

EGS Start Up and Operation

Webinar UI

Welcome to **WEBINAR**, part of the Purafil University webinar series!

During this live webinar, we encourage you to use the Q&A console on the right to ask questions. If we aren't able to get to your question during the webinar, we will follow up with an answer over email.

[See Eric S Houston Bio](#)



Eric S Houston

Commercial Sales Engineer,
Manager
Purafil



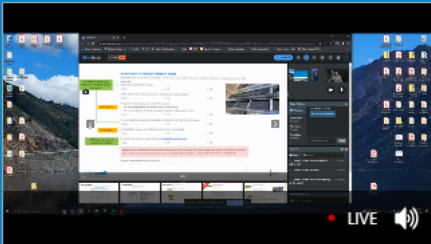
Media Sampling



Using the probe, pull media from the port at 25% depth until you have enough for a full sample bag. Repeat this process at 50% depth, and 100% (or as far in as possible) into the unit.

Consistency in pulling media from the same location will ensure a more accurate result.

It is possible that pulling media samples from significantly different areas within the media bed will cause fluctuating results over time.

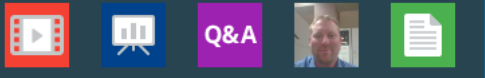


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Agenda

- **EGS Basics (End User Training)**
 - Units
 - Media
 - Operation
 - Components
- **Start Up**
 - Start-Up Checklist
 - Structural
 - Mechanical
 - Electrical/ Controls
- **Maintenance**

EGS Basics

Our Units

Purafil's emergency gas scrubbers (EGS) provide protection from a catastrophic release of toxic gases such as CL2, SO2, and ammonia.

FOC5
(150#s CL2)



FOC300
(300#s CL2)



AOC1
(1-ton CL2)



FOC1
(1-ton CL2)



These sizes are available in Aluminum and Fiberglass

Units are sized based on the largest container of toxic gas to be treated.
Common toxic gas container sizes are 150 #s, 1 ton, and 2 ton
2- ton fiberglass units are also available but not shown

Additional designs are available to treat other toxic gases!

WHAT'S INSIDE

15% Removal Capacity*

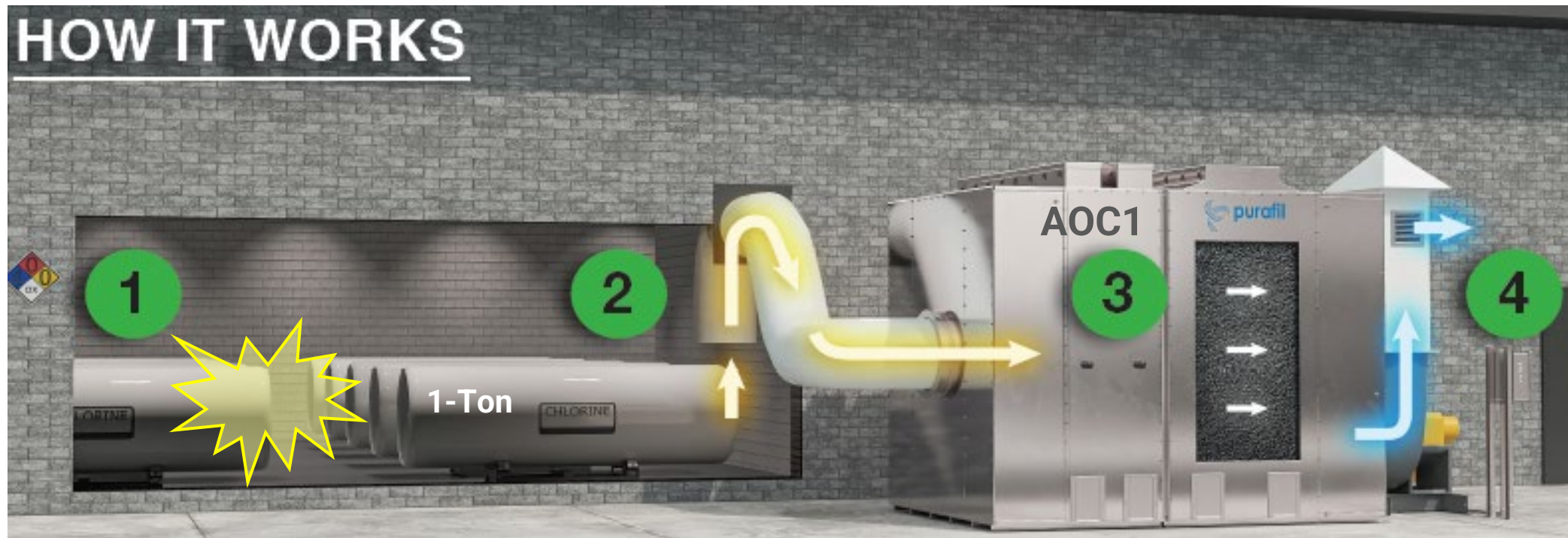
PURAFIL'S PATENTED DRY SCRUBBING MEDIA

CHLOROSORB® ULTRA

- Rapidly removes and neutralizes chlorine gas
- Operates in below freezing temperatures without special heaters
- *Highest removal capacity available in the Industry with 15% minimum by weight capacity for chlorine Gas
- Landfill disposable

