

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection

N681859137

FACILITY: Linn Products Inc	SRN / ID: N6818
LOCATION: 1200 Lipsey Drive, CHARLOTTE	DISTRICT: Lansing
CITY: CHARLOTTE	COUNTY: EATON
CONTACT: Mark Korienek , Maintenance/Tooling Manager	ACTIVITY DATE: 08/03/2021
STAFF: Michelle Luplow	COMPLIANCE STATUS: Compliance
SUBJECT: Scheduled, announced, onsite inspection to determine compliance with PTI 141-00C.	
RESOLVED COMPLAINTS:	

Inspected by: Michelle Luplow

Linn Products Personnel Present: Mark Korienek, Maintenance/Tooling Manager (mkorienek@linnproducts.net)

Purpose

Conduct an announced, scheduled compliance inspection of Linn Products to determine compliance with PTI 141-00C for aluminum etching and anodizing processes.

Linn Products was last inspected November 2017.

Facility Background

Linn Products is an aluminum etching facility comprised of 2 plants: "Plant 1" contains all permitted equipment and is the source of all air emissions. "Plant 2" is used solely for aftermarket parts assembly, QA/QC, wrapping and packaging parts, shipping/receiving, and warehousing parts.

I confirmed with M. Korienek that 50-60% of the business is acid and base-etching, and anodizing (metal treatment) of aluminum power sunroof tracks for various automobile manufacturers, including Toyota and GM; 15% of the business is for metal treatment for the architectural (conveyors, hinges, etc) industry, and the remaining fraction is for miscellaneous parts. They operate 2 10-hour shifts, Monday through Thursday. There are occasions when a 5th day is worked, but the 5th day is typically used for maintenance and maintenance checks.

The anodizing operations predominantly run 24 hours per day, 4 days per week, for energy efficiency purposes (heating the solution baths, etc).

Since the last inspection, PTI's 141-00B (replacing the "A" version) and 141-00C (replacing the "B" version) were issued. PTI 141-00B was issued June 22, 2018 to address unpermitted replacement of the control equipment and unpermitted installation and control of the hydrofluoric acid (HF) tank. The original, permitted packed bed scrubbed systems for both EUETCHSTRIP and EUALANODIZING were replaced with composite mesh pads (CMP) control systems. These changes were done to accommodate the added volume associated with the installation of an HF etch tank.

PTI 141-00C was issued March 31, 2020 for the installation of a fourth anodizing tank with its own CMP control system.

M. Korienek verified that Linn Products does not currently have any emergency generators or boilers installed (other than the 2 boilers that are permitted).

Inspection

I had attempted to conduct the inspection on July 21, 2021; however, Linn Products receptionist informed me that due to COVID-19 restrictions they require that all visits be scheduled with them prior to coming to the facility. I spoke with Mark Korienek, Maintenance and Tooling Manager, who was able to reschedule the inspection with me for August 3, 2021, as he was leaving for the day when I arrived.

I arrived at Linn Products at approximately 7:30 a.m. on August 3, 2021 and met with M. Korienek.

Table 1 contains a list of all permitted and exempt equipment which were verified during the inspection, and contains an evaluation of all exempt equipment.

Table 1. Equipment located onsite

Unit	Description	Control	PTI/Exemption	Compliance Status
EUALANODIZING	4 aluminum anodizing tanks containing H ₂ SO ₄ (tanks 28, 29, 31, 32) HF etch tank (acid etch) 2 organic dye tanks Electrolytic 2-step Rinse tanks	Composite mesh pads (CMP) mist eliminator – one to control 3 tanks and another to control the new tank (MAPCO Enforcer III for both)	PTI 141-00C	

EUETCHSTRIP	<p>Used when HF etching isn't used.</p> <p>2 Aluminum etch and strip tanks containing a caustic, NaOH solution</p> <p>3 rinse tanks</p> <p>Parts then go through anodizing process</p>	Composite mesh pads (MAPCO MW-300) with continuous water flow	PTI 141-00C	
<p>Parts Washer</p> <p>(located in tool shop)</p>	<p>Safety Kleen solvent (100% petroleum distillates)</p> <p>Operating instructions are present.</p> <p>Lid was closed.</p> <p>Surface area is less than 10 ft²</p>	NA	Rule 281(2)(h)	Compliance
2 Aluminum extruders	Used to form the aluminum billets into profiles	NA	Rule 285(2)(l)(i)	Compliance
2 natural gas-fired aging ovens	<p>Rated at 10 MMBtu/hr (Belco 3-chambered oven) and 1 MMBtu/hr (oven #13).</p> <p>They are used for heat-treating aluminum parts</p>	NA	Rule 282(2)(a)(i)	Compliance
2 cutting saws for aluminum (MetalSaw and B&O brands)	Saws used to cut lengths of aluminum billets.	In-plant baghouse for both	Rule 285(2)(l)(vi) (B)	Compliance

	<p>B&O system has a filter system in addition to a mechanical pre-cleaner which drops the larger shavings out.</p> <p>MetalSaw shavings/fines are captured in a bin.</p> <p>Aluminum shavings/particulate captured from this process are collected and sold back to the billet company to remelt and make new aluminum billets</p>	(not exhausted to atmosphere)		
20+ Presses	Used to form aluminum via bending/shaping	NA	Rule 285(2)(l)(i)	Compliance
2 Natural Gas-fired Billet Ovens	For indirect heating of aluminum billets, each rated at 3 MMBtu/hr	NA	Rule 282(2)(b)(i)	Compliance

PTI 141-00C

Permit for 4 aluminum anodizing tanks containing H₂SO₄ (EUALANODIZING), HF etch tank, and aluminum etch and strip tanks containing NaOH (EUETCHSTRIP). The emissions from these processes are controlled by composite mesh pad (CMP) systems (CMP acid mist eliminators for EUALANODIZING tanks and CMP scrubbers for EUETCHSTRIP tanks). All permitted processes were operating during the inspection.

