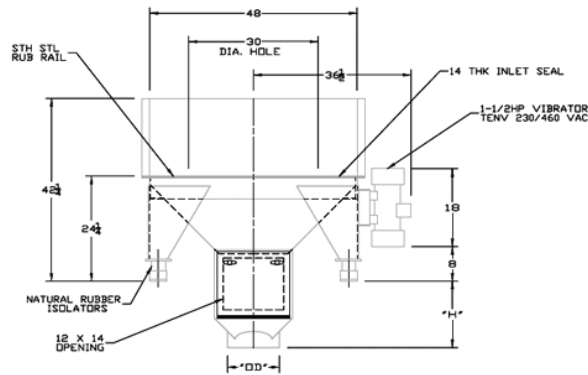
Dimensions



Bulk Bag Unloader



OD	H
8	16
10	16-1/2
12	17-1/4
14	18
16	18-1/2



OD	H
8	16-5/8
10	16-1/8
12	15-3/8
14	14-5/8
16	14-1/8

Construction

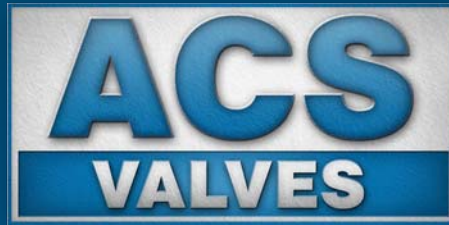
- Carbon steel or stainless steel, with or without a hoist frame

Available Options

- Other MetalFab upstream/downstream feeders, bin activators, Convey-All™ Conveyors, PosiBins™ and hoppers

All Products

- Bin Activators**
 - Standard Bin Activators
 - Sanitary Bin Activators
 - Pre-Steamer Bin Activators
 - LVT (Low Vibration Transmission)
- Posibins & Bins**



Rotary Valves

For Metering, Feeding & Airlock

In Bulk Material Handling and
Pneumatic Conveying Applications



MD Series

Rotary Valve for Metering, Feeding and Airlock Applications



The MD Series valves, with ACS RotorRail™ quick-clean design, provide tool-less, single-step access to rotor and internal surfaces.

Features & Benefits

- Available in 7 heights, from 7 3/8" H to 23 1/2" H; and 7 flange diameters from 4" to 16".
- Valve housing cast in North America; ensures superior strength and solidification of housing's metallurgy.
- CNC-machined components and housing provide precision tolerances; eliminates axial shaft movement, extends maintenance cycles.
- Outboard bearing design protects bearings in high-temperature and high-PSIG applications; removes bearings from direct path of damaging contaminants.
- Easily manages pressure differentials up to 15 PSIG; with super-duty series up to 22 PSIG.
- Excellent performance in high-temperature applications up to 750°F.
- Cast iron housing.
- 8-vane rotor with beveled tips and sides.

Options

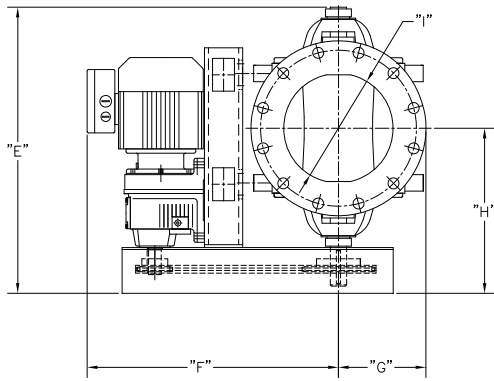
- 304 or 316 cast stainless steel valve housing.
- RotorRail™ feature provides tool-less access to rotor and internal surfaces; speeds cleaning and inspection; ensures fast, accurate rotor and endplate re-alignment.
- No. 4 finish on internal product contact surfaces of housing, and all rotor surfaces.
- Interior coatings: hard chrome, tungsten, nickel, and epoxy.
- Rotor types: closed-end, metering, shallow-pocket, adjustable-tip, and Teflon®-coated.
- Adjustable rotor tip types: EPDM rubber, polyurethane, hardened steel, stainless steel, and bronze.
- Shaft seal types: ACST-4™ glandless Teflon® shaft seal, and packing gland.
- Valve housing vent ports.
- Shaft seal and rotor pocket air purge.
- 6-vane, 10-vane, or 12-vane rotor.
- Custom drive packages.
- Application-specific accessories: blow-through adapter, shear plate deflector, surge hopper, motion speed switch assembly.