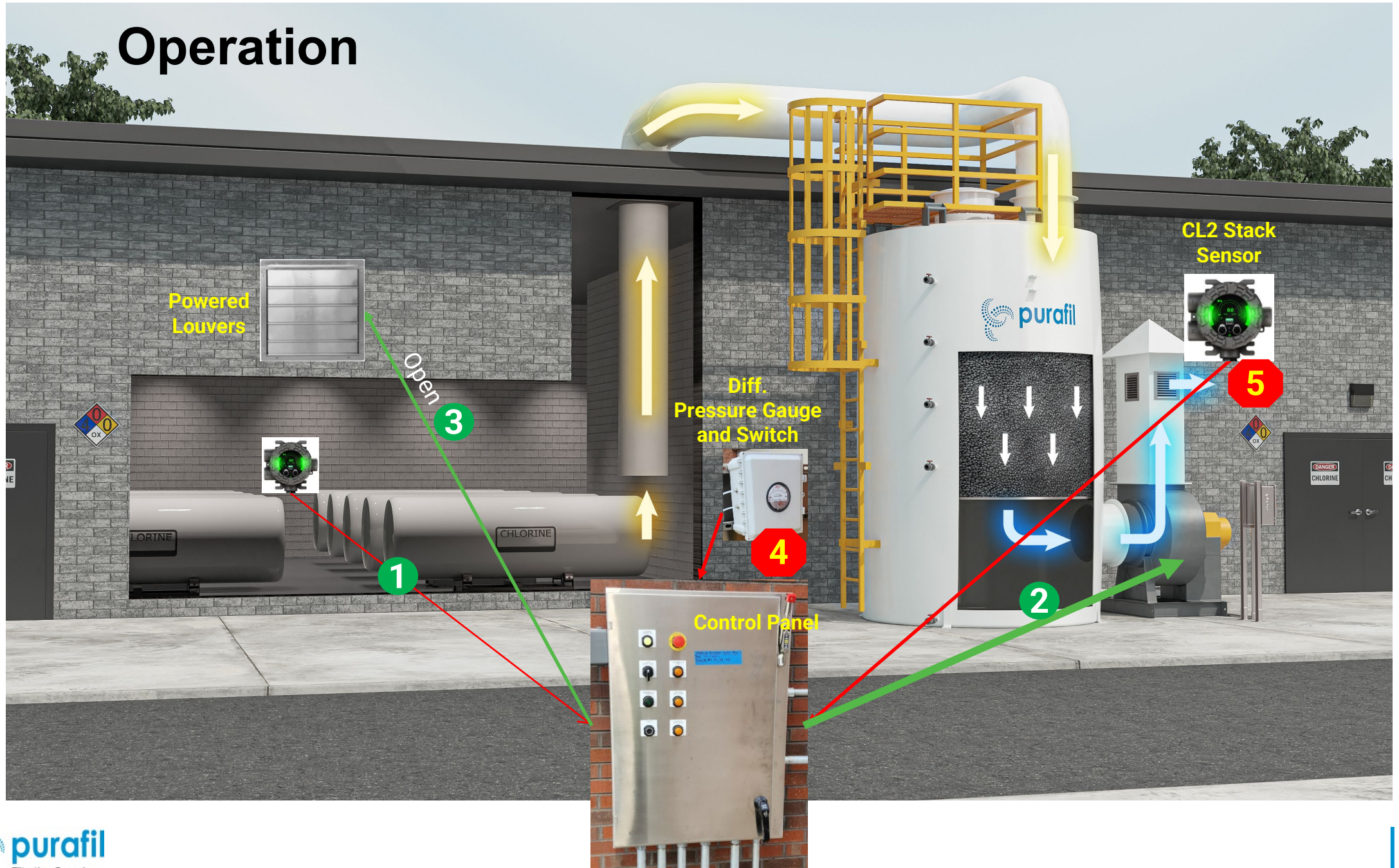
This process is essentially *instantaneous & irreversible* - it will not release chemicals back into the airstream.