All parts are etched (HF or NaOH) before they are anodized because it removes surface contaminants.

Etching Process:

Alkaline cleaner → Acid Etch (HF) or Caustic Etch (NaOH)

Anodizing Process:

Anode Rinse → 2-step tin application (fills pores) or black organic dye → Nickel seal → Deionized water rinse → Air dry

EUALANODIZING & EUETCHSTRIP

EUALANODIZING consists of 4 sulfuric acid tanks. Emissions from 3 of the tanks (tanks 29, 31, and 32) are controlled by 1 CMP system; the new, 4th tank (tank 28) is controlled by its own CMP system. Both CMP systems are MAPCO Enforcer III mist eliminators.

EUETCHSTRIP consists of 2 NaOH caustic etching tanks controlled by a MAPCO MW300 CMP scrubber system.

There are no Emission Limits, Material Limits, or Testing/Sampling requirements for this unit at this time.

Permit conditions for both emission units are the same and therefore will be addressed together in the report.

Process/Operational Limits & Recordkeeping

Linn Products shall not operate EUALANODIZING and EUETCHSTRIP unless a malfunction abatement plan (MAP) is implemented and maintained. Linn Products submitted their MAP to me within the appropriate timeframe after PTI 141-00C was issued. The MAP was reviewed and deemed acceptable and appropriate for preventative maintenance on the CMP systems and identifying the appropriate operating ranges for the pressure drop on each system.

Design/Equipment Parameters & Monitoring/Recordkeeping

The CMP systems are required to be installed, maintained, and operated in a satisfactory manner, where “satisfactory manner” includes operating the system according to manufacturer’s recommendations as well as in accordance with the MAP. Additionally, the permit requires that pressure drop across each CMP system is recorded daily, including corrective actions taken if the pressure drop is outside of the appropriate operating range.

The MAP specifies that proper operation of the CMP systems for EUALANODIZING’s 3 old tanks and 1 new tank includes operating at a pressure drop between 1.0 and 5.0” H2O for “total pressure” of the system. Proper operation of the CMP system for EUETCHSTRIP is 1.0 – 4.0” H2O. Table 2 lists the pressure drop recorded from each of the CMP systems during the inspection. M. Korienek explained that the two MAPCO Enforcer III CMP systems have Stage 1, Stage 2, and Stage 3 pressure drop monitors that are used for troubleshooting, whereas the “Total Pressure Drop” is what is used to determine the systems’ overall function and is the pressure drop of interest for compliance and ensuring the control devices are operating properly.

Table 2. CMP pressure drop readings on 8/3/21 for the 3 CMP (2 acid, 1 caustic) systems.

Control Device	Total Pressure Drop	
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	(“H2O)	Proper Operating Range (“H2O)
Acid Mist Eliminator (CMP controlling 3 acid etch tanks)	3.25	1.0 – 5.0
Acid Mist Eliminator (CMP controlling 1 acid etch tank)	2.75	1.0 – 5.0
Caustic Scrubber Pressure	3.7	1.0 – 4.0

Daily pressure drop records were reviewed for calendar year 2020 and 2021 through the month of July. All pressure drop readings for the caustic scrubber and 2 acid mist eliminators were within the established operating ranges.

Linn Products' MAP reflects manufacturer's recommendations for maintenance: the MAP requires that the spray nozzles be visually checked on a monthly basis to ensure proper spray patterns/no clogs, and mesh pads are required to be checked on a monthly basis, as well as ensuring that the washdown schedules for the acid mist eliminator CMP systems are maintained. M. Korienek said that if the washdown cycles were not functioning properly a fault would be triggered, which would largely be caused by a dysfunctional pump. The system relies on the pump to ensure the washdowns occur.

Maintenance activities also include quarterly cleaning of the composite mesh pads to remove buildup in one of 2 ways: 1) a chemical cleaner is introduced into the holding tanks of the CMP systems and the wash down cycle is run to clean build up from the pads, or 2) the mesh pads are removed and washed with a cleaning chemical over the grates in the floor, which is then sent to an internal waste stream that is treated prior to sending the wastewater to the City of Charlotte Wastewater Treatment Plant. M. Korienek said this cleaning practice usually bring the pressure drop down to 3 “H2O for the acid mist eliminator systems.

The MW-300 CMP control system for EUETCHSTRIP is cleaned every Friday. The cleaning chemical is run through this system to remove mineral deposits from the city water that is used in this control device. Every 6 months they will also clean the filters in this system. M. Korienek said that the pressure drop is higher in this unit than in the MAPCO Enforcer III units because there is a constant flow pushing through the filters. If the pressure drop is below 1 “H2O this is an indicator that there is a loss of water flow through the system. Linn Products also uses a gallon per minute flow meter to ensure proper operation. To demonstrate this during the inspection, Linn Products staff dropped the flow below 58 gpm, at which point a loud audible alarm sounded to notify staff that there is an issue with the control device. If they cannot fix the issue within 5-10 minutes of the alarm sounding, production is shut down.

The ductwork from the tanks to each CMP system is required to be inspected on a quarterly basis to ensure there are no leaks, and records of this activity are required to be kept. Records were provided on the pressure drop record logs. Inspections were conducted on a quarterly basis for calendar years 2020 and 2021 (through July); no leaks or issues were reported. M. Korienek said that the ductwork is composed of PVC plastic; metal clamp-like structures are used to connect the PVC pipes. Corrosion was noticed on the older clamps (the clamps on the newer CMP ductwork was not corroded). M. Korienek said that over time surface rust develops on these clamps because of the humidity in the air from the heated (180°) process tanks (which are composed primarily of water). I did not observe any leaks in any of the ductwork that I saw during the inspection.