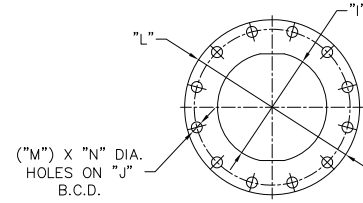
800-655-3447 | acsvalves.com

Rotary Valve Capacity (Cubic Feet/Hr.)										
Valve Size (inches)	2	3	4	5	6	8	10	12	14	16
4	2	8	12	15	18	21	24	27	30	33
6	6	30	48	60	72	84	96	108	120	132
8	12	60	96	120	144	168	192	216	240	264
10	24	120	192	240	288	336	384	432	480	528
12	45	225	360	450	540	630	720	810	900	990
14	66	330	528	660	792	924	1056	1188	1320	1452
16	84	420	672	840	1008	1176	1344	1512	1680	1848
	1	5	8	10	12	14	16	18	20	22

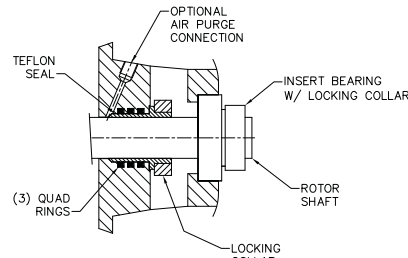
Rotor Speed (RPM)