HOW IT WORKS

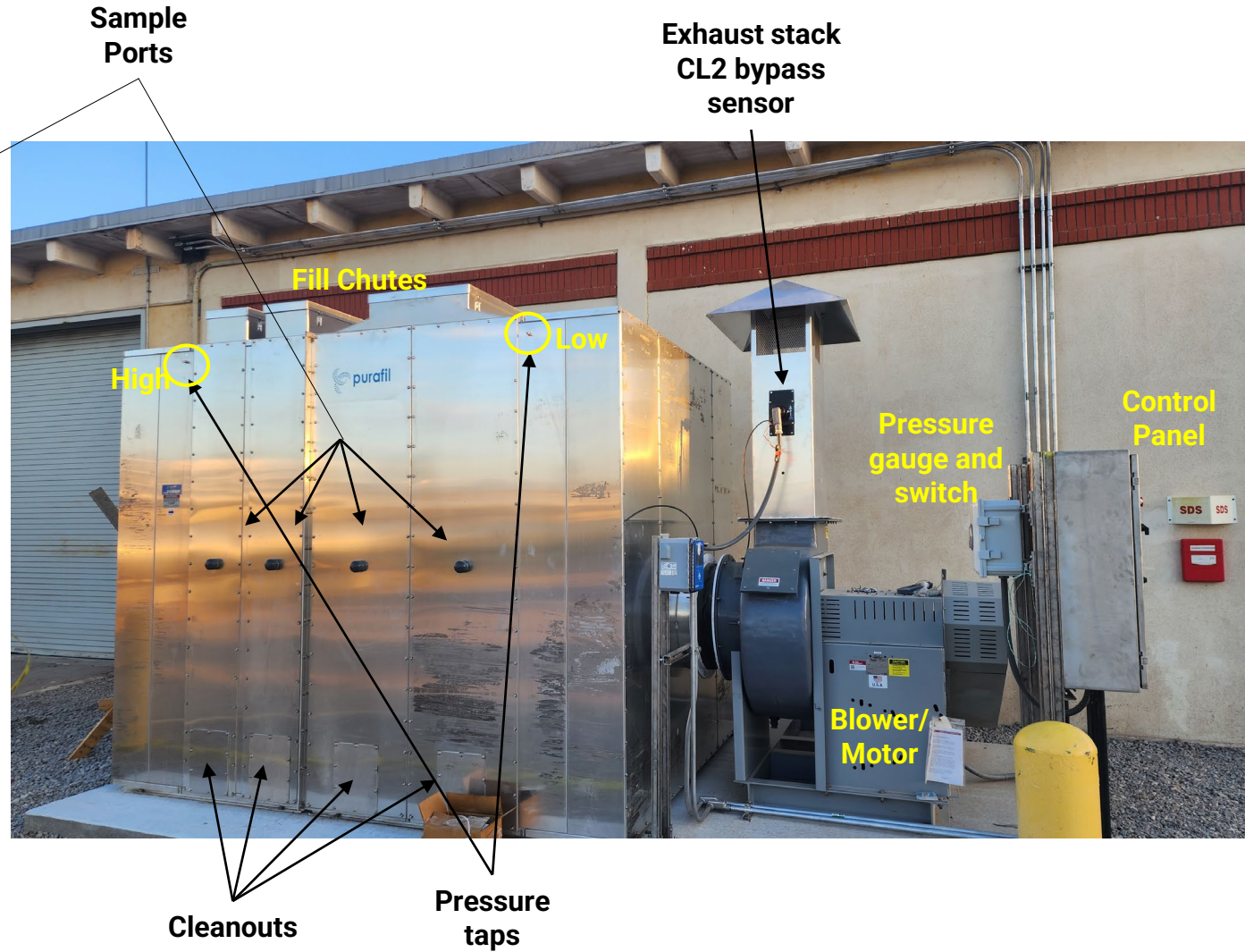
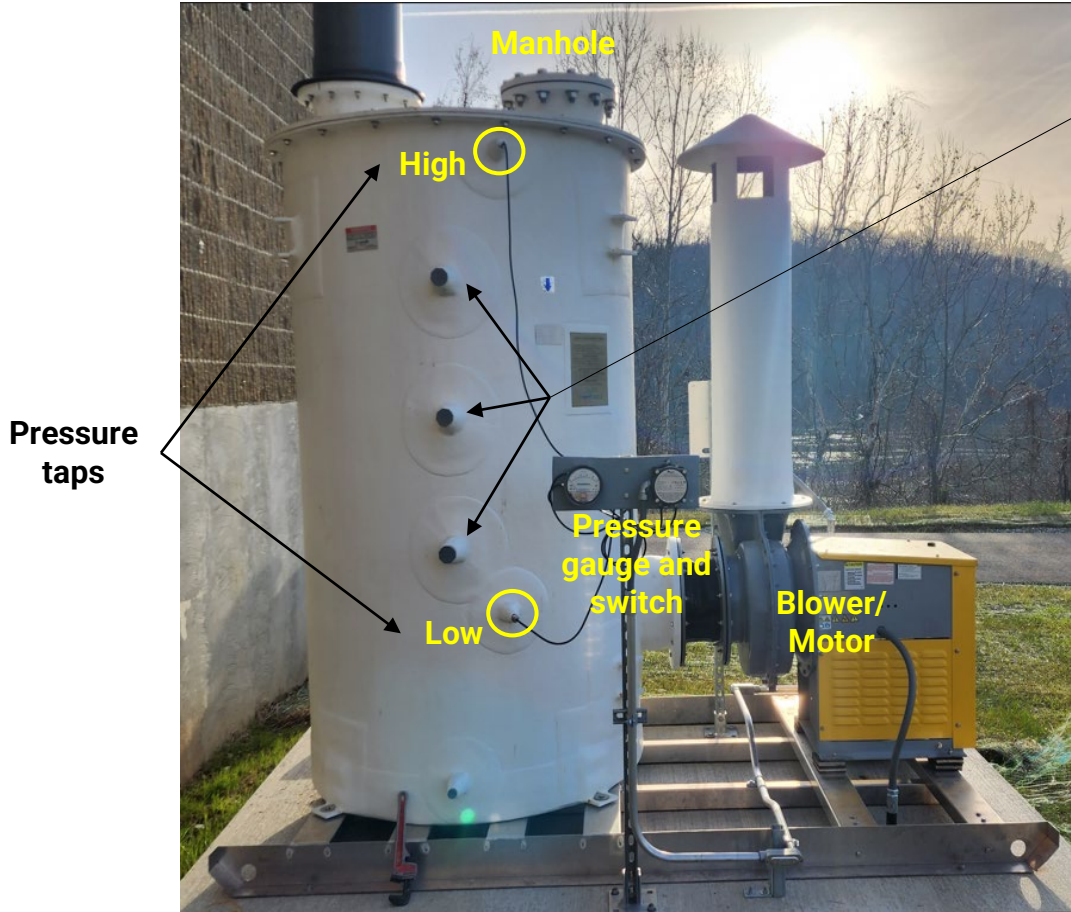


- 1** Approximately 400 lbs of liquid chlorine will flash into vapor and the remaining contents of the chlorine cylinder would spill out as a liquid at its boiling point.
- 2** A chlorine sensor inside the room activates the EGS blower which will begin suction of the room at 5,000 cfm until the full contents of the release have passed into the scrubber.
- 3** Inside the scrubber, Chlorosorb Ultra media will use adsorption, absorption and irreversible chemical reaction to change the chlorine into a harmless solid.
- 4** Chlorine Free air is released, protecting employees, and preventing the need to evacuate the local community.