During the semi-annual cleaning of the MW-300 control device, M. Korienek said the joints on the ductwork are inspected, as well as the silicone gaskets and the plastic welds to ensure no leaks are present and that the seals are intact. He said that the pressure drop on the Enforcer III and MW-300 control systems would also be an indicator on whether there were leaks in the ductwork.

Reporting – EUALANODIZING only

Linn Products is required to notify AQD within 30 days of completion of installation of the 4th anodizing tank. The notification was provided with other compliance records after the inspection (outside of the 30-day window). A violation will not be cited, but it will be noted in MACES that the report was late. Completion of installation of the tank and its control device were completed June 1, 2020.

Compliance Statement

Linn Products appears to be in compliance with PTI 141-00C at this time.



Image 1(NaOH caustic etch) : Caustic etch tank. Note the baffles just above the solution's surface - pulls vapors from surface interface to control device, MW-300.



Image 2(Ductwork) : Ductwork coming off of each of the permitted anodizing tanks, routing acid gas to Enforcer III control device.



Image 3(New vs Old Ductwork) : Note the lower ductwork system appears newer with newer metal clamps - this routes acid gas from the new anodizing tank #4 to its own control device. Older ductwork is above this, with surface-rust metal clamps.



Image 4(Enforcer III - 1) : Pressure gauges on the control device that controls emissions from 3 anodizing tanks. Top guage is total pressure.



Image 5(Enforcer III -2) : Pressure drop gauges for the new anodizing tank #4. Top guage is total pressure.



Image 6(MW-300) : Pressure drop guage on caustic, EUETCHSTRIP, control device.

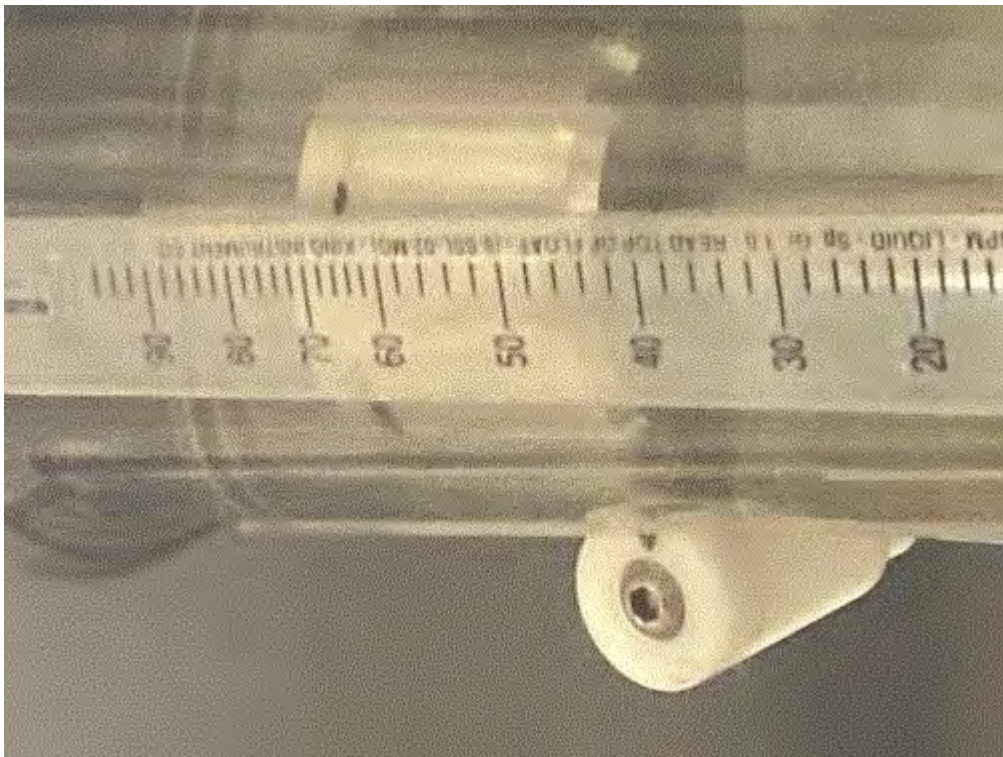


Image 7(MW-300 - Flow meter) : Flow meter guage at 70 gpm for MW-300 caustic control device. Minimum rate

before alarm sounds is 58 gpm.