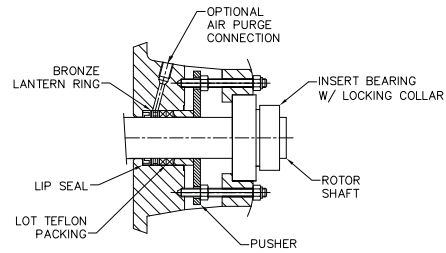
PLAN VIEW



FLANGE DETAIL

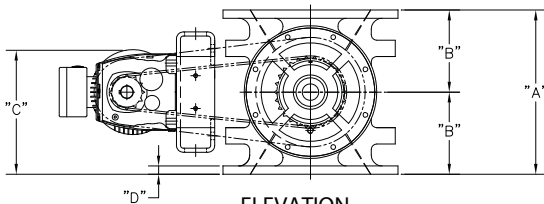


ACST-4

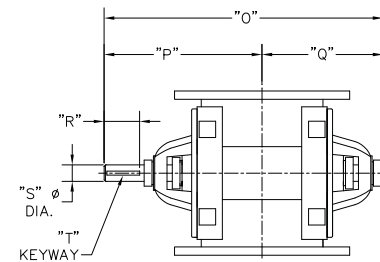


PACKING GLAND

SHAFT SEAL ASSEMBLY OPTIONS



ELEVATION



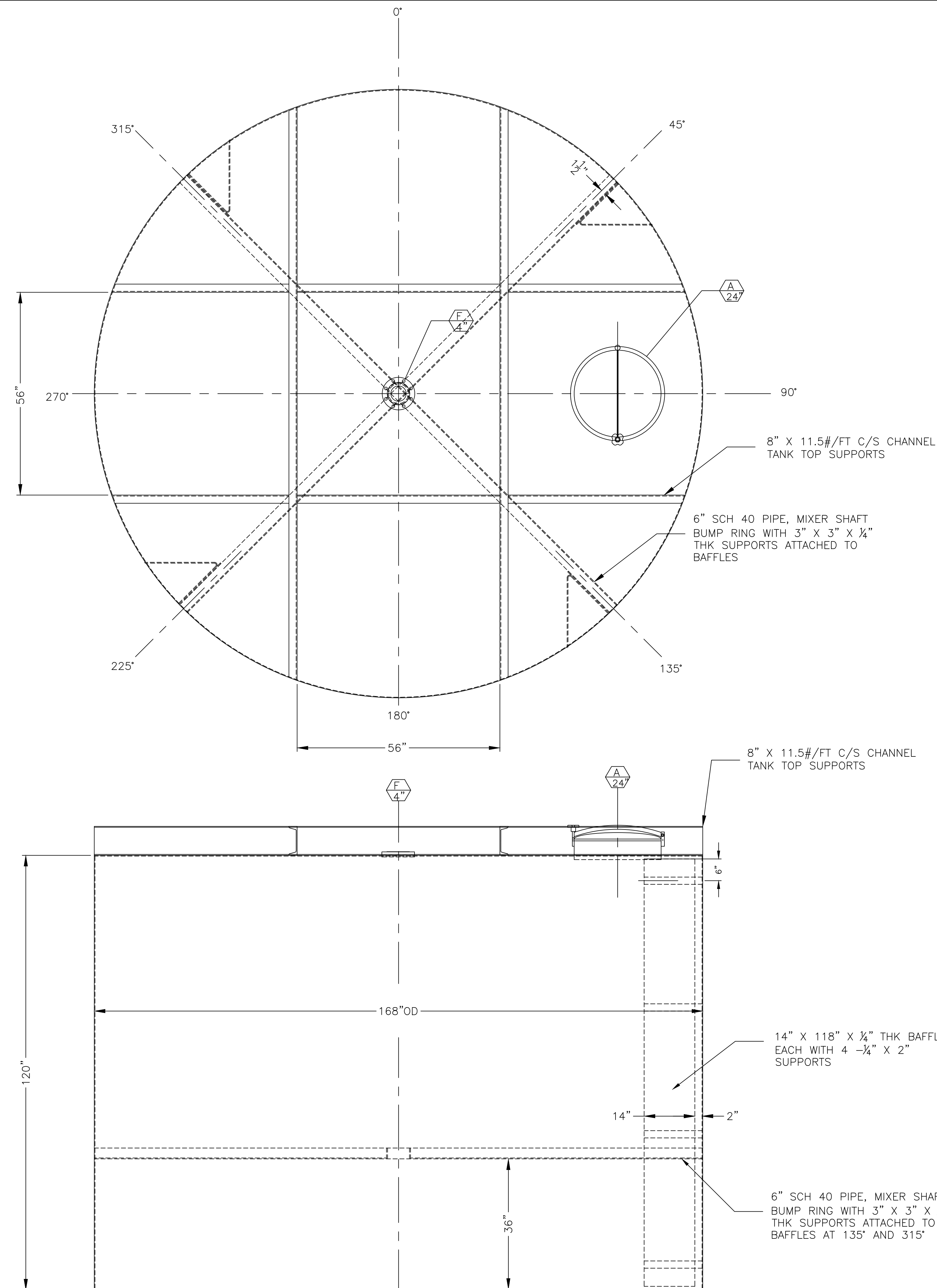
ELEVATION

ITEM	A	B	C	D	E	F	G	H	I	J	K
MD 4	7 3/8	3 11/16	9 5/16	3/8	17 11/16	14 5/8	4 1/2	9 3/8	4Ø	7 1/2	N/A
MD 6	10 5/8	5 5/16	8 1/2	1/2	21 5/16	17 15/16	5 1/2	13 1/16	6Ø	9 1/2	N/A
MD 8	12 1/2	6 1/4	9 7/16	5/8	23 11/16	19 5/16	6 3/4	13 15/16	8Ø	11 3/4	N/A
MD 10	15	7 1/2	11 3/8	3/4	26 1/8	22 15/16	8	15 1/16	10Ø	14 1/4	N/A
MD 12	18 3/8	9 3/16	13	3/4	28 7/16	23 11/16	9 1/2	16 5/16	12Ø	17	N/A
MD 14	20 1/2	10 1/4	14 1/4	1	31 7/16	24 13/16	10 1/2	17 15/16	14Ø	18 3/4	N/A
MD 16	23	11 1/2	15 1/2	1	33 1/16	26 3/16	11 3/4	18 9/16	15Ø	21 1/4	N/A

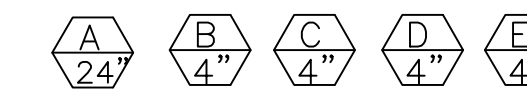
ITEM	L	M	N	O	P	Q	R	S	T (KEYWAY)	C.F.R.	WEIGHTS
MD 4	9Ø	8	5/8-11 NC	14 3/4	8 1/2	6 1/4	2 1/4	1Ø	1/4 X 1/8	.025	175 lbs.
MD 6	11Ø	8	3/4-10 NC	21	12 1/8	8 7/8	3 1/4	1 1/2Ø	3/8 X 3/16	.10	250 lbs.
MD 8	13 1/2Ø	8	3/4-10 NC	23	13 1/4	9 3/4	3 1/4	1 1/2Ø	3/8 X 3/16	.20	315 lbs.
MD 10	16Ø	12	1"Ø	25	14 1/4	10 3/4	3 1/4	1 1/2Ø	3/8 X 3/16	.40	400 lbs.
MD 12	19Ø	12	1 1/8Ø	27 3/4	15 5/8	12 1/8	3 1/4	1 1/2Ø	3/8 X 3/16	.75	650 lbs.
MD 14	21Ø	12	1 1/8Ø	30 1/4	16 3/4	13 1/2	3 1/4	1 15/16Ø	1/2 X 1/4	1.10	850 lbs.
MD 16	23 1/2	16	1 1/8Ø	32	17 1/2	14 1/2	3 1/4	1 15/16Ø	1/2 X 1/4	1.40	900 lbs.