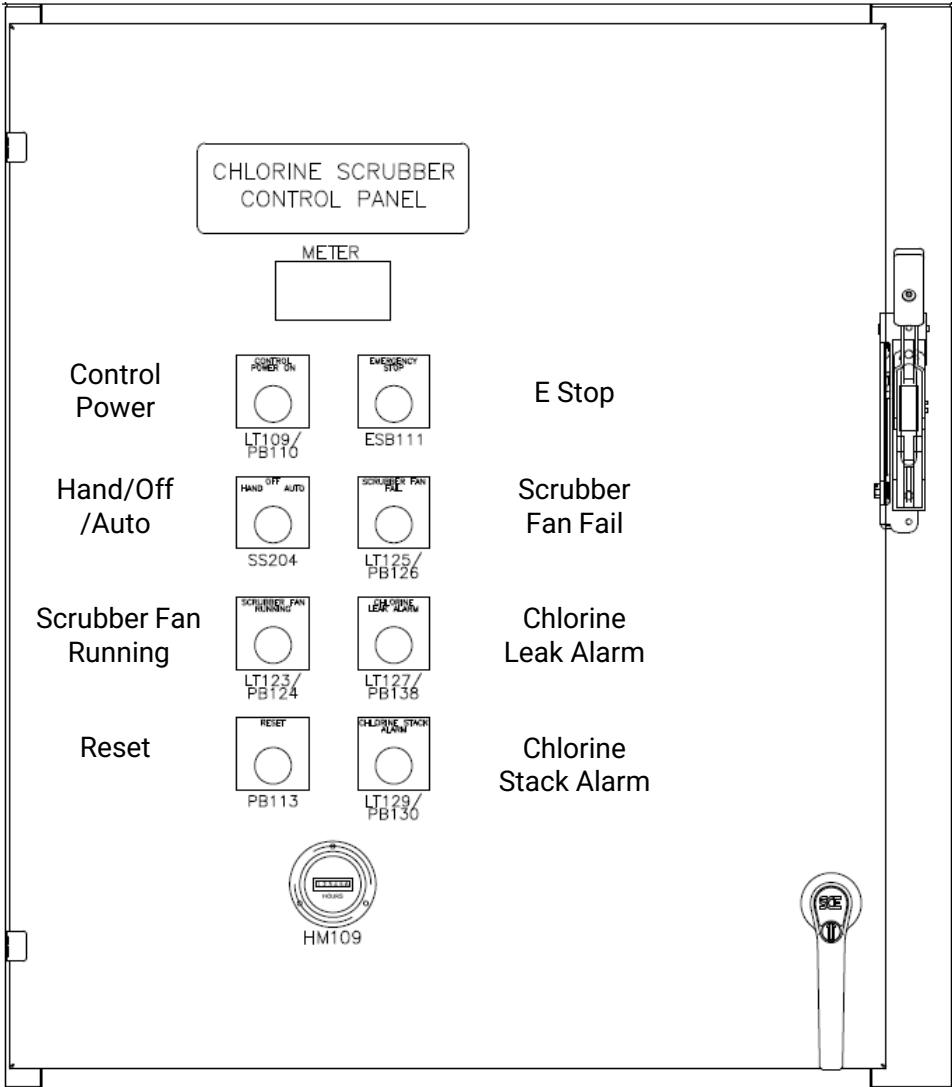
Operation



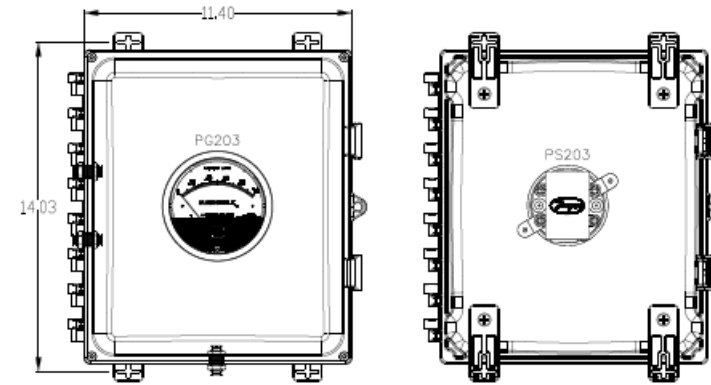
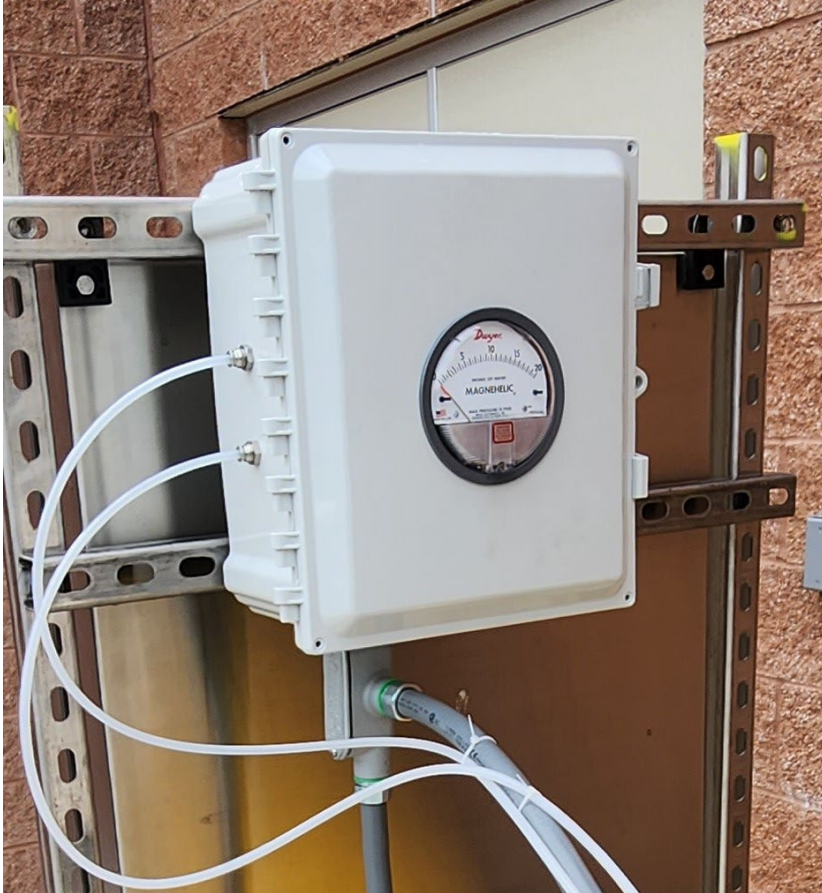
The EGS Unit