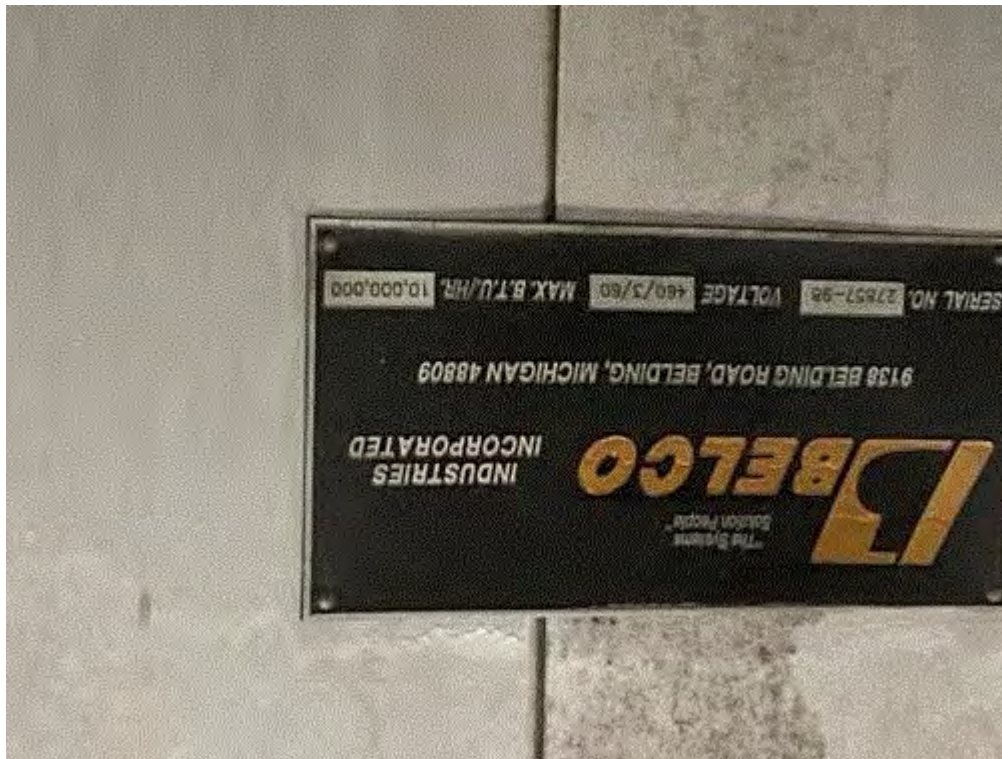


Image 8(10 MMBTU Oven) : Belco oven rated at 10 MMBTU.



Image 9(HF Etch Tank) : Tank #13 is HF Etch Tank (part of EUALANODIZING)

NAME Michelle Luplow

DATE 8/17/21

SUPERVISOR B.M.

Scrubber/ Mist Eliminator Pressure Log CY 2021

Date of Reading	MA-737 Caustic Scrubber Pressure (1.0" to 4.0")	MA-735 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	MA-926 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	Comments
1/4/2021	3.4	2.8	2.6	
1/5/2021	3.2	2.8	2.6	Powerwashed filters on MA-735 and MA-926 and checked ductwork for leaks.
1/6/2021	3.2	2.8	2.8	
1/7/2021	3.2	2.8	2.8	
1/11/2021	3.2	3.0	2.8	
1/12/2021	3.2	3.0	2.8	
1/13/2021	3.1	3.0	2.8	
1/14/2021	3.1	3.0	2.8	
1/15/2021	3.4	3.0	3.2	
1/18/2021	3.3	3.2	2.8	
1/19/2021	3.4	3.4	3.2	
1/20/2021	3.4	3.4	3.0	
1/21/2021	3.4	3.2	2.8	
1/22/2021	3.4	3.4	3.0	
1/25/2021	3.4	3.4	3.0	
1/26/2021	3.5	3.6	3.0	
1/27/2021	3.6	3.6	3.2	
1/28/2021	3.6	3.6	3.2	
2/1/2021	3.6	3.8	3.2	
2/2/2021	3.6	3.8	3.2	
2/3/2021	3.5	3.6	3.2	
2/4/2021	3.4	3.6	3.2	
2/5/2021	3.4	3.6	3.2	
2/8/2021	3.6	3.6	3.4	
2/9/2021	3.6	3.6	3.2	
2/10/2021	3.6	3.6	3.2	
2/11/2021	3.6	3.6	3.2	
2/15/2021	3.2	3.8	3.4	
2/16/2021	3.3	4.0	3.3	
2/17/2021	3.5	4.4	3.4	
2/18/2021	3.5	4.4	3.4	
2/19/2021	3.5	4.2	3.4	
2/22/2021	3.4	4.0	3.2	
2/23/2021	3.3	4.2	3.2	
2/24/2021	3.4	4.4	4.0	
2/25/2021	3.5	4.8	3.3	
2/26/2021	3.5	4.8	3.3	
3/1/2021	3.4	4.6	3.3	
3/2/2021	3.3	4.8	3.2	
3/3/2021	3.4	4.6	3.4	
3/4/2021	3.4	4.6	3.4	
3/5/2021	3.4	4.6	3.4	
3/8/2021	3.4	4.0	3.3	
3/9/2021	3.4	5.0	3.3	MA-735 pressure at max reading. Found water in pressure line causing false reading.
3/10/2021	3.4	4.6	3.4	
3/11/2021	3.5	4.6	2.5	
3/12/2021	3.5	4.6	2.5	
3/15/2021	3.4	3.4	2.4	
3/16/2021	3.4	3.4	2.4	
3/17/2021	3.4	3.4	2.4	
3/18/2021	3.4	3.4	2.4	
3/19/2021	3.4	3.4	2.4	
3/22/2021	3.4	3.4	2.5	
3/23/2021	3.4	3.3	2.3	
3/24/2021	3.5	3.3	2.4	
3/25/2021	3.5	3.3	2.4	
3/26/2021	3.5	3.3	2.4	
3/29/2021	3.5	3.1	2.2	
3/30/2021	3.5	3.2	2.2	
3/31/2021	3.5	3.3	2.3	
4/1/2021	3.5	3.3	2.4	
4/5/2021	3.5	3.2	2.4	
4/6/2021	3.4	3.4	2.6	
4/7/2021	3.6	3.2	2.6	
4/8/2021	3.6	3.0	2.6	
4/9/2021	3.6	3.2	2.6	
4/12/2021	3.5	2.8	2.6	
4/13/2021	3.6	2.8	2.6	