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NOTE: PLEASE LOCATE NOZZLES



NOZZLE SCHEDULE										
MK.	SIZE	QUAN.	NOZZLE FLANGE			NECK		PROJ	ORIENT	SERVICE
			TYPE	RATG.	MAT'L	SCH.	MAT'L			
A	24"	ONE	CROSSARM	MANWAY	T-304	10	T-304	6"		MANWAY
B	4"	ONE	RFSO	150#	T-304	10	T-304	6"		
C	4"	ONE	RFSO	150#	T-304	10	T-304	6"		
D	4"	ONE	RFSO	150#	T-304	10	T-304	6"		
E	4"	ONE	RFSO	150#	T-304	10	T-304	6"		
F	4"	ONE	PAD	150#	T-304	---	---	---		FOR VAPOR SEAL

Wolfe Mechanical and Equipment Co., Inc.
P.O. Box 276 • Lugoff, S.C. 29078 • Phone 803-438-1093

VESSEL: M.A.W.P. 25/- .03PSI@ 0-250 °F
JACKET: M.A.W.P. N/A PSI@ N/A °F
MFGRS SN: LATER YR. BUILT 2016
MATL VESSEL T-304 JACKET N/A
MAX.SP.GR. 1.25 CAPACITY(GAL) 11400

DESIGN DATA			
DESIGN CONDITIONS:	VESSEL	0.25/-0.036	PSIG 0 TO 250 °F
	JACKET	N/A	PSIG N/A °F
OPERATING CONDITIONS:	VESSEL	0.25/-0.036	PSIG 0 TO 250 °F
	JACKET	N/A	PSIG N/A °F
SPECIFIED CORROSION ALLOWANCE:		0.00"	
CODE:		N/A	STAMP: NO
STRESS RELIEF:		N/A	RADIOGRAPH: NO
SPEC. GRAVITY		1.25	
TYPE HEADS:	VESSEL FLAT TOP AND BOTTOM		
JACKET	N/A		
TYPE SUPPORT:	N/A		
JOINT EFF:			
	VESSEL - HEAD		SHELL:
	JACKET - HEAD		SHELL:
SHIPPING WT.:			TEST WT.:
CAPACITY (NOMINAL):	11,400 GALLONS		
HYDROSTATIC TEST:	VESSEL		PSIG
	JACKET		PSIG
MATERIALS			
SHELL:	VESSEL 3/16" THK SA-240-304 S/S		
JACKET:	N/A		
HEADS:	VESSEL 3/16" THK SA-240-304 S/S		
JACKET:	N/A		
FLANGE SPEC.:	SA-182F-304 S/S		
EXTERNAL PIPE SPEC.:	SA-312-304 S/S		
INTERNAL PIPE SPEC.:	N/A		
CLADDING OR LINING SPEC.:	N/A		
BOLTING:	N/A		
GASKETS:	NATURAL RUBBER		
INTERNALS:	SA-240-304 S/S		
SUPPORTS:	C/S CHANNEL EXTERNAL TOP HEAD SUPPORT		
INSULATION:	N/A		
PAINTING:	C/S TO BE SANDBLASTED & PAINTED W/ ONE COAT RED OXIDE PRIMER		

- NOTES
- COVER ALL FLANGES, OPENINGS AND MACHINED SURFACES PRIOR TO SHIPMENT UNLESS OTHERWISE NOTED.
 - NOZZLE BOLT HOLES SHALL STRADDLE 0-180 CENTERLINE OR ITS PARALLEL UNLESS OTHERWISE NOTED.
 - ALL INTERIOR WELDS TO BE GROUND CLEAN W/ 36 GRIT SOFT DISC.
 - EXTERIOR WELDS TO BE SANDBLASTED.
 - INTERIOR & EXTERIOR TO BE CLEANED & DESCALED WITH 10% PHOSPHORIC ACID AND RINSED WITH AMBIENT WATER.
 - ALL ISO PADS TO HAVE 1" RADIUS ON CORNERS.
 - ALL REPADS AND ISO PADS TO HAVE 1/8" NPT DRILLED AND TAPPED HOLE.

REVISION	DATE	BY	DESCRIPTION

Wolfe Mechanical and Equipment Co., Inc.
P.O. Box 276 • Lugoff, SC 29078
Phone 803-438-1093 • Fax No. 803-438-5265