Controls



Differential Pressure Gauge & Switch



Estimated pressure drops by unit

- FOC5 = 3.50"
- FOC300 = 3.4"
- FOC1 = 14.7"
- FOC2 = 15.0"

- AOC5 = 4.29" total through three media beds (1.43" per bed)
- AOC300 = 3.18" total through three media beds (1.06" per bed)
- AOC1 = 6.15" total through 6 feet of media beds

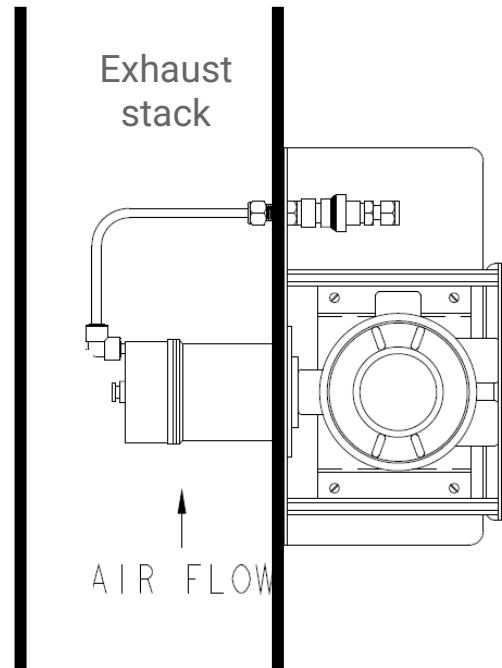
Chlorine Stack Sensor

- Calibrated and certified from the factory.
- Preset to 5 PPM

ULTIMA® X5000 Gas Monitor



Quarterly calibration is recommended in normal applications. However, it is dependent on plant safety personnel and operational needs.



Life Expectancy: XCell sensor
CL2 expected Life is 5 years
Warranty is 3 years

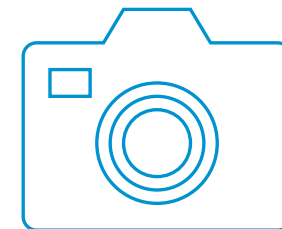
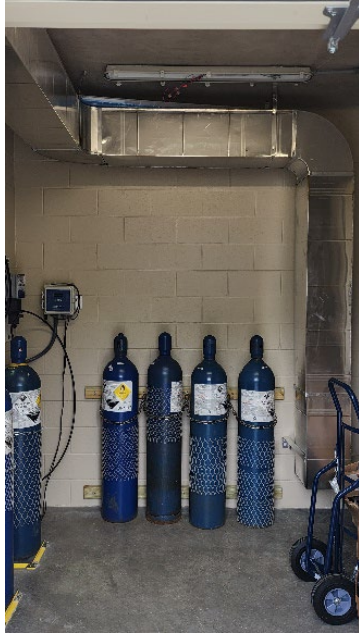
Start-Up

Pre-Start-Up Checklist

To be completed and verified prior to start up:

1. Vessel is filled up with media to appropriate height.
2. Blower is hooked to the vessel, wired with control panel (if applicable), powered and rotating.
3. Inlet ducting is done and attached with vessel inlet.
4. Pressure gages are installed.
5. Authorized start-up and training date from end user.
6. Approved training schedule from end user for their employees.
7. Media sampler is on-site and available for start up.

Take Pics!



Start-Up Checklist

Purafil has created a new Start-Up Form for use on all units. It is now filled out and submitted digitally.

<https://www.purafilsystems.com/Public/Form?form=Pfl17>

purafil Systems
Filtration Group

EQUIPMENT START-UP FORM (PFL17 REV. 58)

Today's Date: 10/26/2023
Name of Person Completing Form:
Company:

Phone:
Email:
Your Purafil RSM: Choose an RSM

Use the following checklist to fully inspect the unit prior to operation.

WARNING Power should be safely turned off and all safety and lockout procedures applied where applicable for safe inspection of the unit and moving parts.

Submittals / Operations, Installation and Maintenance OIM

Locate and review Operations, Installation, and Maintenance (OIM) manual. This is typically a digital copy.

Yes No N/A

Review Scope of Supply to ensure all included components are accounted for.

Yes No N/A

Comments:

General Inspection

Inspect foundation to ensure adequate support.

Pass Fail N/A

Submittals / OIM

Submittals / Operations, Installation and Maintenance OIM

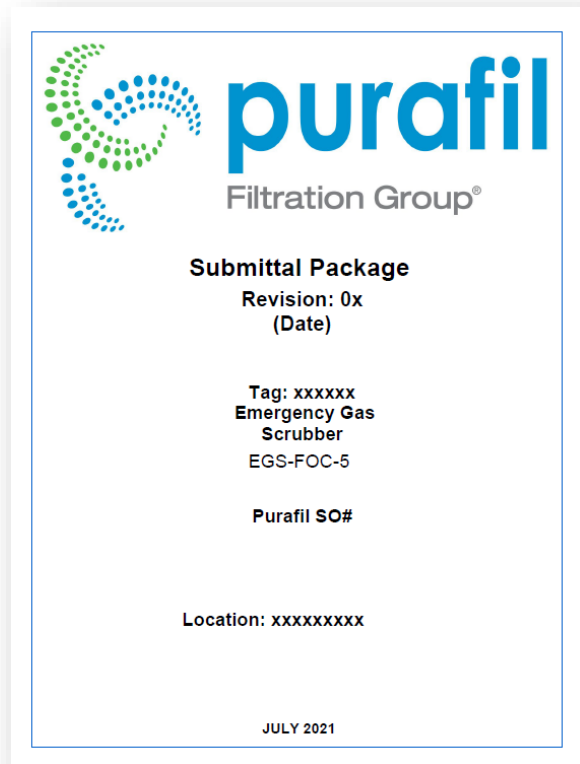
Locate and review Operations, Installation, and Maintenance (OIM) manual. This is typically a digital copy.