Date of Reading	MA-737 Caustic Scrubber Pressure (1.0" to 4.0")	MA-735 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	MA-926 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	Comments
4/14/2021	3.6	2.8	2.6	
4/15/2021	3.6	2.8	2.6	
4/16/2021	3.6	2.8	2.6	
4/19/2021	3.6	2.6	2.6	
4/20/2021	3.6	2.6	2.6	
4/21/2021	3.6	2.6	2.6	
4/22/2021	3.6	2.6	2.6	
4/23/2021	3.6	2.6	2.6	
4/26/2021	3.6	2.6	2.6	
4/27/2021	3.5	2.6	2.6	
4/28/2021	3.6	2.6	2.6	
4/29/2021	3.6	2.6	2.6	
4/30/2002	3.6	2.6	2.6	
5/3/2021	3.6	2.6	2.6	
5/4/2021	3.6	2.6	2.6	Powerwashed filters on all three units and checked ductwork for leaks. (per PM)
5/5/2021	3.6	2.6	3.6	
5/6/2021	3.6	2.8	2.6	
5/7/2021	3.6	2.8	2.6	
5/10/2021	3.6	2.6	2.6	
5/11/2021	3.6	2.8	2.6	
5/12/2021	3.6	2.8	2.6	
5/13/2021	3.6	2.8	2.6	
5/14/2021	3.6	2.8	2.6	
5/17/2021	3.6	2.8	2.6	
5/18/2021	3.6	3.0	2.8	
5/19/2021	3.6	3.0	2.8	
5/20/2021	3.6	3.0	3.2	
5/21/2021	3.6	3.0	3.2	
5/24/2021	3.6	3.0	2.4	
5/25/2021	3.6	2.8	2.4	
5/26/2021	3.6	2.6	2.6	
5/27/2021	3.7	3.2	2.7	
5/28/2021	3.7	3.2	2.7	
6/1/2021	3.6	2.6	2.4	
6/2/2021	3.6	3.6	2.4	
6/3/2021	3.6	3.0	2.4	
6/4/2021	3.6	3.0	2.4	
6/7/2021	3.6	3.8	2.4	
6/8/2021	3.6	3.8	2.6	
6/9/2021	3.6	4.0	2.4	
6/10/2021	3.6	4.0	2.4	
6/14/2021	3.6	4.0	2.4	
6/15/2021	3.6	4.0	2.4	
6/16/2021	3.7	4.2	2.6	
6/17/2021	3.7	4.0	2.6	
6/18/2021	3.7	4.0	2.6	
6/21/2021	3.7	4.0	2.4	
6/22/2021	3.7	4.0	2.6	
6/23/2021	3.7	4.1	2.6	
6/24/2021	3.7	4.2	2.6	
6/25/2021	3.7	4.8	2.6	
6/28/2021	3.6	4.0	2.4	
6/29/2021	3.6	4.2	2.4	
6/30/2021	3.6	4.0	2.4	
7/1/2021	3.6	4.0	2.4	
7/12/2021	3.6	4.2	2.6	
7/13/2021	3.5	4.2	2.4	
7/14/2021	3.6	3.2	2.4	Maintenance powerwashed filters on MA-735.(needed from observation)
7/15/2021	3.6	3.2	2.4	
7/16/2021	3.6	3.0	2.4	
7/19/2021	2.6	3.0	2.3	
7/20/2021	3.6	2.2	2.6	
7/21/2021	3.6	3.1	2.3	
7/22/2021	3.7	3.1	2.3	
7/23/2021	3.7	3.1	2.3	
7/26/2021	3.6	3.2	2.6	
7/27/2021	3.6	3.2	2.6	
7/28/2021	3.6	3.2	2.6	MA-735 Changed all four belts on fan unit.
7/29/2021	3.6	3.2	2.6	
7/30/2021	3.6	3.2	2.6	
8/2/2021	3.6	3.2	2.6	
8/3/2021	3.6	3.4	2.6	

Date of Reading	MA-737 Caustic Scrubber Pressure (1.0" to 4.0")	MA-735 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	MA-926 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	Comments
8/4/2021	3.7	3.4	2.6	

Scrubber/ Mist Eliminator Pressure Log CY 2020

Date of Reading	MA-737 Caustic Scrubber Pressure (1.0" to 4.0")	MA-735 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	MA-926 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0") MA-926	Comments
1/2/2020	3.3	3.9 *		* New Unit not in operation
1/3/2020	3.3	3.6 *		
1/6/2020	3.2	3.8 *		
1/7/2020	3.3	3.9 *		
1/8/2020	3.3	4.1 *		
1/9/2020	3.3	3.9 *		
1/10/2020	3.3	3.9 *		
1/13/2020	3.3	3.8 *		
1/14/2020	3.3	4.0 *		
1/15/2020	3.3	4.0 *		
1/16/2020	3.5	4.0 *		
1/17/2020	3.5	4.0 *		
1/20/2020	3.5	4.1 *		
1/21/2020	3.4	4.1 *		
1/22/2020	3.5	4.0 *		
1/23/2020	3.4	4.1 *		
1/24/2020	3.4	4.0 *		
1/27/2020	3.3	4.1 *		
1/28/2020	2.7	4.1 *		
1/29/2020	3.6	4.1 *		
1/30/2020	3.5	4.1 *		
1/31/2020	3.6	4.1 *		
2/3/2020	3.6	4.1 *		
2/4/2020	3.7	4.1 *		
2/5/2020	3.7	4.1 *		
2/6/2020	3.7	4.0 *		
2/7/2020	3.8	4.1 *		
2/10/2020	3.5	4.1 *		
2/11/2020	3.2	4.2 *		
2/12/2020	3.6	4.2 *		
2/13/2020	3.6	4.2 *		
2/14/2020	4.0	4.1 *		
2/17/2020	3.4	4.1 *		
2/18/2020	3.5	4.1 *		
2/19/2020	3.4	4.2 *		
2/20/2020	3.4	4.6 *		
2/21/2020	3.4	4.6 *		MA-737 Scrubber cleaned and checked ductwork for leaks.
2/24/2020	3.3	4.0 *		
2/25/2020	3.3	4.1 *		
2/26/2020	3.5	4.1 *		
2/27/2020	3.5	4.6 *		
2/28/2020	3.5	4.6 *		
3/2/2020	3.5	4.1 *		
3/3/2020	3.4	4.1 *		
3/4/2020	3.4	4.1 *		
3/5/2020	3.5	4.1 *		
3/6/2020	3.6	4.1 *		
3/9/2020	3.4	4.1 *		
3/10/2020	3.5	4.2 *		
3/11/2020	3.5	4.4 *		
3/12/2020	3.5	4.2 *		
3/13/2020	3.5	4.4 *		
3/16/2020	3.5	4.4 *		
3/17/2020	3.7	4.4 *		