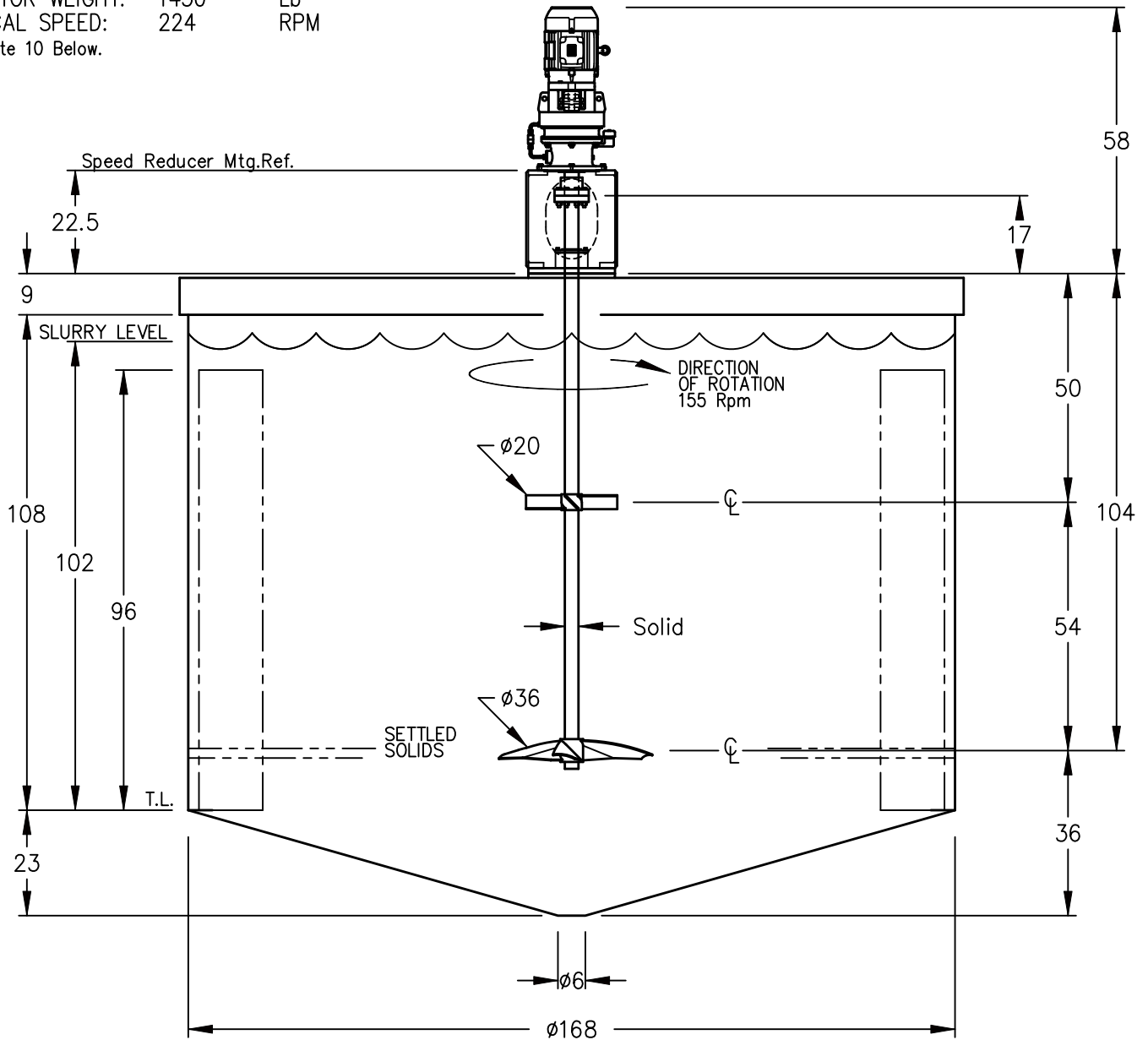
SCALE: 3/4"=1' QUANTITY: ONE DRAWN BY: CJC
DATE: 05/23/16 MATERIAL: T-304

11,400 GALLON TANK
VLS RECOVERY DRAWING NUMBER: LATER

DESIGN LOADS:

BENDING MOMENT: 16420 in-Lbf
 TORQUE REACTION: 7920 in-Lbf
 AGITATOR WEIGHT: 1450 Lb
 CRITICAL SPEED: 224 RPM
 See Note 10 Below.

DRAWN TO SCALE



NOTE:

1. MixPro Agitator Model: 31GTC-10-155
2. Motor: 10 HP at 1750 Rpm Suitable for 460V/3p/60Hz Power
3. Belt Drive: No Belt Drive is Used.
4. Gear Reducer: Inline Cycloidal Speed Reducer Drive.
5. Seal: VP Seal, Low Pressure Packing Seal, MP-300-S.
6. Shaft: One (1) Piece Extension Shaft, made from Solid Bar.
7. Impellers: Two (2) Impellers. Upper: MP4445. Lower: MP3300.
8. Process: 1.250 SpGr Slurry Mixture having 30%w/w Solids, 1.00 Liquid SpGr, 3.00 Solids SpGr, Maximum Particle Size 100 microns. 500 cP Viscosity @5/s. Operating at 250°F. No Gas Added. Batch Mixing. Mixer designed to operate while draining.
9. Wetted Parts: 304 Stainless Steel
10. The agitator mounting nozzle and tank top must be sufficiently rigid to prevent the agitator from vertically deflecting .087 inch and 1/3° deflection in any direction (ie twist) with loads above.

QUANTITY: One (1)



LOCATION DRAWING
 Wolf Mechanical & Equipment, Lugoff SC
 Carbon Black Makedown Tank, TAG:
 Carbon Black Makedown TK Ag

DIMENSIONS IN INCHES	
DATE	REV.
12-May-2016	A

DWG. NO.
 Q16-5994-01L

[Regions](#)

Handte Wet Scrubbers

[Home \(/\)](#) > [Products \(/products\)](#) > [Handte Wet Scrubber Wet Dust Collectors](#)

Handte Vortex and Handte Venturi

The Handte Vortex and Handte Venturi wet scrubber systems provide high-efficiency and low-maintenance removal of dusts from the workplace.



[Download Brochure \(PDF\) \(/uploads/product/pdf/9/vortex-venturi.pdf\)](/uploads/product/pdf/9/vortex-venturi.pdf)

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[\(/uploads/product/pdf/9/vortex-venturi.pdf\)](/uploads/product/pdf/9/vortex-venturi.pdf)

Wet Scrubber Technology

Particles dispersed in the gas stream are brought into contact with a scrubbing fluid in order to bind them. This requires the generation of a phase interface as large as possible between the gas (air) and the liquid. The gas stream is then deflected whereby the inertia causes the particles to move to the surface of the liquid where they are contained.

Advantages of the Handte Vortex

- No filter elements required
- The safest solution when dealing with flammable/combustible materials
- Universal applications
- High-level separation combined with safe operating technique
- Low-maintenance

Wet scrubbing technology ensures compliance with NFPA and EPA standards



Select the Best Wet Scrubber for Your Factory's Needs:



THE HANDTE VORTEX MADE SPECIAL FOR DEALING WITH FIBERS AND FLUFF, INCLUDING STICKY MATERIALS

The Handte Vortex is a combination of centrifugal and water separator with a downstream ventilator which works on the water swirl principle. The pollutant-laden air is introduced at a tangent and settles as an eddy sink on the surface of the water. The special routing of the air flow generates an intensive swirl of water through which the pollutant-laden gas stream is led. Intensive mixing with the scrubbing fluid causes the pollutants to bond and precipitate. The radial-mounted spiral separates the liquid through centrifugal force from the pollutants bound up in the gas stream. The cleansed air is sucked in by the downstream ventilator and then blown out.



THE HANDTE VORTEX DUAL: EXTREME VERSATILITY COMBINED WITH ROBUST DESIGN TO MEET A WIDE VARIETY OF APPLICATIONS

The Handte Vortex Dual works with an integrated ventilator. Pollutants are separated from the air stream by means of a combination of water swirl and disintegration principle. Pollutant-laden air enters the middle section at a tangent and deflected. An air flow is routed to generate a strong swirl of water through which the contaminated raw gas must pass. Ultrafine particles are filtered out by means of the ventilator blade which is simultaneously employed as a disintegrator whereby non-separated particles are mixed intensively with water and flung through centrifugal force into a wall of water to achieve a high level of separation. The wet particles flow back into the bottom part of the equipment with scrubbing fluid where they then settle in the water-stilling zone. Then, the cleansed gas escapes through the central ventilation pipe.

FILTRACON - Wet separators by Camfil Handte APC

EFFICIENT OPERATING PRINCIPLE AND DIVERSE USE

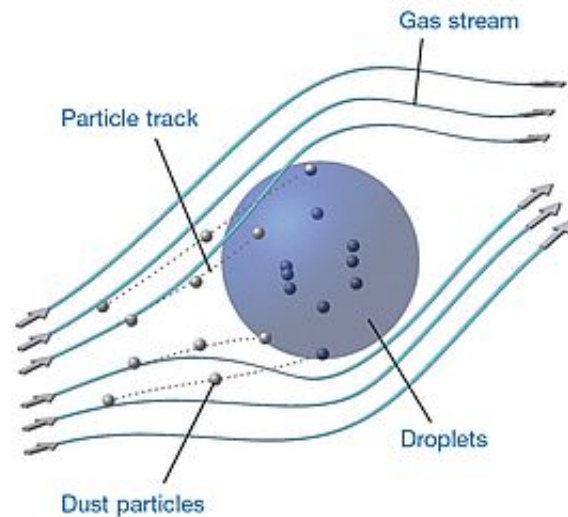
The wet separators work with water as a filter medium and are based on the operating principle of inertia. In addition, all of the production series have a flow-optimized structure and are highly dirt-resistant, due to the separation of the loaded water/air mixture by means of centrifugal force. The devices offer the best results when used in critical processes, such as during the separation of sticky dust and fibers, processes with high fire loads and sparks, the separation of explosive dusts, mixing processes with dry and wet machining cycles as well as the separation of compound emissions from dust gases, aerosols, vapors and smoke.

WET SEPARATORS OFFER MANY ADVANTAGES:

- a system to avoid damage rather than to reduce it: a secure solution for flammable and explosive dusts
- a high degree of availability, permanent operation
- stable operating conditions
- a high degree of separation
- low maintenance
- a space-saving/small installation area
- no "clogging" of filter elements
- dust-free repair & maintenance

Particles dispersed in the gas stream are brought into contact with a scrubbing fluid in order to bind them. This requires the generation of a phase interface as large as possible between the gas (air) and the liquid. The gas stream is then deflected whereby the inertia causes the particles to move to the surface of the liquid where they are contained or accumulated.





For which areas of application are wet separators suitable?

In the case of steam, including: washing machines, waste treatment, die-casting machines, release agents, paint spray, paint stripping systems, plating, lead production, galvanizing, foundry, soldering, cooling units, spark erosion machines

In the case of smoke, including from: furnaces, engine dynamometers, rippers, foundries, baking and glass melting processes, hardening shops, die casting, holding furnaces, fire protection

In the case of aluminum-magnesium dusts, including from: minimal quantity lubrication, blasting material production, cutting, deburring, brushing, finishing processes, forging, cutting, grinding

In the case of aluminum-magnesium shavings, including from: drilling, milling, grinding, sawing, deburring, forming processes, recycling technology

In the case of rubber/leather/plastic removal with: shoemaking, tire retreading, plastics processing, film production, extruders, model making, textile production

In the case of fibers/lint/textile dust from: polishing, paper machines, waste sorting, textile processing, food processes, recycling systems, insulation material production, asbestos removal, grain processing

In the case of sticky powder, including from: pharmaceutical processes, the production of: food, animal feed, dyes, mold forming, presses, tire and chip manufacturing, ceramic coating, adhesive applications, textile finishing, blending and conveying systems, plastics processing

In the case of exhaust vapor from fat, including from: commercial kitchens, rendering plants, food preparation, washing plants, biofiltration, pharmaceutical products, degreasing, animal processing, mixing stations

In the case of flammable/explosive dust from: grinding processes, finish polishing, blasting machines, explosives manufacturing, recycling and grain processing, PCB manufacturing, brake testers, power plant equipment, drying equipment, forging presses, mining

In the case of carbon dust from: bentonite applications, oven soot, mixers, tire manufacturing, the cement industry, mining, mold forming, dye manufacturing, electrode manufacturing

Wet scrubber Vortex Dual: The all-rounder

Extreme versatility combined with robust design to meet a wide variety of applications

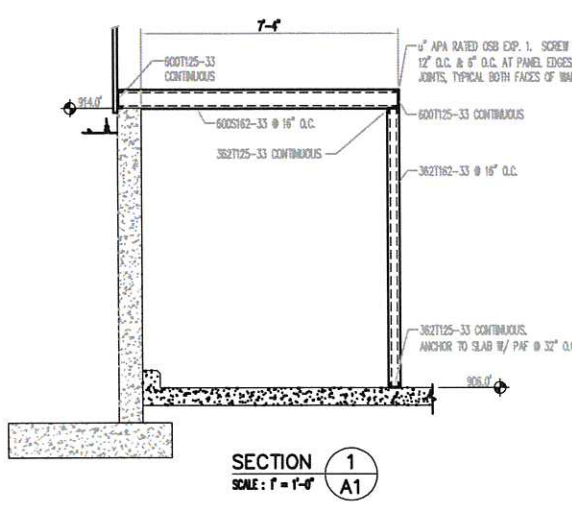
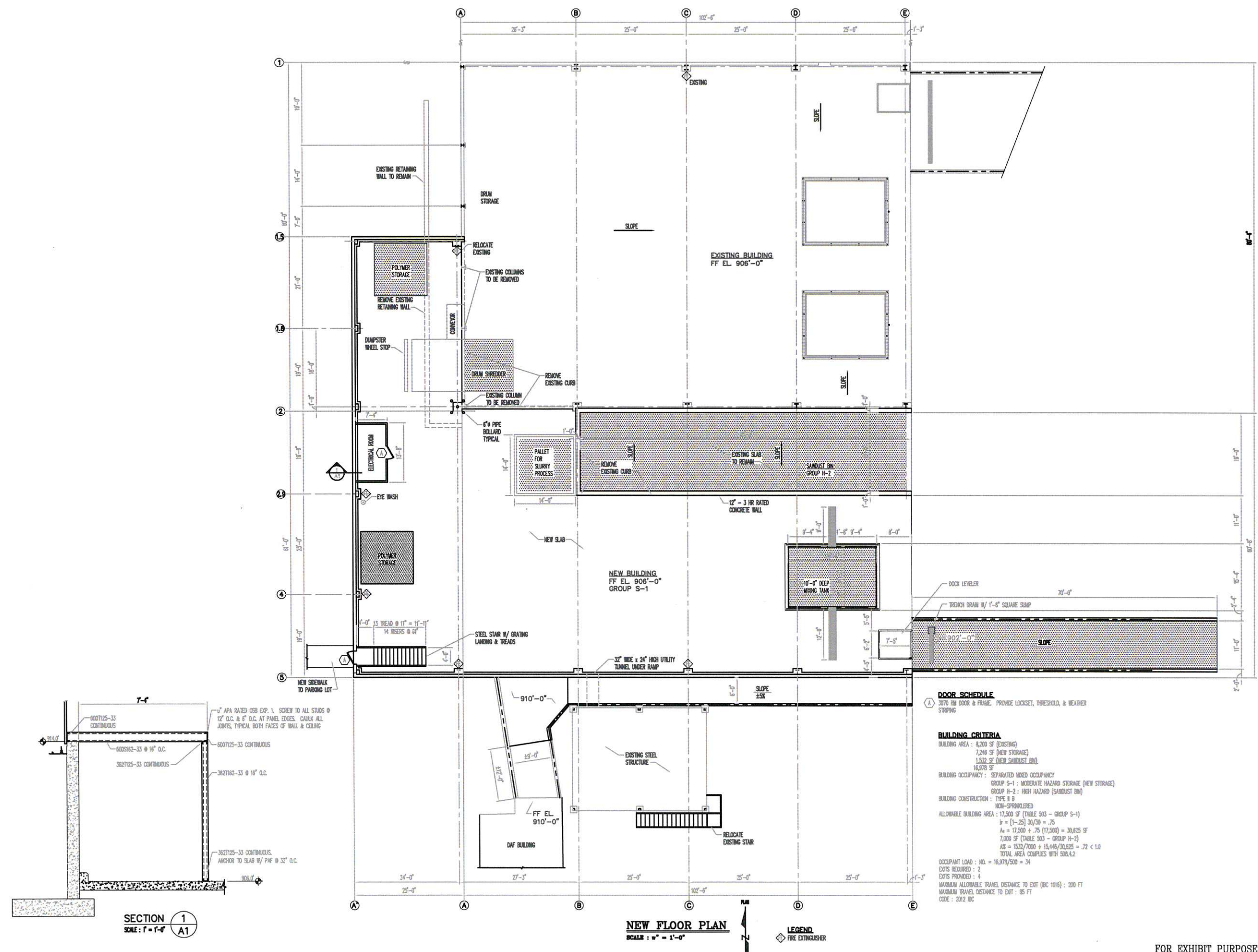


Functional features:

The Handte Vortex Dual works with an integrated ventilator. Pollutants are separated from the air stream by means of a combination of water swirl and disintegration principle. Pollutant-laden air enters the middle section at a tangent and then deflected. An air flow is routed to generate a strong swirl of water through which the contaminated raw gas must pass. Ultrafine particles are filtered out by means of the ventilator blade which is simultaneously employed as a disintegrator whereby non-separated particles are mixed intensively with water and flung through centrifugal force into a wall of water to achieve a high level of separation. The wetted particles flow back into the bottom part of the equipment together with the scrubbing fluid where they then settle in the water-stilling zone and the cleansed gas escapes through the central ventilation pipe.

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NO.	DATE	DESCRIPTION



DOOR SCHEDULE
 (A) 3070 HM DOOR @ FRAME. PROMEX LOCKSET, THRESHOLD, & WEATHER STRIPING

BUILDING CRITERIA
 BUILDING AREA : 8,200 SF (EXISTING)
 7,240 SF (NEW STORAGE)
 1,532 SF (NEW SANDUST BIN)
 16,978 SF

BUILDING OCCUPANCY : SEPARATED MIXED OCCUPANCY
 GROUP S-1 : MODERATE HAZARD STORAGE (NEW STORAGE)
 GROUP H-2 : HIGH HAZARD (SANDUST BIN)

BUILDING CONSTRUCTION : TYPE II B
 NEW-SPRINKLERED

ALLOWABLE BUILDING AREA : 17,500 SF (TABLE 503 - GROUP S-1)
 $A_a = [1-25] 30/20 = 75$
 $A_s = 17,500 \times .75 (17,500) = 30,825 SF$
 7,000 SF (TABLE 503 - GROUP H-2)
 $A_B = 1532/7000 + 15,448/20,625 = .72 < 1.0$
 TOTAL AREA COMPLIES WITH 508.4.2

OCCUPANT LOAD : N/A = 16,978/500 = 34
 EXITS REQUIRED : 2
 EXITS PROVIDED : 4
 MAXIMUM ALLOWABLE TRAVEL DISTANCE TO EXIT (IBC 1016) : 200 FT
 MAXIMUM TRAVEL DISTANCE TO EXIT : 85 FT
 CODE : 2012 IBC

NEW FLOOR PLAN
 SCALE : 1/4" = 1'-0"

NEW FLOOR PLAN
 FOR MODIFICATIONS TO DRUM BUILDING
 VLS RECOVERY SERVICES
 MAULDIN, SOUTH CAROLINA

FOR EXHIBIT PURPOSES
 FIGURE 2 - PROPOSED BUILDING LAYOUT