Yes No N/A

Review Scope of Supply to ensure all included components are accounted for.

Yes No N/A

Comments



Scope of Supply

The system is designed to process a minimum of 900 cfm of air while not exceeding a pressure drop of 7.2 iwg.

The unit will draw air in through the inlet ductwork connected to a 12" inlet. Contaminated air will pass through the media bed, neutralizing the chlorine mixed in the air. Air will flow out of the 7 7/8" outlet, through the flexible connector, into the blower, and finally clean air will leave the exhaust stack.

Components of the system include the following:

- Standard Purafil FOC5 - Skid Mounted Unit
- 1,620lbs Chlorosorb Ultra media per Unit
- Inlet and Outlet Gaskets for blower
- NEMA 4X Stainless Steel Control Panel
- One (1) Dwyer Magnehelic Pressure Gage per Unit
- One (1) Dwyer Differential Pressure Switch per Unit
- One (1) MSA X5000 chlorine sensor for outlet per Unit
- Media Sampling Probe
- Free media life analysis

Notes:

- Does not include installation (electrical, or mechanical), spare parts, controls, supplementary duct work, taxes, etc.

Start-Up Checklist

Note: Power Off



Walk around visual inspection

General Inspection

Inspect foundation to ensure adequate support.

- Pass Fail N/A

Inspect clearances to ensure access to doors and fill chutes are unimpeded.

- Pass Fail N/A

Inspect inlet and outlet ducts or louvers for free airflow.

- Pass Fail N/A

Inspect all joints, seals, and gaskets for potential bypass.

- Pass Fail N/A

Inspect all door latches and door gaskets for acceptable seal.

- Pass Fail N/A

See OIM for instructions

If this is a belt driven unit, check all belts and sheaves for proper tension and alignment.

- Pass Fail N/A

Walk around visual inspection

Inspect all isolation mounts and motor mounts, if applicable.

- Pass Fail N/A

N/A for EGSs

If ISA standards apply, survey room for tightness.

- Pass Fail N/A

General Inspection Comments

Start-Up Checklist

Note: Power Off

With power off, check connections are secure

Electrical Inspection (if required)

Inspect electrical connections and contacts.

Pass Fail N/A

Electrical Inspection Comments

Inspection of Particulate Filtration

Inspect mist eliminator for correct installation and ensure that there are no gaps between filters causing bypass.

Pass Fail N/A

Inspect pre-filter and final filter installations for correct airflow.

Pass Fail N/A

Inspect pre-filter and final filter installations to ensure that there are no gaps between filters causing bypass.

Pass Fail N/A

N/A for EGSs

Particulate Filtration Inspection Comments

Start-Up Checklist

Note: Power Off

Inspection of Chemical Filtration Media

IMPORTANT! Purafil, Inc. will offer it's complimentary media life analysis program (MLA) to the customer, direct from its state-of-the art laboratory, for the lifetime of the Purafil media.

Inspect chemical media beds for bypass.

- Pass Fail N/A

Confirm chemical media beds are in the correct order and in the direction of airflow.

- Pass Fail N/A

If chemical modules are used, make certain airflow is correct.

For horizontal equipment, point the nose of the "V" facing inlet air.

For vertical airflow, the "V" should point upwards regardless of the direction of airflow.

- Pass Fail N/A

If the unit is bulk filled, make certain the media bed extends into the fill chute to avoid air by-pass.

- Pass Fail N/A

If PuraGRID filters are used, ensure filters are inserted into the proper track(s).

- Pass Fail N/A

For bulk fill units, take media samples following the [Purafil Media Sampling Guide](#).

- Pass Fail N/A

IMPORTANT! The first media sample should be taken at initial start-up, except for PuraGRID filters. Another sample should be taken within 90 days of operating life. The first 90 days are critical to determine that the system is functioning as designed. The first two samples allow Purafil to estimate expected media life.

Chemical Filtration Media Inspection Comments

Will need to remove top manhole or fill chute covers to inspect



N/A for EGSs

N/A for EGSs

Will review process in maintenance section



Start-Up Checklist

Note: Power On



Inspection of Operations

After initial inspection, power on the unit. **Follow all safety guidelines for a unit powered on.**

***Note: Dust from the media may be expelled from the back of the unit when initially starting a unit. This is normal but we advise ensuring the area is clear of personnel. We also advise removing new final filters from the unit prior to initial start up and then reinstalling them after dust is clear.**

Inspection of Electrical Components (if required)

Test motor starter or VFD.

- Pass Fail N/A

Test wheel direction for proper airflow.

- Pass Fail N/A

Compare input line voltage to motor or VFD voltage rating.

- Pass Fail N/A

Test control panel.

- Pass Fail N/A

Bump test motor and check rotation in direction of arrows shown on blower

Perform with on site electrician

**Hand/Off/Auto
All lights are working**

Start-Up Checklist

Note: Power On

Note: You will need to determine surface area of inlets to calculate CFM.

Inspection of Unit Operation

Inspect all joints, seals, and gaskets for air leakage.