Date of Reading	MA-737 Caustic Scrubber Pressure (1.0" to 4.0")	MA-735 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	MA-926 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0") MA-926	Comments
3/18/2020	3.8	4.4	*	
3/19/2020	3.7	4.2	*	
3/23/2020	3.5	4.4	*	
3/24/2020	3.4	4.4	*	
3/25/2020	3.3	4.4	*	
3/26/2020	3.2	4.4	*	
3/27/2020	3.5	4.4	*	
3/31/2020	3.5	4.2	*	
4/1/2020	3.0	4.6	*	
4/2/2020	3.5	4.0	*	
4/6/2020	3.8	4.6	*	
4/7/2020	3.5	4.2	*	
4/8/2020	3.5	4.2	*	
4/9/2020	3.4	4.2	*	
4/13/2020	2.3	4.1	*	
4/14/2020	3.6	4.6	*	
4/15/2020	3.7	4.2	*	
4/16/2020	3.5	4.2	*	
4/20/2020	3.8	4.2	*	
4/21/2020	2.0	4.2	*	
4/22/2020	3.5	4.2	*	
4/23/2020	3.5	4.2	*	
4/27/2020	3.7	4.1	*	
4/28/2020	3.8	4.6	*	
4/29/2020	3.8	4.2	*	
5/4/2020	3.8	4.2	*	
5/5/2020	3.6	4.4	*	
5/6/2020	3.2	4.2	*	
5/7/2020	3.8	4.2	*	
5/11/2020	4.0	4.2	*	
5/12/2020	3.6	4.4	*	
5/13/2020	2.6	4.4	*	
5/14/2020	3.6	4.2	*	
5/18/2020	3.4	4.2	*	
5/19/2020	3.6	4.6	*	
5/20/2020	3.8	4.2	*	
5/21/2020	3.8	4.6	*	
5/22/2020	3.8	4.6	*	
5/26/2020	3.2	4.2	*	
5/27/2020	3.0	4.4	*	
5/28/2020	3.2	4.0	*	
5/29/2020	3.3	4.0	*	
6/1/2020	3.8	4.1	*	
6/2/2020	3.6	4.1	*	
6/3/2020	3.7	4.1	*	
6/4/2020	3.6	4.1	*	
6/5/2020	3.6	4.1	*	
6/8/2020	3.7	4.6	2.1	New scrubber now running
6/9/2020	3.6	4.4	2.1	
6/10/2020	3.7	4.1	2.1	MA-737 Cleaned Filters and checked ductwork for leaks.
6/11/2020	3.3	4.1	2.2	
6/12/2020	3.3	4.1	2.2	
6/15/2020	3.4	4.1	2.2	
6/16/2020	3.2	4.1	2.2	
6/17/2020	3.4	4.2	2.2	
6/18/2020	3.3	4.1	2.2	
6/19/2020	3.3	4.1	2.2	
6/22/2020	3.3	4.2	2.2	

Date of Reading	MA-737 Caustic Scrubber Pressure (1.0" to 4.0")	MA-735 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	MA-926 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0") MA-926	Comments
6/23/2020	3.4	4.4	2.8	
6/24/2020	2.7	4.4	2.2	
6/25/2020	2.7	4.4	2.2	
7/6/2020	3.6	2.4	2.4	MA-735 & 926 Cleaned Filters and checked ductwork for leaks
7/7/2020	3.5	2.4	2.1	
7/8/2020	3.6	2.2	2.4	
7/9/2020	3.6	2.0 *		Acid scrubber off no production
7/13/2020	3.4	2.1	2.2	
7/14/2020	3.4	2.1	2.2	
7/15/2020	3.8	2.2	2.2	
7/16/2017	3.7	2.2 *		Acid scrubber off no production
7/17/2020	3.7	2.2 *		Acid scrubber off no production
7/20/2020	3.7	2.2	2.2	
7/21/2020	3.4	2.2	2.4	
7/22/2020	3.6	2.0	2.2	
7/23/2020	3.6	2.0 *		Acid scrubber off no production
7/24/2020	3.6	2.0 *		Acid scrubber off no production
7/27/2020	3.7	2.2	2.4	
7/28/2020	3.6	2.2	2.2	
7/29/2020	3.7	2.2	2.4	
7/30/2020	3.6	2.4	2.4	
7/31/2020	3.6	2.4	2.4	
8/3/2020	3.6	2.4	2.4	
8/4/2020	3.5	2.4	2.4	
8/5/2020	3.6	2.4	2.4	
8/10/2020	3.6	2.2	2.2	
8/11/2020	3.7	2.4	2.4	
8/12/2020	3.7	2.2	2.4	
8/13/2020	3.7	2.4	2.4	
8/14/2020	3.7	2.4	2.4	
8/17/2020	3.7	2.4	2.4	
8/18/2020	3.7	2.4	2.4	
8/19/2020	3.7	2.4	2.4	
8/20/2020	3.7	2.4	2.4	
8/21/2020	3.7	2.4	2.6	
8/24/2020	3.6	2.2	2.2	
8/25/2020	3.7	2.4	2.4	
8/26/2020	3.7	2.6	3.1	
8/27/2020	3.7	2.6	3.1	
8/28/2020	3.6	2.4	2.4	
8/31/2020	3.8	2.2	2.2	
9/1/2020	3.8	2.2	2.2	
9/2/2020	3.7	2.2	2.2	
9/3/2020	3.7	2.2	2.2	
9/8/2020	3.7	2.6	2.4	
9/9/2020	3.7	2.4	2.4	
9/10/2020	3.7	2.4	2.4	
9/11/2020	3.7	2.4	2.4	
9/14/2020	3.7	2.4	2.4	
9/15/2020	3.7	2.4	2.4	
9/16/2020	3.7	2.4	2.6	
9/17/2020	3.7	2.4	2.4	
9/18/2020	3.7	2.4	2.4	
9/21/2020	3.7	2.6	2.4	
9/22/2020	3.7	2.6	2.4	
9/23/2020	3.6	2.6	2.4	
9/24/2020	3.8	2.6	2.4	
9/25/2020	3.6	2.6	2.4	