Pass Fail N/A

	Expected	Actual
Measure RPM.		Tachometer needed, checked on motor shaft
Measure Airflow		Anemometer needed, checked on inlet(s)

Check OIM, motor tag, and/or confirm with Purafil for expected parameters

Set the pressure flag to determine when the filters need to be replaced. With the unit running, read and record pressure as shown on gauges.

	Flag Settings	Pressure Readings
Pre-Filter / Mist Eliminator		N/A for EGSs
Final Filter		N/A for EGSs
Media Bed		Read at differential pressure gauge



Start-Up Checklist

Customer/End User Information

Company

Primary Contact

Primary Contact Title

Unit Information

Date Unit Started

Model Number

Sales Order Number

Location of Unit

Serial Number

Primary Monitor Method

 N/A for EGSs

Media Container Type

Bulk-filled PuraGrid 2" PuraGrid 4" PK-12 PK-18

EGS will be bulk filled

Drop downs for media

Bed #1 Media Type	Bed #2 Media Type	Bed #3 Media Type	Bed #4 Media Type
Choose One	Choose One	Choose One	Choose One

Add Additional Unit

PURAFIL - TERMS AND CONDITIONS OF SALE

Market Segment

User Type

User Type Other

Trouble Shooting

Common Issues:

- **Scrubber Fan Fail Alarm (usually shuts unit off after short time running in hand)**
 - Differential pressure switch
 - Check diff press gauge – is it at or near expected reading?
 - Ensure lines to pressure taps are correctly installed and clear of blockages
 - Have electrician confirm wiring is correct
 - Adjust switch as needed
 - Fan Overload (unit will run in hand for up to a few minutes and then shut down)
 - Confirm fan overload is set within range of full load amp rating of motor
- **Chlorine Stack Alarm**
 - Have electrician confirm wiring is correct
- **Chlorine Leak Alarm (occurs immediately after putting in Auto)**
 - Have electrician confirm wiring is correct

Maintenance

Maintenance

Monthly

- Inspect exterior and interior surfaces for any change in condition
- Energize the blower to assure proper operation
- Inspect media bed for any change of condition
- Observe and record media bed differential pressure

Quarterly (or as required by local procedures)

- Calibrate stack gas sensor

Semi Annually

- Perform blower maintenance as required
 - Grease, if needed
 - Check belt tension
- Take and send media samples to Purafil to analyze (should also be done after each potential leak)

Media Life Analysis Process

<https://www.purafil.com/mla-process-submittal-form/>

MEDIA LIFE ANALYSIS SAMPLING INSTRUCTIONS

This process should be followed to sample the remaining media life of your Purafil dry- scrubbing system. A sample bag should be prepared for each media bed in your system. For example, if you have a two-pass system, prepare and return two sample bags, one for each pass. The included transmittal form must also be completed and included with your sample shipment. The below information must also be labeled on each media sample bag. Be sure to note your serial number for personal reference.

Purafil Media Sampling Procedure

Reminder: DO NOT SAMPLE MEDIA FROM THE CAP OF THE PORT

How Much to Sample: Use an air-tight plastic bag than can hold at least half of cup = 4 ounces = 118 milliliters


For Modules: Remove one Purafil module from near the center of the bank to be tested. Pour about 1/3 to 1/2 of the contents of the module into a box and fill the sample bag with pellets. Refill the module adding a little new media, if necessary, and replace in the system.

For Bulk Fill Systems: Using the last three (3) inches of each twelve (12) inch bed, insert the sample probe halfway down into the bed for samples. Continue this procedure until the sample bag is filled.

Mark the bag with the following information: (a form is included on page 3 that can be completed and attached to each sample bag, or this information can be written directly on the sample bag)

- Sales Order (S.O.) Number
- Serial Number
- Media Type
- Unit Type
- Date Filled
- Date Sampled
- Indicate which bed/pass the media is from

MEDIA SAMPLE BAG LABELING



2654 Weaver Way, Doraville, GA 30340, USA
FILL BAG COMPLETELY

*S.O. No. _____
 Serial No. _____
 Unit Type: _____
 Bed ID #: _____
 Unit Fill Date: _____ Sample Date: _____
 Equipment manufacturer* (if other than Purafil, Inc.): _____



MEDIA SAMPLE ANALYSIS TRANSMITTAL

Serial Number: _____ Unit Type: _____

Important Notes

Purafil requires each customer to complete and submit the Media Sample Transmittal form prior to conducting the Media Sample Analysis testing. **Please make any necessary changes on this sample transmittal form.** Use a separate transmittal form for each unit and identify each unit by serial number. A maximum of four media beds can be sampled and submitted with each transmittal form.

Sales Rep*	
Company Name of Installation*	
Company Contact*	
Phone Number / Email Address*	
Address of Scrubber*	
Specific Room/Area Treated	

COMPLETE THE FOLLOWING BEFORE RETURNING TO PURAFIL INC.

Number according to the direction of the airflow:

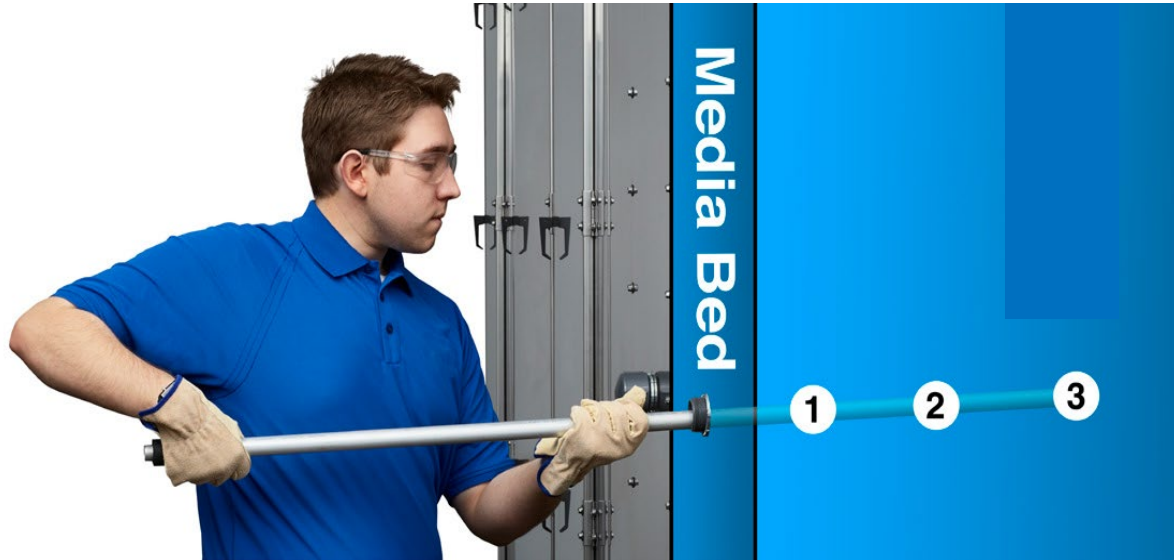
	Bed 1	Bed 2	Bed 3	Bed 4
Media/Trade Name				
Your Sample Identification				
Date Current Media Filled*				
Date Sample Taken*				

LAB USE ONLY

% NanO ₂ /KmnO ₄				
Na ₂ S ₂ O ₃				

Media Sampling

During start-up, also take samples from top of unit



Using the probe, pull media from the port at **25%** depth until you have enough for a full sample bag.

Repeat this process at **50%** depth, and **100%** (or as far in as possible) into the unit

Consistency in pulling media from the same location will ensure a more accurate result.

It is possible that pulling media samples from significantly different areas within the media bed will cause fluctuating results over time.

MLA Report

<https://its.purafil.com>

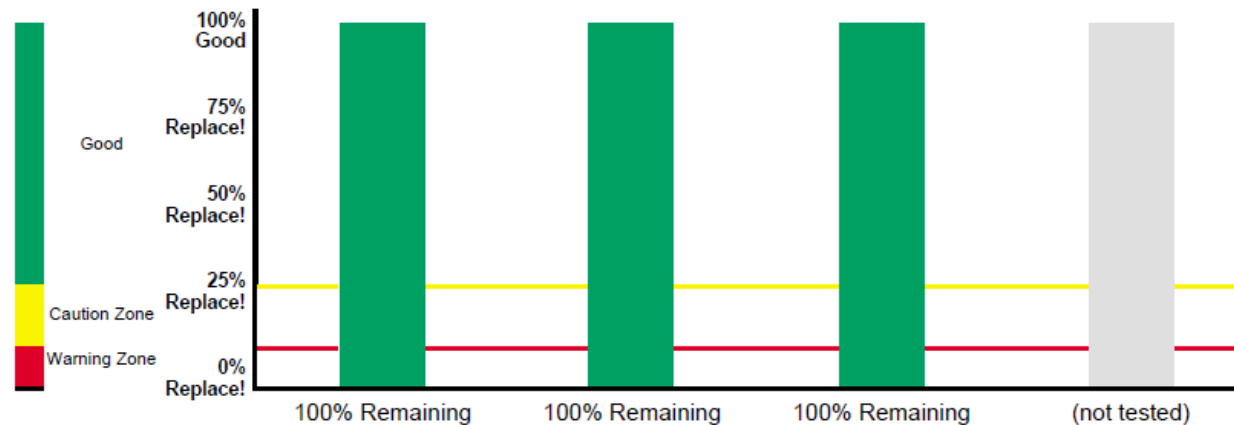


MEDIA CERTIFICATE OF ANALYSIS FOR SERIAL

Co. Name: Report Date: 9/18/2023
 Attn: Unit Type: AOC1
 Room/Area: Chlorine Building

Results/Projections

	Bed 1	Bed 2	Bed 3	Bed 4
*Media Type:	Chlorosorb Ultra	Chlorosorb Ultra	Chlorosorb Ultra	
Date of Analysis/ID:	September 11,2023	September 11,2023	September 11,2023	
*Date Filled:	6/30/2016	6/30/2016	6/30/2016	
*Date Sampled:	8/23/2023	8/23/2023	8/23/2023	
Time in Service:	86 months	86 months	86 months	
Moisture:	N/A%	N/A%	N/A%	
Activity:	10.0 pH	10.0 pH	10.0 pH	
+Chemistry Left:	100%	100%	100%	
*See EGS Notes	*EGS Note	*EGS Note	*EGS Note	
Reanalysis Date:	11/21/2023	11/21/2023	11/21/2023	



Long Term Follow-Up



EGS Technical Assessment

Emergency Gas Scrubber Site assessment process and check list.

Pre-visit

- Pull original order Submittals for information about the installation.
- Check previous MLA results to see the testing frequency and history of results.
- Make sure to bring below necessary tools:
 - 14 airtight or ziplock bags per unit being sampled
 - A Sharpie pen
 - Socket set (electric impact recommended)
 - Screwdriver
 - Tape measure
 - Anemometer
 - Tachometer
 - Steel sampling rod
 - Hammer

Storage Facility

- Take pictures of chlorine storage room
- How many chlorine tanks are hooked up at one time?
- How often do you change the chlorine tanks? (Leaks can occur during change over)
- Has there been a release? Estimate on how much was released?
- Check exterior of the ductwork
- Check inlet vent(s) that is connected to our unit (ensure it is not blocked)

Questions



TOGETHER, WE ARE MAKING
THE WORLD SAFER, HEALTHIER
AND MORE PRODUCTIVE.