Date of Reading	MA-737 Caustic Scrubber Pressure (1.0" to 4.0")	MA-735 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	MA-926 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0") MA-926	Comments
9/28/2020	3.7	2.6	2.4	
9/29/2020	3.7	2.6	2.4	
9/30/2020	3.7	2.6	2.4	
10/1/2020	3.7	2.6	2.4	
10/2/2020	3.7	2.6	2.4	
10/5/2020	3.7	2.8	2.6	
10/6/2020	3.7	2.8	2.6	
10/7/2020	3.7	2.8	2.6	
10/8/2020	3.7	2.8	2.6	
10/9/2020	3.7	2.8	2.6	
10/12/2020	3.7	2.8	2.6	
10/13/2020	3.7	2.8	2.6	
10/14/2020	3.6	2.8	2.6	
10/15/2020	3.7	2.8	2.6	
10/16/2020	3.7	2.8	2.6	
10/19/2020	3.7	3	2.6	
10/20/2020	3.7	3	2.6	
10/21/2020	3.7	3.4	2.9	
10/22/2020	3.7	3.4	2.8	
10/23/2020	3.7	3.4	2.8	
10/26/2020	3.7	4.2	2.6	
10/27/2020	3.7	4.2	2.9	
10/28/2020	3.7	4.2	3	
10/29/2020	3.7	3.4	2.6	
10/30/2020	3.7	3.4	2.6	
11/2/2020	3.7	4	2.6	
11/3/2020	0	2.6	2.6	*Caustic scrubber down for cleaning
11/4/2020	3.2	2.6	2.4	
11/5/2020	3.1	2.6	2.4	
11/6/2020	3.1	3	2.4	
11/9/2020	3.1	1.9	2.2	
11/10/2020	3.1	1.8	2.1	
11/11/2020	3.1	1.9	2.4	
11/12/2020	3.2	1.9	2.2	
11/13/2020	3.2	1.9	2.2	
11/16/2020	3.2	1.9	2.2	
11/17/2020	3.1	2.2	2	
11/18/2020	3.2	2.2	2	
11/19/2020	3.2	2.3	2.1	
11/20/2020	3.2	2	2.2	
11/23/2020	3.2	2	2.4	
11/24/2020	3.2	2	2.4	
11/25/2020	3.1	2.1	2.4	
11/30/2020	3.2	2.1	2.6	
12/1/2020	3.2	2.1	2.6	
12/2/2020	3.3	2.2	2.3	MA-737 Cleaned Filters and checked ductwork for leaks.
12/3/2020	3.3	2.2	2.3	
12/5/2020	3.4	2.4	2.6	
12/7/2020	3.4	2.4	2.6	
12/8/2020	3.3	2.2	2.6	
12/9/2020	3.3	2.3	2.2	
12/10/2020	3.3	2.3	2.2	
12/11/2020	3.2	2.3	2.2	
12/12/2020	3.1	2.3	2.2	
12/14/2020	3.2	2.6	2.6	
12/15/2020	3.2	2.6	2.6	
12/16/2020	3.1	2.6	2.6	
12/17/2020	3.6	2.6	2.6	

Date of Reading	MA-737 Caustic Scrubber Pressure (1.0" to 4.0")	MA-735 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0")	MA-926 Acid Mist Eliminator Pressure Stage 4 Reading (1.0" to 5.0") MA-926	Comments
12/18/2020	3.6	2.6	2.6	
12/21/2020	3.5	2.6	2.6	
12/22/2020	3.5	2.8	2.6	
12/23/2020	3.5	2.8	2.8	
12/24/2020	3.4	2.6	2.6	

MIDWEST AIR PRODUCTS CO., INC.
Preventative Maintenance Report
Caustic Etch Wet Scrubber

Customer: Linn Products
Mapco Original Job Number: 22690
Inspection Performed By:
Date:

New
7/5/12

MA-737 North

DANGER: DISCONNECT AND LOCKOUT POWER BEFORE PERFORMING ANY MAINTENANCE PROCEDURES

NEGATIVE PRESSURE (S.P.) - WEEKLY

.5 hr.

Inspect magnehelic gauge for increase or decrease in negative pressure. **Increase** - check packing, mist eliminator or mesh pad for plugging. **Decrease** - check packing for settling, mesh pad for separation from retainer. Note condition of magnehelic gauge (if applicable) and replace if necessary. Record readings to establish normal operating pressure range.

737A

Observations:

AND Tech. B. MacB...

SPRAY NOZZLES AND HEADERS - MONTHLY

737B 2 hr.

Inspect spray nozzles for proper spray pattern. If nozzles are plugged, remove spray header, remove cap on the end of the header, remove each nozzle and clean all internals if necessary. Check for plugging or chemical build-up. Check for low sump level. Increase sump level by adjusting flowmeter.

Observations:

AND M. - Tim B.

PUMP - MONTHLY

Inspect solution level in scrubber sump. Suction should be submerged in solution. Check pump suction, strainer and control valve for plugging. Clean as necessary. Check amp draw on motor.

Observations:

BLOW-DOWN - MONTHLY

Verify that blow down setting on the flowmeter is correct per recommended volume. Recalibrate if necessary. Check solenoid valve and timer if applicable. Concentrated scrubber liquor or no recirculation can cause scrubber malfunction, accumulation of debris and organic growth.

Observations:

LEVEL CONTROLS / SOLENOID VALVES - MONTHLY

Check condition of all accessory controls for proper operation. Inspect for corrosion or other damage. Mechanical float-type level controls should be removed, disassembled and cleaned. Electronic level control probes can be removed from the mounting block and cleaned.

Observations:

SCRUBBER EXTERIOR PLUMBING – MONTHLY ✓

Inspect spray header flanges, drain, overflow and all other plumbing for leaks.

Observations:

SCRUBBER SHELL – MONTHLY ✓

Inspect welds, gasket connections, and inlet / outlet transitions for leaks. Check for cracks.

Observations:

SCRUBBER RECIRCULATION Y-STRAINER – MONTHLY ✓

Remove and clean y-strainer screen. Inspect for condition and replace if necessary.

Observations:

SCRUBBER PACKING – ANNUALLY ✓

Due 6/28/13 -137C J.H.R.
Inspect packing for plugging due to chemical build-up, algae or pack settling. Clean using chemicals recirculated through spray nozzles or high-pressure spray. Add packing through access door. Plugged or settled packing can cause scrubber malfunction.

Observations:

MESH PAD MIST ELIMINATOR – ANNUALLY ✓

-137C
Inspect for increase in negative pressure or misting at fan outlet. Check eliminator for chemical build-up or plugging. Clean mesh pad or replace. Check for separation of pad from retainer. Moisture at scrubber outlet may indicate problem.

Observations:

NOTES:

MIDWEST AIR PRODUCTS CO., INC.
Preventative Maintenance Report
Acid Mist Eliminator

Customer: Linn Products
Mapco Original Job Number: 22690
Inspection Performed By:
Date:

NEW
7/5/12

MA-735

South

DANGER: DISCONNECT AND LOCKOUT POWER BEFORE PERFORMING ANY MAINTENANCE PROCEDURES

NEGATIVE PRESSURE (S.P.) – WEEKLY

Inspect magnehelic gauge for increase or decrease in negative pressure, record pressure across each "Stage" in log book.

Increase – check packing, mist eliminator or mesh pad for plugging. **Decrease** – check packing for settling, mesh pad for separation from retainer. Note condition of magnehelic gauge (if applicable) and replace if necessary. 735A

Observations:

WASHDOWN SPRAY NOZZLES AND HEADERS – MONTHLY ✓

Inspect spray nozzles for proper spray pattern in each "Stage." If nozzles are plugged, remove spray header, remove cap on the end of the header, remove each nozzle and clean all internals if necessary. Check for plugging or chemical build-up. Nozzles must be observed during a timed washdown (timer can be manually over-ridden.) 735B

Observations:

WASHDOWN SUPPLY PUMP – MONTHLY ✓

Inspect solution level in each washdown supply tank. Pump suction extension tube and strainer should be submerged in solution. Check pump suction, strainer and control valves for plugging. Clean as necessary. Check amp draw on motor.

Observations:

FRESH WATER SOLENOID VALVE(S) – MONTHLY ✓

Verify fresh water solenoid is functional with the electronic liquid level control. Clean the 1" dia. Y-strainer installed in front of the solenoid valve. Repair any plumbing leaks or faulty valves.

Observations:

WASHDOWN RATE – MONTHLY ✓

Verify that the Inline Rotameter(s) are set to deliver within the recommended washdown rates. Adjust flow rate if necessary.

Observations:

WASHDOWN SUPPLY LIQUID LEVEL CONTROLS – MONTHLY ✓

Check condition of all accessory controls for proper operation. Inspect for corrosion or other damage. Mechanical float-type level controls should be removed, disassembled and cleaned. Electronic level control probes can be removed from the mounting block and cleaned.

Observations:

MA-735

ENFORCER III WASHDOWN TIMER - MONTHLY

Inspect timer for proper operation (timer, day, date display) and review programmed washdown times and durations against the recommended washdown schedule. Verify each applicable timer channel functions in manual over-ride. Verify the timer starts/ stops pumps and opens valves on washdown demand.

Observations:

ENFORCER III ELIMINATOR EXTERIOR PLUMBING - MONTHLY

Inspect spray header flanges, drain, overflow and all other plumbing for leaks. Repair / replace any plumbing components as required.

Observations:

ENFORCER III ELIMINATOR SHELL - MONTHLY

Inspect welds, gasket connections, and inlet / outlet transitions for leaks. Check for cracks.

Observations:

ENFORCER III WASHDOWN SUPPLY Y-STRAINER - MONTHLY

Remove and clean Y-strainer screen. Inspect for condition and replace if necessary.

Observations:

ENFORCER III MESH PAD MIST ELIMINATORS - ANNUALLY

Inspect for increase in negative pressure or misting at fan outlet. Check eliminator for chemical build-up or plugging. Clean mesh pad or replace. Check for separation of pad from retainer, cracked PVC mesh pad retainers, leaks at mesh pad removal door gaskets.

735C Due 6/28/13

Observations:

NOTES: