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

B286462397

FACILITY: Grouper Casting, LLC		**SRN / ID:** B2864
LOCATION: 250 Adams Avenue, ALMA		**DISTRICT:** Lansing
CITY: ALMA		**COUNTY:** GRATIOT
CONTACT: Dan Rinke , Human Resources Manager		**ACTIVITY DATE:** 03/29/2022
STAFF: Michelle Luplow	**COMPLIANCE STATUS:** Non Compliance	**SOURCE CLASS:** MINOR
SUBJECT: Unannounced onsite inspection to determine compliance with PTI No's 183-95A, 272-96, and 5-00A.		
RESOLVED COMPLAINTS:		

Personnel Present at inspection: Dan Clark, Continuous Improvement Manager

Levi Marrow

Company Compliance Contacts: Dan Rinke, Human Resources Manager (daniel.rinke@aludyne.com)

Ben Bates, EHS Coordinator (ben.bates@aludyne.com)

Purpose

Conduct an unannounced, onsite compliance inspection to determine compliance with PTI's 183-95A, 272-96, and 5-00A, as well as investigating PTE for HF emissions from this facility.

Facility Background/Regulatory Overview

Aludyne was formerly known as Shiloh Industries. In December 2020, Grouper Castings became owner of this facility. According to Dan Clark, Continuous Improvement Manager, within 6 months of owning this facility, Grouper Castings sold this facility, thus Aludyne was created as a result of the sale.

Aludyne is a fabricator of various aluminum automotive parts (predominantly Ford and GM) which are die cast molded onsite from aluminum ingots. The die cast process starts by melting clean charge aluminum ingots into the permitted jet melt furnaces. From there, the molten aluminum is sent to a holding pot (what Aludyne calls the furnaces' "baths") to hold the aluminum and keep it up to temperature until the die cast machines are ready to use the material. At this holding pot stage, aluminum flux and nitrogen is injected into the holding pot in order to remove impurities from the aluminum. The impurities, "dross," are skimmed off the surface of the molten aluminum. Once the aluminum is fluxed it is ready to be sent to a "launder system" which is an enclosed conveyor that distributes the aluminum from the holding pot to the die cast machines.

The facility currently has 3 active air quality permits for 3 natural gas-fired aluminum jet melter furnaces: 183-95A, 272-96, and 5-00A. PTI 272-96 has a supplemental revision of the original October 1996 permit, issued in December 1996. The supplemental permit changed the opacity limit from 5% to 20% and changed the flux usage rate limit from 131.4 tons/year to 6.6 tons/year.

Aludyne operates 24 hr/day, runs 3 shifts, and most often operates 5 days per week, although they do occasionally schedule a 6th day to meet production demands. During the last year or so Aludyne has operated heavily on 1st and 3rd shifts. On 2nd shift, Aludyne operates at minimal staff capacity.

Hydrofluoric Acid (HF) is the HAP of concern at this facility. The flux material used in the aluminum melt furnaces contains potassium fluorosilicate, which contains a fluoride component. The 2008 SDS for Aludyne's flux states that less than 40% is potassium fluorosilicate (K_2SiF_6), the fluorine-containing compound. Soon after the 2017 inspection, the facility submitted a Potential to Emit for HF from their aluminum fluxing process (see attached). This PTE was further reviewed by permit engineer, Michelle Rogers. It was determined that the HF PTE without the permitted limits would yield approximately 15.6 tons per year based on an aluminum melt rate of 10,000 lb/hr, and the flux manufacturer's recommended rate of 3.75 lb flux per ton aluminum; however, based on a memo by former AQD Permit Engineer Mary Charley (attached), HF emissions from injection fluxing only emit at 17% by weight of the total HF generated. The HF PTE for the site is therefore 2.65 tons per year (15.6 tons *.17). This analysis was conducted in order to ensure that the facility did not take limits in their permit that would make the facility a synthetic minor for HAPs. Based on this review, Aludyne is a true minor source for HAP.

Inspection

This was an unannounced, onsite compliance inspection. I arrived at the site at approximately 10:00 a.m. on March 29, 2022, and I was put in touch with Dan Clark, Continuous Improvement Manager, at approximately 10:30 a.m. (Dan Rinke, Human Resources Manager, and Dan Stahl, EHS Manager, were not available for the inspection).

D. Clark and I reviewed the list of equipment at the facility. Table 1 includes all emission units located onsite. A notable change to the facility was replacing the electric hold furnace "holding pot" and die cast machine associated with No. 1106 aluminum jet melter furnace with a "squeeze cast" die cast machine and new launder system. Aludyne staff refer to the jet melter furnaces as "stack melters."

Table 1. Current equipment onsite

Emission Unit	PTI/Exemption	Inspection Notes
No. 1106 Aluminum jet melter furnace, natural gas-fired, metal fabric filter screen, east side of building. 4,000 lb/hr maximum melt rate 10,000 lb capacity	5-00A	See Inspection Report Section "PTI 5-00A: No 1106 Al jet melter furnace"
No. 1053 Aluminum jet melter furnace, natural gas-fired, metal	183-95A	See Inspection Report Section "PTI 183-95A: No. 1053 Al jet melter furnace"

fabric filter screen, southeast side of building **3,000 lb/hr maximum melt rate** **7,550 lb capacity**		
No. 1100 Aluminum jet melter furnace, natural gas-fired, metal fabric filter screen, southwest side of building **3,000 lb/hr maximum melt rate** **7,550 lb capacity**	**272-96**	**See Inspection Report Section "272-96: No. 1100 Al jet melter furnace"**
~~**One electric hold furnace and die cast machine, "holding pot"**~~ -	~~**Rule 282(2)(a)(vi)**~~	**Removed and replaced with "squeeze cast" machines and launder system. This unit was the holding pot for the No. 1106 aluminum jet melter. The new launder system and squeeze cast machines are still serviced by No. 1106.**
NEW Two (2) Aluminum "squeeze cast" die casting machines with a new launder system which maintains aluminum's heat as it is conveyed to the die casting machine.	**Rule 285(2)(l)(ii)**	**New launder system and squeeze cast die casting machine are supplied the fluxed, melted aluminum from furnace No. 1106.**
One existing launder system that services 8 aluminum die cast machines. The launder system maintains aluminum's heat as it is conveyed	**Rule 285(2)(l)(ii)**	**The No. 1053 and No. 1100 aluminum jet melting furnaces provided fluxed, melted aluminum to this launder system and associated die casting machines.**
"T-4" **Wisconsin Oven Corp. 2 MMBtu/hr natural gas-fired heat treating oven**	**Rule 282(2)(a)(i)**	**Bring aluminum parts up to melting before quenching in order to relieve stress in the material.**
"T-5"	**Rule 282(2)(a)(i)**	**Unit artificially ages the aluminum.**

Wisconsin Oven Corp. 2 MMBtu/hr natural gas-fired heat treating oven used to heat and cool Al ingots. Ingots remain solid throughout process. **Model: BATCH 8/8/7-G6** **Serial #: 062160003**		
(NEW) "T-5" **Wisconsin Oven Corp 920,000 Btu/hr natural gas-fired heat treating oven used to heat and cool Al ingots. Ingots remain solid throughout process.** **Model: EWN-810-8G** **Serial #: 13482A1809**	**Rule 282(2)(a)(i)**	**Installed in 2018/2019.**
CNC machines, mills, lathes	**Rule 285(2)(l)(vi)(B)**	**Multiple units for the manufacturing of 6 total parts types. All emissions are vented to the in-plant environment.** **Aludyne operates a minimum of 16 CNC machines**
Steel Shot blasting: vented to in-plant environment	**Rule 285(2)(l)(vi)(B)**	**Steel media used on the manufactured parts. Control is self-contained within the plant.**
(NEW) Zinc Shot blasting: vented outside to baghouse	**Rule 285(2)(l)(vi)(C)**	**Zinc media used on the manufactured parts. Controlled by a baghouse and vented outside.** **See additional compliance discussion under "Exempt Equipment: Zinc Shot Blaster"**

Parts Washing	**Rule 281(2)(e)**	**3 parts washing units – city water only.** **Electrical power used to heat city water to rinse coolant off parts from the machining processes (CNC, etc)**
12.5 kW Onan Emergency Generator **Model # 12.5IC-18R10259AB** **Serial # 300539077**	**Rule 285(2)(g)**	**Used for backup lighting and keeping Aludyne server running if the event of power failure.**

D. Clark said that Aludyne only uses raw ingots (bars) of aluminum, also known as "clean charge", in their processes, in addition to reusing the scrap aluminum from the die casting process or parts from the die cast processes that did not meet QA/QC. He explained that Aludyne has tight requirements on the aluminum quality that is used because they go into transmission components. The aluminum dross and the machine chips are sent to a 3rd party to adjust the chemistry of the aluminum to ensure the parameters are brought back up to spec.

L. Marrow said that flux is charged on a shift basis (generally once at the end of each shift) at 2.5 lbs of flux per charge. D. Rinke clarified that the 2.5 lbs of flux is added each shift each day when the furnace is being used under normal production conditions and 100% operational efficacy. He said most of the time Diecast operates at a lower operation efficiency and less than normal production due to preventive maintenance on machines, unexpected downtime and customer scheduling. This means that more often than not, furnaces may remain idle, full, wet, and are not fluxed because the metal is not being added to the furnace or the metal is not used frequently enough to warrant cleaning. This results in some furnaces receiving less flux than others at times.

Each furnace has a 20% limit on opacity being emitted from the stack. Prior to entering and leaving the facility I saw no signs of opacity from any of the stacks.

There were a few issues discovered while reviewing records for compliance with PTI 183-95A (1053 furnace), PTI 272-96 (1100 furnace), and PTI 5-00A (1106 furnace), listed here:

- Furnaces 1053 and 1100 are each limited to 1 lb of flux per ton of aluminum melted; however, Aludyne does not track aluminum melted per furnace, but instead calculates lb flux per ton of Al melted using a weighted average that is based on flux usage per furnace and total Al melted across all 3 furnaces. Aluminum needs to be tracked per furnace. Michelle Rogers, AQD Permit Engineer, confirmed that collecting tons of aluminum melted per furnace is the only way to calculate a lb/ton rate per furnace. This request has been passed along to D. Rinke.
- Furnace 1106 is limited to 2 lb flux per hour. Operating hours are required to be tracked on a monthly basis for this furnace. Aludyne reports that the furnace operates 24/7 each month; however, this

includes furnace idle time, bottlenecks from the die cast machines, etc. Michelle Rogers, AQD Permit Engineer, confirmed that “operating hours” as referenced in PTI 5-00A refers to only those hours where aluminum is being actively melted and/or when flux is being added. Therefore, operating hours cannot include furnace idle time or other times when aluminum is not being melted or flux isn’t being added. This requirement to begin recording operating hours on 1106 for metling/fluxing has been passed along to D. Rinke.

This inspection used the records provided by the company “as is” to determine compliance; however, AQD will request that the company begin recording aluminum throughput per furnace, as well as actual operating hours of the furnace when aluminum is actively being melted or flux is being added, and calculating the lb/hr rate based on those new operating hours. If Aludyne cannot gather this data, AQD will request that permit modifications be submitted to include recordkeeping that they can comply with but that is also in alignment with Michigan Air Pollution Control rules. These modifications may also be part of the compliance plan to address exceedances of the limits in PTI 183-95A and PTI 272-96; 2 months of data will be required as an indicator of compliance if they are able to collect the appropriate data, as outlined above.

PTI 183-95A: No. 1053 Al jet melter furnace

Aludyne is limited to 1.0 pound of flux per ton of aluminum melted, and 6.6 tons of flux per year for furnace 1053. Aludyne is required to keep monthly records of the amount of flux used. Records for calendar years 2018 – 2021 were reviewed. Table 3 contains the flux usage data for calendar years 2018 – 2021.

Table 2. Furnace 1053 flux usage data.

	Calendar Year 2018	Calendar Year 2019	Calendar Year 2020	Calendar Year 2021
Tons flux used	0.73	0.58	0.06	0.10
Highest flux used per ton Al	**1.20 (December)	**1.12 (December)	0.83 (December)	0.85 (October)

** indicates exceedance of lb/ton limit

Aludyne records indicate non-compliance with the lb flux per ton of aluminum melted for December 2018 and December 2019. A violation notice will be issued to address these exceedances.

PTI 183-95A requires that all collected waste materials be disposed of in a manner that minimizes the introduction of air contaminants to the outer air. All waste collected from these processes (waste

scrap metal and dross) are sent to a 3rd party to be chemically readjusted before being reused in Aludyne processes.

The stack is required to be not less than 35' above ground level. D. Rinke said the height of the building from the floor to the ceiling is 24'. Furnace 1053 has an additional height of 12'10" above the roof. This would make the total stack height almost 37' above ground level and therefore meets the permitted stack height requirement. This stack height may be verified in the future using AQD's Nikon Forestry Pro II Rangefinder.

272-96: No. 1100 Al jet melter furnace

Aludyne is limited to 1.0 pound of flux per ton of aluminum melted, and 6.6 tons of flux per year for furnace 1100. Aludyne is required to keep monthly records of the flux usage rate, and the flux composition is to be kept on file. Records for calendar years 2018 – 2021 were reviewed.

Table 3 contains the tons of flux used per calendar year, as well as the month(s) within each calendar year with the highest flux per ton of aluminum rates.

Table 3. Furnace 1100 flux usage data.

	Calendar Year 2018	Calendar Year 2019	Calendar Year 2020	Calendar Year 2021
Tons flux used	0.30	0.36	0.47	0.55
Highest flux used per ton Al	**1.20 (December)	**1.12 (December)	**1.13 (July)	**1.17 (April) **1.43 (May) **1.19 (June)

** indicates exceedance of lb/ton limit

Aludyne records indicate non-compliance with the lb flux per ton of aluminum melted for December 2018; December 2019; July 2020; and April, May, and June 2021. A violation notice will be issued to address these exceedances.

The stack for furnace melter 1100 is required to be no less than 36.5' above ground level. This stack height may be verified by AQD in the future using AQD's Nikon Forestry Pro II Rangefinder.

PTI 5-00A: No 1106 Al jet melter furnace

Aludyne is permitted to melt clean charge and materials generated within the facility only in the 1106 furnace. D. Clark said that Aludyne only uses raw aluminum/clean charge in their processes, as well as scrap aluminum from the die casting process or parts from the die cast processes that did not meet QA/QC.

Aludyne is limited to 2 pounds of flux per hour on a monthly average and is required to keep record of the flux usage rate and hours of operation on a monthly basis. Records for calendar years 2018 – 2021 were reviewed.

Table 4. Flux usage rate (lb/month) for calendar years 2018 - 2021

	Calendar Year 2018	Calendar Year 2019	Calendar Year 2020	Calendar Year 2021
Highest Monthly lb/hr flux usage rate	0.0034 (March/May)	0.05 (October)	0.13 (July)	0.17 (March)

Exempt Equipment: Zinc Shot Blaster

Aludyne installed a zinc shot blasting unit that is vented through a baghouse to ambient air. During the inspection, several areas of concern were noted (see attached photos).

Inside the facility, particulate could be seen on the ventilation duct that runs from the shot blasting unit to the baghouse outside. There were also indicators on the baghouse enclosure, the duct outside to the baghouse, on the ground, and other areas (structural supports, etc) that particulate dust could be seen. I brought this to the attention of D. Clark and L. Marrow during the inspection. D. Clark wondered if the seals were bad on the door, which allowed for leaks.

D. Rinke said the Aludyne technicians said the seals are good, but visually seem bad because past leaks have not been cleaned. He said that Aludyne would take care of the ducts as soon as possible. He said they have power washed and soda blasted the concrete surrounding the baghouse, but that he is told the concrete is permanently stained with particulate residue. I noted to him that there were chunks of material that were able to be kicked around and that this particulate would need to be cleaned up to prevent entrainment into the air.

A violation will not be cited for this because the company believes the particulate on the outside of the baghouse is from past leak issues. However, I required the following information from Aludyne within the next 2 weeks, including how each of these issues was resolved or plans to be resolved, and the date by which the resolution has or will occur.:

a. The shot blasting dust is surrounding the baghouse unit on the ground –Aludyne should provide the steps they plan to take or have taken to prevent a reoccurrence of the dust on the ground and any cleanup measures taken.
b. The ducts directing the air to the baghouse has spots in the ductwork, at the seams, where particulate is escaping, as indicated by the “sooty” appearance at those seams. This demonstrates that the particulate from the shot blasting is not being properly collected due to these issues. Corrective actions for addressing these points of particulate escape need to be identified and taken to prevent a reoccurrence.

Compliance Statement: Aludyne is currently in non-compliance with PTI’s 183-95A and 272-96. A violation notice will be issued to address the lb flux per ton of aluminum exceedances for furnaces 1053 and 1100. Further work will be done concerning the Zinc Shot Blasting unit and addressing any areas where it is believed particulate is escaping from the unit and areas where cleanup is necessary.

Image 1(Aluminum Shavings) : These are the aluminum scrap that are not reused, but sent to a 3rd party to readjust the material's chemistry.

Image 2(Furnace 1106) : Standalone furnace with 1 launder system.

Image 3(Heat Treating ovens) : Used to heat treat aluminum

Image 4(Emergency Generator) : Used for IT support & lighting if power went out.

Image 5(Steel Shot) : Steel shot blasting machine venting to in-plant environment post-control

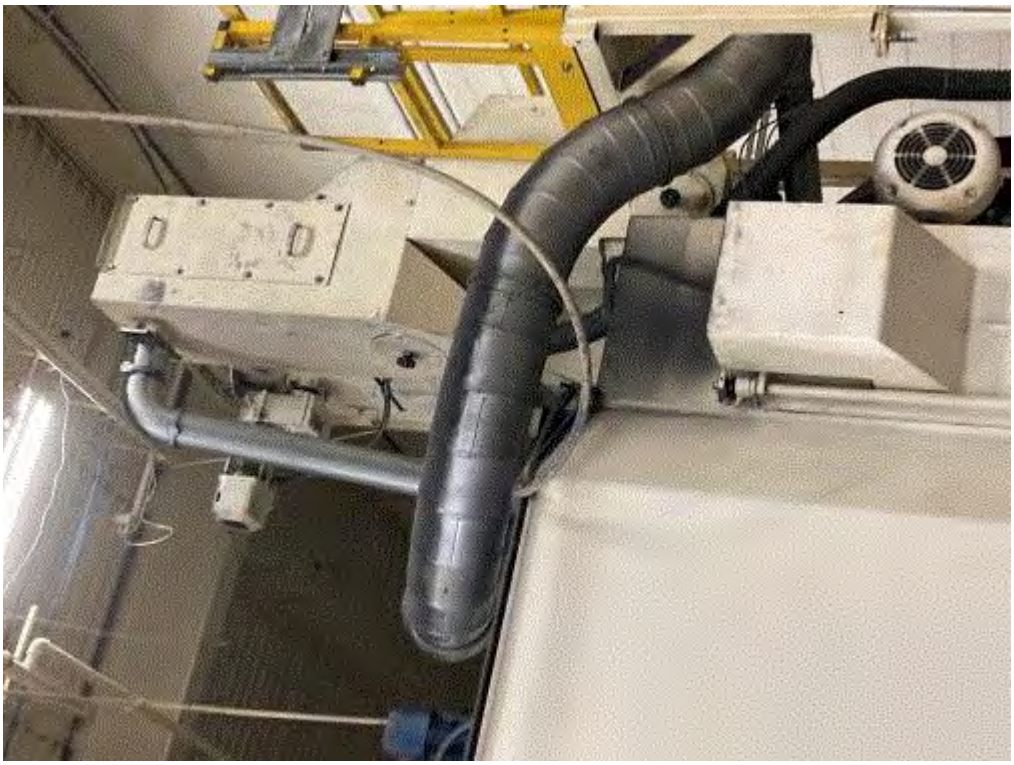

Image 6(Zinc Shot Blast) : Indoor view of ductwork leading outside to baghouse. Note the black particulate underneath the ductwork.

Image 7(Zinc Shot Baghouse) : Note the particulate on the ground, the facility wall, down the sides of the unit,

and from the ductwork feeding into the baghouse.

Image 8(Zinc collection) : Note particulate near base of collection drum for the zinc shot blasting baghouse.

Image 9(Zinc close-up) : Close-up of Zinc baghouse door, where it appears particulate had at one time, been released through the baghouse door.

Image 10(Close-up Zinc coll.) : Note particulate on structural supports and underneath where the baghouse funnel connects to the collection drum.

NAME Michelle Luplow DATE 4/8/22 SUPERVISOR BM

Fluorine Content of Flux within the confines of Shiloh Alma Air Permits.

On July 25, 2017 Michelle Luplow from the Department of Environmental Quality Air Quality Division completed an unscheduled / unannounced compliance inspection during which we discussed the importance of being aware of the fluorine content of the flux and how compliance within the permit ensures that HF emissions from the facility, at the property line, are at a safe level from public health. Michelle asked me to investigate the fluorine content within the flux and submit a Potential To Emit calculation based on the SDS of Shiloh's flux (SF-350) and specifically the fluorine containing compound Potassium Fluorosilicate (K_2SiF_6).

Michelle noted that calculating our potential to emit may require me to contact the Flux distributor or solicit the advice of a chemist to verify the amount of Fluorine content in the potassium fluorosilicate. Synex Synthetic Exotermics provided a spec sheet, and SDS makeup that confirm although less than 40% of the Flux contains Potassium Fluorosilicate, less than 22% of the flux contains fluorides. Using this data I am able to quantify our potential to emit HF based on the requirements of our air permit.

Each Furnace 1106, 1053, and 1100 are all permitted differently regarding flux permissions

1053 Al Melt Furnace (permit 183-95A)
One pound of flux per ton of aluminum melted and 6.6 tons of flux per year.

1100 Al Melt Furnace (permit 272-96)
One pound of flux per ton of aluminum melted and 6.6 tons of flux per year.

1106 Al Melt Furnace (permit 05-00A)
2 pounds of flux per hour average based on a monthly usage records.

sumptions

To calculate the potential to emit we must make some assumptions.

We must assume that the only impurity is hydrogen and the entire fluoride content of the flux is escaping in the form of HF emission through the stack, rather than binding in the dross. Synex the manufacturer, insists that if the flux is used properly (adding the flux below the surface) almost all of the fluoride will combine with the hydrogen and associated impurities in the aluminum bath and float to the top in the form of dross leaving little to no emissions. We at Shiloh Alma go even further than the manufacturer's recommendation of adding the flux below the surface by adding the dross using gas injection to the very bottom of the bath.
Because we do produce dross, we know that not all the fluoride is reacted as HF and emitted, and therefore, the estimate is conservative.

Synex recommends using 1 - 3 oz. of flux per 100 lbs. of aluminum. As seen in the calculations below, the high end, 3 oz. is 0.1875 lbs., which if added to 1 ton, would be 3.75 lbs. of flux.

	1	oz. to	3	ozs.
Which =	0.0625	lbs. to	0.1875	lbs.
One ton of Aluminum is	2,000	lbs.		
So the recommended use is	1.25	to	3.75	lbs / ton

However, since our permits for lines 1053 and 1100 limits us to 1 lb. of flux per ton of aluminum melted, we must assume that the emission potential, for our purposes, is 1 lb. of flux per ton of aluminum melted. Likewise, for furnace 1106, we must assume a limit of 2 lbs. of flux per hour averaged over a month.

Synex states there is less than 22% fluorine in the flux. Since we don't know how much less, we will use 22%.

The furnaces each have rated melt capacities in lbs. aluminum per hour. However, if we continuously melted throughout the year, no flux would be used. To properly flux, the burners must be switched to low. We reserve one hour per 8 hour shift for fluxing. Therefore, as calculated below, annual potential operation would be 7,665 rather than 8,760 hours.
Note: This reduction does not apply to the hours per month used in the averaging calculation for furnace 1106.

Hours per year:	8,760	
at 7/8ths operation, we have:	7,665	potential hours of operation

lculations

Permit Limited Potential Emissions

The potential to emit for each of the furnaces 1053 & 1100 is:

Melt rate:	3,000	lbs. / hour
Or:	22,995,000	lbs. / year (3000*7665)
Which is:	11,498	tons / year if never shut down.

At 1 lb. flux per ton Aluminum, this is also the allowed lbs. / year of flux use.

At 22% fluorides, the potential emissions would be:	2,529	lbs. HF / year / furnace.
or:	1.26	Tons / year / furnace

Furnace 1106 has a melt capacity of 4,000 lbs. per hour. However, we are limited to 2 lbs. per hour flux use averaged over a monthly period. Therefore, our emission potential is currently limited by the permit. The potential would therefore be:

(Fluoride/lb. of flux) x **(Average Hours /Month)** x **(Permitted Rate / hour)**

Fluoride / lb. of flux	22%	
Average hours/month	730	hours (8760/12)
Monthly Average lbs. / hour	2	lbs.
Monthly Average Flux use	1460	lbs.
or:	321.2	lbs. fluoride per month permitted
Annual emissions would be:	3854.4	lbs. HF
or:	1.93	Tons / year

The potential emissions for all three furnaces, *limited by the permits*, is:	4.46	Tons / year [(2*1.26) + 1.93]

Actual Potential to Emit

If we were not limited by the permits, the true potential to emit would be:

Melt rate for all 3 furnaces:	10,000	lbs. / hour

Or:	76,650,000	lbs. / year
Which is:	38,325	tons / year
At the maximum recommended rate of	3.75	lb. flux per ton Aluminum,
the flux use would be:	143,719	lbs. / year
At 22% fluorides, the potential emissions would be:	31,618	lbs. HF / year
or:	15.81	Tons / year

Flux Emission Factors

SF-350 Aluminum Flux (Sinex)	Composition	Highest Composition	Formula	Compound MW					lb HF/lb flux	lb Cl_2/lb flux	lb HCl/lb flux
Potassium Sulfate					1	35.45	0	0			
Potassium Carbonate					1	35.45	0	0			
Potassium fluorosilicate	less than 40%	40.00%	K_2SiF_6	220.27	0	0	6	114	0.218	0.000	0.000

Maximum:	**0.218**	**0.000**	**0.000**
Adjusted:	**0.218**	**0.000**	**0.000**
Broadcast (Top) Flux:	**0.072**	**0.000**	**0.000**
Injection Flux:	**0.037**	**0.000**	**0.000**

.4 lb k2SiF6	mol K2SiF6	6 mol F	1 mol HF	20.008 lb HF	
1 lb flux	220.27 lb K2SiF6	mol K2SiF6	1 mol F	mol HF	= lb HF/lb flux

0.218 lb HF/lb flux

For Furnace 1106 with limit of 2 lb flux/hr:

2 lb flux	0.218 lb HF		
hr	lb flux	= lb HF/hr	
		0.44	**lb HF/hr**
		1.91	**tpy**

Using 33% emitted for top (broadcast) flux,
0.630198862 tpy
Using 17% emitted for injection flux,
0.324647899 tpy

For other furnaces (1053 & 1100), permit limits of 1 lb flux/ton and 6.6 tons flux/year

(throughput of aluminum is 6000 lb/hr (3 tons/hr)

3 tons Al	1 lb flux	0.218 lb HF		
hr	ton Al	lb flux	= lb HF/hr	
			0.65	**lb HF/hr**
			2.86	**tpy**

Using 33% emitted for top (broadcast) flux,
0.945298293 tpy
Using 17% emitted for injection flux,
0.486971848 tpy

6.6 tons flux	2000 lb flux	0.218 lb HF		
yr	ton flux	lb flux	= lb HF/hr	
			1.44	**tpy each furnace**
			2.88	tpy both furnaces

Using 33% emitted for top (broadcast) flux,
0.474807362 tpy
Using 17% emitted for injection flux,
0.244597732 tpy

Total

	TPY (assume 100%)	TPY (assume 33%)	TPY (assume 17%)
Furnace 1106	1.91	0.63	0.32
furnaces (1053 & 1100)	2.88	0.47	0.24
Total	**4.79**	**1.11**	**0.57**

SF350

SODIUM FREE INJECTON FLUX

SF350 is a chlorine replacement injection flux for aluminum alloys. Designed to clean molten aluminum, its chemical properties will remove unwanted hydrogen gas as well as other nonferrous oxide buildups. SF350 is sodium free, hex free and chloride free.

Product Appearance

Like all Synex fluxes, **SF350** is snow white in color and has the consistency of powdered sugar. All materials in Synex **SF350** are of the highest quality available. The high quality materials are custom blended to keep the product granularity very tight, which prevents them from becoming unblended during shipment. Material separation is a common problem with the uneven particle size distribution found in the dry chemicals of other fluxes.

Product Usage

SF350 is most effective when injected with an inert gas such as nitrogen or argon. It is compatible with all injection flux machines. The amount of injection flux needed is determined by the normal operation practices and the ingot/scrap ratio of the molten aluminum. Consistent fluxing will provide excellent results as well as a clean furnace. The recommended amount of flux is about one to three oz. of flux for every 100 lbs. of molten metal.

To order or receive additional product information call:

Syn*thetic* Ex*othermic*, Inc.
One Madison St.
Newnan, Georgia 30263

Tel. - 770-253-7652
FAX - 866-894-4254
Web - http://www.synex-flux.com
charlie@synex-flux.com

HIGH TECH FLUXES FOR WORLD CLASS CASTERS

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: sf350 aluminum flux
PRODUCT USE: flux for molten aluminum
SUPPLIER:

MANUFACTURER:
Synex, Inc.
1 Madison Street
Newnan, Ga. 30263
Tel. 770-253-7652

EMERGENCY: 770-253-7652

SECTION 2 - HAZARDS INDENTIFICATION

GHS CLASSIFICATION

HEALTH		ENVIRONMENT		PHYSICAL
Acute Toxicity	none	Acute Toxicity	NONE KNOWN	NONE KNOWN
Skin Irritation	slight skin irritant	Chronic Toxicity:	NONE KNOWN	
Skin Sensitization	unknown			
Eye	slight eye irritant			

NFPA/HMIS: Health -2, Fire -0, Reactivity-0, Specific hazard
GHS LABEL



HAZARD STATEMENTS	PRECAUTIONARY STATEMENTS
H319: Causes eye irritation	P261: Avoid breathing dust/fume/gas/mist/vapors/spray
H332: Harmful if inhaled	P280: Wear protective gloves/protective clothing/eye protection/face protection
H335: May cause respiratory irritation	P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
	P403+P233: Store in a well ventilated place. Keep container tightly closed
	P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSTION/INFORMATION ON INGREDIENTS

potassium silico fluoride	16871-90-2
potassium chloride	7447-40-7

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: this product is not considered flammable, nor will it support combustion
Unsuitable Extinguishing Media: na
Exposure Hazards: Inhalation and dermal contact
Flammability na
Combustion Products: na
Protection for Firefighters: fumes of f sif4 and na2 may be given off. Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Provide sufficient ventilation, wear suitable respiratory protective equipment. Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material.
Materials not to be used for clean up: water

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing. use NIOSH approved respirator when tlv is exceeded.
Do not eat, drink or smoke while handling.
Storage: Store in dry area.
Keep away from acid, acidferous vapors
Follow all precautionary information on container label, and product bulletins.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:

Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
Fluorides as Hexafluorosilicic	2.5mg/m3		2.5mg/m3	

Engineering Controls: Use local exhaust as needed.
Monitoring: Maintain breathing zone airborne concentrations below exposure limits.

Personal Protective Equipment (PPE):
Eye Protection: Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.

Skin Protection: Prevent contact with the skin as much as possible. Use of gloves or should provide adequate protection.

Respiratory Protection: Prevent inhalation of the fumes. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White or pink powder
Odor: NA
Odor Threshold: NA
pH: Not Applicable
Melting/Freezing Point: (deg. F):1150-1250
Boiling Range: NA
Boiling Point: NA
Evaporation Rate: NA
Flash Point: NA
Flammability: this product is not considered flammable, nor will it support combustion
Specific Gravity: NA
Flammability Limits:NA
Solubility:(wt.%) 8.5gr/LT .
UEL: NA
Partition Coefficient n-octanol/water: Not Available
Vapor Pressure: NA
Auto-ignition Temperature: NA
Vapor Density:NA
Decomposition Temperature: Not Applicable
Other Data: Viscosity: NA

SECTION 10 - STABILITY AND REACTIVITY

VOC Content: fumes of F, Cl, and NaO2 may be given off when heated to decomposition.

Stability: Stable
Hazardous decomposition products: fumes of F, Cl, and NaO2 may be given off
Conditions to avoid: Avoid dampness.

SECTION 11 - TOXICOLOGICAL INFORMATION

Incompatible Materials: acid, acidferous vapors
Likely Routes of Exposure: Inhalation, Eye and Skin Contact
Acute symptoms and effects:

Inhalation: Can cause irritation of eyes and nasal passages.
Eye Contact: Vapors slightly uncomfortable. Overexposure may result in severe eye injury.
Skin Contact:contact may remove natural skin oils resulting in skin irritation.
Ingestion: May cause nausea, vomiting.

Chronic (long-term) effects: None known to humans
Toxicity:
Sodium fluorosilicate
430 mg/kg (oral, rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: None Known
Mobility: None Known
Degradability: Biodegradable
Bioaccumulation: Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	cleaning compound
Hazard Class:	2
Secondary Risk:	None
Identification Number:	UN 2856
Packing Group:	PG II
Label Required:	Class 2
Marine Pollutant:	NO

SECTION 15 - REGULATORY INFORMATION

Risk Phrases:	R20: Harmful by inhalation. R36/37: Irritating to eyes and respiratory system.
Safety Phrases:	S9: Keep container in a well-ventilated place. S25: Avoid contact with eyes. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice S46: If swallowed, seek medical advise immediately and show this container or label.

SECTION 16 - OTHER INFORMATION

Specification Information:
Department issuing data sheet: Synex, Safety Health & Environmental Affairs
All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).
E-mail address: charlie@synex-flux.com
Training necessary: Yes, training in practices and procedures contained in product literature.
Reissue date / reason for reissue: 12/01/2015 / Updated GHS Standard Format
Intended Use of Product: aluminum flux for molten metal.

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The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.

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To ERIC GRUNSTERN	From MARY CHARLEY
Co.	Co. AQD
Dept. AQD	Phone # 517-373-7080
Fax # 616-356-0201	Fax #

After contacting Mr. John E. Gotheridge from AMCOR on 10/13/92 (Ph# 216-725-4501) about Amlox-41 and other similar fluxes it was determined that the release of Hydrogen Chloride (HCL) and Hydrogen Fluorine (HF) is significantly less than expected in gaseous emissions from electric and gas aluminum melt processes that use fluxes. HCL and HF are generated in stacks with moisture contents of 4% and greater. Generally the fate of chloride and fluoride is aluminum chloride and aluminum fluoride respectively. The majority of the two compounds will be skim off the surface of the molten aluminum as slag and recycled.The remainder of the waste compounds are in the exhaust stream and escape through the stack. The worst case scenario would be to consider all of the emissions as either HCl or Hf and 4% moisture content in the stack. This would lead to the following emission rate depending on application:

17% by weight for injection processes
33% by weight for surface applications

Generally 10% by weight is expected for injection processes and 25% by weight for surface application processes are more commonly observed. The gaseous emissions of HCl and HF can be determined by using the following equation:

$$HCl = (\%Cl \text{ by wt})(PPH)(KE)$$

where -HCl is in pounds per hour
-PPH is pounds per hour
-KE is the percent of expected release depending on the method of application of the flux

2018 Flux Usage Tracking

Part Number	# Cav	Shot Weight	January			February			March			April			May			June			July			August			September			October			November			December		
			Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots
26080951	8	9	124896	140508	15612	97976	110223	12247	153120	172260	19140	195488	219924	24436	186320	209610	23290	56400	63450	7050	123016	138393	15377	120016	135018	15002	108912	122526	13614	143592	161541	17949	47544	53487	5943	56080	63090	7010
26134538	2	10.5																																				
26134543	2	10.5																																				
26137092	4	0																																				
26137534	4	21.15	26718	141271	6680	24390	128962	6098	27762	146792	6941	22476	118842	5619	18001	95180	4500	31608	167127	7902	12550	66358	3138	9987	52806	2497	19076	100864	4769	32707	172938	8177	22945	121322	5736	19536	103297	4884
26136479	4	21.15	26718	141271	6680	24390	128962	6098	27762	146792	6941	26828	141853	6707	38995	206186	9749	7928	41919	1982	1782	9422	446	15469	81792	3867	19708	104206	4927	20241	107024	5060	18715	98956	4679	19536	103297	4884
26114621	8	13																																				
7812145	8	6.82																																				
5686815/7810890	8	6																																				
26031034	8	6																																				
26114205	6	11	18507	33930	3085	18660	34210	3110							21783	39936	3631	2139	3922	357				20148	36938	3358	5631	10324	939	22485	41223	3748	15801	28969	2634	9771	17914	1629
28268864	6	12	18507	37014	3085	23352	46704	3892	33294	66588	5549	16398	32796	2733	21783	43566	3631	23433	46866	3906	28086	56172	4681	26463	52926	4411	21318	42636	3553	22485	44970	3748	21585	43170	3598	9771	19542	1629
28278634	6	12																																				
26075238	6	11																																				
28083774	4	0																																				
26086252	4	10.5																																				
26086230	4	10.91																																				
26134166	1	6.33																																				
26142142	2	13.23																																				
26105382	8	8.25																																				
38206298	6	12	86448	172896	14408	103122	206244	17187	107406	214812	17901	111114	222228	18519	67488	134976	11248	119784	239568	19964	72912	145824	12152	100893	201786	16816	74895	149790	12483	64686	129372	10781	63558	127116	10593	66978	133956	11163
5401-125-001	4	21	8608	45192	2152	10604	55671	2651	12864	67536	3216	29636	155589	7409	11096	58254	2774	8704	45696	2176	5448	28602	1362	19308	101367	4827							1180	6195	295			
5405-125-001	4	17	12840	54570	3210	13328	56644	3332	17372	73831	4343	9712	41276	2428	6108	25959	1527	14308	60809	3577	16500	70125	4125	1360	5780	340	13528	57494	3382	9352	39746	2338	7732	32861	1933	1532	6511	383
24276243	4	16	18940	75760	4735	31304	125216	7826	31072	124288	7768	14528	58112	3632	12160	48640	3040	31384	125536	7846	42588	170352	10647	48932	195728	12233	30276	121104	7569	37612	150448	9403	40640	162560	10160	44304	177216	11076
24276241	1	8	37360	298880	37360	23732	189856	23732	18872	150976	18872	32796	262368	32796	38600	308800	38600	19812	158496	19812	27872	222976	27872	16032	128256	16032	21696	173568	21696	27756	222048	27756	21928	175424	21928	16788	134304	16788
61313	1	5.84																																				
61333	2	6.21																																				
10264339	4	22	16576	91168	4144	13104	72072	3276	6604	36322	1651	13988	76934	3497	16036	88198	4009	17560	96580	4390	10376	57068	2594	18748	103114	4687	12152	66836	3038	15520	85360	3880	19720	108460	4930	15244	83842	3811
6006494	1	7																																				
6006593	1	7																																				
28305401	2	4.6	26818	61681	13409	14296	32881	7148	28740	66102	14370	26372	60656	13186	26474	60890	13237	22164	50977	11082	14986	34468	7493	26184	60223	13092	17860	41078	8930	22014	50632	11007	20626	47440	10313	22764	52357	11382
28206461	2	4.6	26818	61681	13409	14296	32881	7148	28740	66102	14370	26372	60656	13186	26474	60890	13237	22164	50977	11082	14986	34468	7493	26184	60223	13092	17860	41078	8930	22014	50632	11007	20626	47440	10313	22764	52357	11382
38002170	2	5.8	4784	13874	2392				5044	14628	2522				2500	7250	1250	3848	11159	1924							4484	13004	2242				3126	9065	1563			
24282885	2	9.5	93122	442330	46561	81184	385624	40592	92496	439356	46248	83170	395058	41585	88728	421458	44364	93239	442885	46620	113612	539657	56806	107208	509238	53604	106586	506284	53293	132914	631342	66457	88260	419235	44130	100436	477071	50218
24273609	4	11.67																			4436	12942	1109	10080	29408	2520	27864	81293	6966	27672	80733	6918	15084	44008	3771	21616	63065	5404
		TOTALS:	547,660	1,812,026	176,920	493,738	1,220,526	103,744	591,148	1,786,384	169,831	608,878	1,846,291	175,733	582,546	1,809,793	178,086	474,475	1,605,968	149,669	489,150	1,573,885	154,185	567,012	1,725,196	163,857	502,678	1,552,809	149,572	601,050	1,887,276	181,310	429,958	1,483,312	138,895	427,120	1,424,753	136,238

TOTAL ALUMINUM MELTED BY

January	1,812,026
February	1,220,526
March	1,786,384
April	1,846,291
May	1,809,793
June	1,605,968
July	1,573,885
August	1,725,196
September	1,552,809
October	1,887,276
November	1,483,312
December	1,424,753
TOTAL:	**19,728,218**

TIMES FLUXED BY MONTH **TIMES FLUXED BY MONTH** 3

	1053	1100	1106	TOTALS	lbs	hours	lb/hr
January	64		1	163	3	744	0.0034
February	53			133	0	696	0.0000
March	68		1	173	3	744	0.0034
April	70			175	0	720	0.0000
May	73		1	185	3	744	0.0034
June	70			175	0	720	0.0000
July	55			138	0	744	0.0000
August	19	53		180	0	744	0.0000
September	3	66		173	0	720	0.0000
October	51	21		180	0	744	0.0000
November	6	54		150	0	720	0.0000
December	50	48		245	0	744	0.0000
TOTAL	582	242	3	2068			

*2.5 lbs of flux used for each time *2.5 lbs of flux used for each time

FLUX USAGE (lbs) / ALUMINUM MELTED (TON)

	1053	1100	1106
January	0.18		0.18
February	0.22		
March	0.19		0.19
April	0.19		
May	0.20		0.20
June	0.22		
July	0.17		
August	0.21	0.73	
September	0.22	0.78	
October	0.67	0.67	
November	0.71	0.71	
December	1.20	1.20	

2019 Flux Usage Tracking

Part Number	# Cav	Shot Weight	January			February			March			April			May			June			July			August			September			October			November			December		
			Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots
26080951	8	9	88632	99711	11079	42888	48249	5361	95264	107172	11908	65392	73566	8174	74152	83421	9269	37152	41796	4644	82203	92478	10275	26936	30303	3367	54864	61722	6858	31077	34962	3885	55504	62442	6938	31077	34962	3885
26134538	2	10.5																																				
26134543	2	10.5																																				
26137092	4	0																																				
26137534	4	21.15	27126	143429	6782	42888	226770	10722	30170	159524	7543	19381	102477	4845	12265	64851	3066	16082	85034	4021	21200	112095	5300	25491	134784	6373	33020	174593	8255	9248	48899	2312	25761	136211	6440	21051	111307	5263
26136479	4	21.15	27126	143429	6782	42888	226770	10722	13610	71963	3403	22443	118667	5611	23091	122094	5773	10534	55699	2634	21200	112095	5300	19251	101790	4813	11228	59368	2807	3124	16518	781	13425	70985	3356	10895	57607	2724
26114621	8	13																																				
7812145	8	6.82																												3300	2813	413	1800	1535	225			
5686815/7810890	8	6																																				
26031034	8	6																																				
26114205	6	11	13440	24640	2240	24093	44171	4016	17262	31647	2877	8157	14955	1360	19512	35772	3252	13560	24860	2260	34727	63666	5788	21340	39123	3557	12826	23514	2138	11993	21987	1999				11993	21987	1999
28268864	6	12	13440	26880	2240	24093	48186	4016	18657	37314	3110	13587	27174	2265	35640	71280	5940	3444	6888	574				21621	43242	3604	12898	25796	2150				31815	63630	5303	2210	4420	368
28278634	6	12																																				
26075238	6	11										2970	5445	495																								
26083774	4	0																																				
26086252	4	10.5																																				
26086230	4	10.91																																				
26134166	1	6.33																																				
26142142	2	13.23																												652	4313	326						
26105382	8	8.25																																				
38206298	6	12	35250	70500	5875	33378	66756	5563	61773	123546	10296	31080	62160	5180	18558	37116	3093	39252	78504	6542	32904	65808	5484	33108	66216	5518	252	504	42	13194	26388	2199	17385	34770	2898			
5401-125-001	4	21				11892	62433	2973	13596	71379	3399	8772	46053	2193	13164	69111	3291	21440	112560	5360	3216	16884	804	13870	72818	3468	23887	125407	5972	9982	52406	2496	17108	89817	4277			
5405-125-001	4	17	20820	88485	5205	26308	111809	6577	10656	45288	2664	12760	54230	3190	4032	17136	1008	8016	34068	2004	14261	60609	3565	8708	37009	2177	56	238	14	7891	33537	1973						
24276243	4	16	45996	183984	11499	40136	160544	10034	48764	195056	12191	37728	150912	9432	50612	202448	12653	30200	120800	7550	53628	214512	13407	34156	136624	8539	30342	121368	7586	2844	11376	711	26734	106936	6684	17373	69492	4343
24276241	1	8	19280	154240	19280	19748	157984	19748	16460	131680	16460	14188	113504	14188	18880	151040	18880	25468	203744	25468	16132	129056	16132	14828	118624	14828	9896	79168	9896	4286	34288	4286	4033	32264	4033	3689	29512	3689
61313	1	5.84																																				
61333	2	6.21																																				
10264339	4	22				6700	36850	1675	12464	68552	3116	15440	84920	3860	21996	120978	5499	5949	32720	1487				17460	96030	4365	14091	77501	3523	18607	102339	4652	12192	67056	3048			
6006494	1	7																																				
6006593	1	7																																				
28305401	2	4.6	7378	16969	3689	18806	43254	9403	17244	39661	8622	15326	35250	7663	19126	43990	9563	22690	52187	11345	27803	63947	13902	22178	51009	11089	18668	42936	9334	6128	14094	3064	12250	28175	6125	11663	26825	5832
28206461	2	4.6	7378	16969	3689	18806	43254	9403	17244	39661	8622	15326	35250	7663	19126	43990	9563	22690	52187	11345	27803	63947	13902	23102	53135	11551	18442	42417	9221	6126	14090	3063	9555	21977	4778	11821	27188	5911
38002170	2	5.8	5522	16014	2761				3894	11293	1947	3214	9321	1607							12	35	6	3940	11426	1970													
24282885	2	9.5	131928	531658	55964	95128	451858	47564	67522	320730	33761	68024	323114	34012	57796	274531	28898	63084	299649	31542	84959	403555	42480	85812	407607	42906	88797	421786	44399	43208	205238	21604	82807	393333	41404	58475	277756	29238
24273609	4	11.67	22128	64558	5532	19380	56541	4845	26448	77162	6612	32344	94364	8086	25252	73673	6313	27652	80675	6913	27697	80806	6924	26460	77197	6615	27612	80558	6903	19028	55514	4757	34539	100768	8635	23941	69848	5985
40176001	20	20.75																												25695	26659		55095	57161	2755	94041	97568	4702
1L2W4224AA	24	22.5																																		113030	105966	4710
HL1W4C000EB	2	23.21																									10884	126309	5442	18102	210074	9051	6611	76721	3306	15706	182268	7853
HL1W4A028AA	1	13.4																												3209	43001	3209	63081	845285	63081	3567	47798	3567
HL1W4A028DA	1	13.4																									6247	83710	6247	11087	148566	11087	6093	81646	6093	7889	105713	7889
		TOTALS:	449,040	1,527,247	137,983	467,132	1,277,030	100,212	471,028	1,454,465	129,917	386,132	1,351,361	119,823	413,202	1,411,430	126,061	347,213	1,281,369	123,688	447,745	1,479,494	143,268	398,261	1,476,936	134,738	374,010	1,546,894	130,785	248,781	1,107,060	81,866	478,380	2,278,163	180,024	438,421	1,270,216	97,956

TOTAL ALUMINUM MELTED BY

January	1,527,247
February	1,277,030
March	1,454,465
April	1,351,361
May	1,411,430
June	1,281,369
July	1,479,494
August	1,476,936
September	1,546,894
October	1,107,060
November	2,278,163
December	1,270,216
TOTAL:	**17,461,665**

TIMES FLUXED BY MONTH

	1053	1100	1106	TOTALS
January	45	37		205
February	41	40		203
March	45	22		168
April	51	27		195
May	36	20		140
June	26	14		100
July	30	25		138
August	39	25	4	170
September	57	21	6	210
October	24		15	98
November	31	22	6	148
December	37	38	6	203
TOTAL	462	291	37	1975
Average	39	26	7	165

TIMES FLUXED BY MONTH 3

	lbs	hrs	lb/hr
	0	744	0.0000
	0	696	0.0000
	0	744	0.0000
	0	720	0.0000
	0	744	0.0000
	0	720	0.0000
	0	744	0.0000
	10	744	0.0134
	15	720	0.0208
	38	744	0.0504
	15	720	0.0208
	15	744	0.0202

FLUX USAGE (lbs) / ALUMINUM MELTED (TON)

	1053	1100	1106
January	0.27	0.27	
February	0.32	0.32	
March	0.23	0.23	
April	0.29	1.01	
May	0.20	0.69	
June	0.16	0.55	
July	0.19	0.65	
August	0.23	0.81	0.23
September	0.27	0.95	0.27
October	0.62		0.18
November	0.45	0.45	0.13
December	1.12	1.12	0.32

2020 Flux Usage Tracking

Part Number	# Cav	Shot Weight	January			February			March			April			May			June			July			August			September			October			November			December		
			Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots
7812145	8	6.82				3672	1130	459	5400	4604	675							12880	10580	1510																		
10264339	4	22	5025	27638	1256				2117	11644	529							2399	13195	600	4668	25674	1167	4656	25608	1164	6374	35057	1594	14852	81686	3713	22888	125884	5722	4121	22666	1030
24273609	4	11.67	33310	97182	8328	28275	82492	7069	31376	91539	7844				20720	60451	5180	19292	56284	4823	12040	35127	3010	36184	105567	9046	24620	71829	6155	36028						40937	119434	10234
24276241	1	8	30338	242704	30338	19821	158568	19821	12620	100960	12620	697	5576	697				21264	170112	21264	11282	90256	11282	12227	97816	12227	28968	231744	28968	18313	146504	18313	9836	78688	9836	19976	159808	19976
24276243	4	16	21963	87852	5491	44662	178648	11166	23293	93172	5823				6370	25480	1593	25037	100148	6259	47122	188488	11781	30536	122144	7634	34424	137696	8606	41288	165152	10322	38022	152088	9506	30624	122496	7656
24282885	2	9.5	90495	429851	45248	87312	414732	43656	75687	359513	37844				15799	75045	7900	64743	307529	32372	79030	375393	39515	73951	351267	36976	102440	486590	51220	95417	453231	47709	75579	359000	37790	72091	342432	36046
26075238	6	11																												4221	7739	704						
26080951	8	9	43637	49092	5455	34632	38961	4329	32648	36729	4081										11912	13401	1489	12416	13968	1552	18716	21056	2340	17244	19400	2156	10896	12258	1362	10856	12213	1357
26114205	6	11	20768	38075	3461	9389	17213	1565	11311	20737	1885							11474	21036	1912	7456	13669	1243	15399	28232	2567	14930	27372	2488	15296	28043	2549	18618	34133	3103	4958	9090	826
26136479	4	21.15	6907	36521	1727	17501	92537	4375	10659	56359	2665				2368	12521	592	7164	37880	1791	7189	38012	1797	5755	30430	1439	2844	15038	711									
26137092	4	0																																				
26137534	4	21.15	48297	255370	12074	33821	178829	8455	33209	175593	8302				7095	37515	1774	22872	120936	5718	22913	121152	5728	48669	257337	12167	41897	221530	10474	37480	198176	9370	50727	268219	12682	37800	199868	9450
26142142	2	13.23																																				
28206461	2	4.6	23647	54388	11824	23516	54087	11758	102	235	51																											
28268864	6	12	22246	44492	3708	22642	45284	3774																														
28278634	6	12																																				
28305401	2	4.6	23953	55092	11977	23502	54055	11751	103	237	52																											
38002170	2	5.8																																				
38206298	6	12				19421	38842	3237																														
40176001	20	20.75	115552	119885	5778	40580	42102	2029	163008	169121	8150	7135	7403	357				89057	92397	4453	88845	92177	4442	184845	191777	9242	161507	167564	8075	153920	159692	7696	118666	123116	5933	111380	115557	5569
1L2W4224AA	24	22.5	42316	39671	1763	92074	86319	3836	113894	106776	4746										113804	106691	4742	129110	121041	5380	131530	123309	5480				100728	94433	4197	106092	99461	4421
26060310/26063655	6	10.9																																				
5401-125-001	4	21	6664	34986	1666	14861	78020	3715	15138	79475	3785				12714	66749	3179	12895	67699	3224	11512	60438	2878	5928	31122	1482	7301	38330	1825	14826	77837	3707	17338	91025	4335	7789	40892	1947
5405-125-001	4	17	4515	19189	1129	16925	71931	4231	10310	43818	2578													9539	40541	2385	12314	52335	3079	10770	45773	2693	15774	67040	3944	2711	11522	678
5686815/7810890	8	6																																				
HL1W4A028AA	1	13.4	3781	50665	3781	2950	39530	2950	1967	26358	1967				9471	126911	9471	127830	1712922	127830	2828	37895	2828	3432	45989	3432	1233			5602	75067	5602	3820	51188	3820	2901	38873	2901
HL1W4A028DA	1	13.4	11582	155199	11582	11993	160706	11993	4224	56602	4224				3867	51818	3867	6023	80708	6023	5420	72628	5420	9561	128117	9561	8571	114851	8571	13687	183406	13687	7013	93974	7013	5711	76527	5711
HL1W4C000EB	2	23.21	12730	147732	6365	9484	110062	4742	12870	149356	6435				3673	42625	1837	7871	91343	3936	12964	150447	6482	8824	102403	4412	10554	122479	5277	19142	222143	9571	15250	176976	7625	10769	124974	5385
		TOTALS:	**567,726**	**1,985,583**	**172,948**	**557,033**	**1,946,048**	**164,911**	**559,936**	**1,582,825**	**114,255**	**7,832**	**12,979**	**1,054**	**82,077**	**499,114**	**35,391**	**430,801**	**2,883,168**	**221,814**	**438,985**	**1,421,448**	**103,804**	**591,032**	**1,693,357**	**120,665**	**608,223**	**1,866,779**	**144,863**	**498,086**	**1,863,845**	**137,790**	**505,155**	**1,728,021**	**116,866**	**468,716**	**1,495,813**	**113,186**

TOTAL ALUMINUM MELTED BY

January	1,985,583
February	1,946,048
March	1,582,825
April	12,979
May	499,114
June	2,883,168
July	1,421,448
August	1,693,357
September	1,866,779
October	1,863,845
November	1,728,021
December	1,495,813
TOTAL:	**18,978,981**

TIMES FLUXED BY MONTH **TIMES FLUXED BY MONTH** 3

	1053	1100	1106	TOTALS	lbs	hours	lb/hr
January	15	24	10	123	25	744	0.0336
February	4	57	13	185	33	696	0.0467
March	8	29	6	108	15	744	0.0202
April	0	0	0	0	0	720	0.0000
May	1	6	5	30	13	744	0.0168
June	0	12	6	45	15	720	0.0208
July	0	54	38	230	95	744	0.1277
August	3	45	35	208	88	744	0.1176
September	0	35	21	140	53	720	0.0729
October	7	40	28	188	70	744	0.0941
November	0	40	28	170	70	720	0.0972
December	11	35	25	178	63	744	0.0840
TOTAL	49	377	215	1603			
Average	4	31	18	134			

*2.5 lbs of flux used for each time *2.5 lbs of flux used for each time

FLUX USAGE (lbs) / ALUMINUM MELTED (TON)

	1053	1100	1106
January	0.12	0.12	0.12
February	0.19	0.19	0.19
March	0.14	0.14	0.14
April			
May	0.12	0.42	0.12
June		0.11	0.03
July		1.13	0.32
August	0.25	0.86	0.25
September		0.52	0.15
October	0.70	0.70	0.20
November		0.69	0.20
December	0.83	0.83	0.24

2021 Flux Usage Tracking

Part Number	Part Name	# Cav	Shot Weight	January			February			March			April			May			June			July			August			September			October			November			December	
				Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight	Shots	Pieces	Weight
10264339	Clutch Housing	4	22																			184	1012	46	3760	20680	940							3472	19096	868		
24273609	X69F CVT Reverse Gear C	4	11.67	18,826	54925	4707	20,919	61031	5230	15,892	46365	3973	12,404	36189	3101	2,728	7959	682	4,236	12359	1059	13,496	39375	3374	17144	50018	4286	7756	22628	1939	2895	8446	724	4788	13969	1197	19380	56541
24276241	8L45 Input Gear Carrier	1	8	23,900	191200	23900	15,481	123848	15481	17,196	137568	17196	12,606	100848	12606	5,566	44528	5566	1,860	14880	1860	13,047	104376	13047	17606	140848	17606	17762	142096	17762	5706	45648	5706	3424	27392	3424	1112	8896
24276243	8L90 Input Gear Carrier	4	16	35,992	143968	8998	42,700	170800	10675	40,013	160052	10003	38,884	155536	9721	47,494	189976	11874	37,930	151720	9483	34,954	139816	8739	22136	88544	5534	25978	103912	6495	34916	139664	8729	21828	87312	5457	28192	112768
24282885	GFx O/D Planetary Gear	2	9.5	68,917	327356	34459	61,867	293868	30934	56,060	266285	28030	61,995	294476	30998	41,415	196721	20708	99,412	472207	49706	58,157	276246	29079	15254	72457	7627				10683	50744	5342	37874	179902	18937	42893	203742
26079997		8	9.75																																			
26080951	K2XX Shift Actuator	8	9	13,056	14688	1632	4,968	5589	621	12,192	13716	1524	10,632	11961	1329	232	261	29	1,956	2201	245										30225	34003	3778					
26114205	GMT610 Gear Shift Level	6	11	16,590	30415	2765	8,070	14795	1345	16,980	31130	2830				7,302	13387	1217	3,279	6012	547	2,178	3993	363	1819	3335	303				55	101	9	3746	6868	624	780	1430
26134543		2	10.5																																			
26136479	CBR Pump Housing LHD	4	21.15																1,275	6742	319	5,467	28907	1367	5146	27209	1287							124	656	31	6175	32650
26137092		4	0																																			
26137534	CBR Pump Housing RHD	4	21.15	31,276	165372	7819	42,725	225908	10681	50,863	268938	12716	47,440	250839	11860	45,133	238641	11283	33,828	178866	8457	35,501	187712	8875	39625	209517	9906	38510	203622	9628	32728	173049	8182	26801	141710	6700	23524	124383
38002170		2	5.8																																			
38206298		6	12																3,006	6012	501	1,512	3024	252	1848	3696	308	32880	65760	5480	163675	327350	27279	108504	217008	18084	89845	179690
40176001	T1xx Front Bearing Cap	20	20.75	149,120	154712	7456	103,666	107553	5183	139,531	144763	6977	159,240	165212	7962	160,614			133,590	138600	6680	156,940	162825	7847	102680	106531	5134												
1L2W4224AA	P552 Bearing Cap	24	22.5	141,096	132278	5879	71,990	67491	3000	162,689	152521	6779	46,336	43440	1931	38,400			103,248	96795	4302	88,206	82693	3675	129972	121849	5416	116991	109679	4875	136260	127744	5678	126055	118177	5252	90715	85045
26060310/26063655		6	10.9																																			
5401-125-001		4	21																																			
5405-125-001		4	17	4,424	18802	1106																																
5686815/7810890		8	6																																			
HL1W4A028AA	Ford Cover 8.8	1	13.4	1,861	24937	1861	1,635	21909	1635	4,621	61921	4621	813	10894	813	2,013	26974	2013	1,746	23396	1746	1,490	19966	1490	1596	21386	1596	2951	39543	2951	1865	24991	1865	2523	33808	2523	0	
HL1W4A028DA	Ford Cover 9.75	1	13.4	7,679	102899	7679	13,977	187292	13977	6,784	90906	6784	5,555	74437	5555	5,002	67027	5002	4,181	56025	4181	8,977	120292	8977	4808	64427	4808	12257	164244	12257	5849	78377	5849	6183	82853	6183	5198	69653
HL1W4C000EB	Torque Arm	2	23.21	5,875	68179	2938	16,174	187699	8087	12,264	142324	6132	8,718	101172	4359	6,210	72067	3105	8,584	99617	4292	10,640	123477	5320	12002	139283	6001	11196	129930	5598	5193	60265	2597	8640	100267	4320	11332	131508
			TOTALS:	518,612	1,429,730	111,198	404,172	1,467,784	106,848	535,085	1,516,489	107,564	404,623	1,245,004	90,234	362,109	857,541	61,478	438,131	1,265,430	93,376	430,749	1,293,713	92,450	375,396	1,069,780	70,751	266,281	981,414	66,984	430,050	1,070,382	75,737	353,962	1,029,016	73,601	319,146	1,006,307

TOTAL ALUMINUM MELTED BY MONTH:

January	1,429,730
February	1,467,784
March	1,516,489
April	1,245,004
May	857,541
June	1,265,430
July	1,293,713
August	1,069,780
September	1,866,779
October	1,458,297
November	1,029,016
December	1,006,307
TOTAL:	**15,505,870**

TIMES FLUXED BY MONTH

	1053	1100	1106	TOTALS
January	2	47	33	205
February	0	49	40	223
March	0	54	52	265
April	18	42	23	208
May	0	51	19	175
June	1	51	34	215
July	13	27	35	188
August	14	16	24	135
September	15	24	10	123
October	11	35	25	178
November	0	25	23	120
December	4	17	16	93
TOTAL	78	438	334	2125

TIMES FLUXED BY MONTH 3

	lbs	hrs	lb/hr
January	83	744	0.1109
February	100	696	0.1437
March	130	744	0.1747
April	58	720	0.0799
May	48	744	0.0638
June	85	720	0.1181
July	88	744	0.1176
August	60	744	0.0806
September	25	720	0.0347
October	63	744	0.0840
November	58	720	0.0799
December	40	744	0.0538

FLUX USAGE (lbs) / ALUMINUM MELTED (TON)

	1053	1100	1106
January	0.29	0.29	0.29
February		0.30	0.30
March		0.35	0.35
April	0.33	1.17	0.33
May	0.00	1.43	0.41
June	0.34	1.19	0.34
July	0.29	1.01	0.29
August	0.25	0.88	0.25
September	0.13	0.46	0.13
October	0.85	0.85	0.24
November		0.82	0.23
December	0.64	0.64	0.18

2019 **Hours of Operation In Month**

	DAYS	1053	1100	1106
January	31	744	744	744
February	29	696	696	696
March	31	744	744	744
April	30	720	720	720
May	31	744	744	744
June	30	720	720	720
July	31	744	744	744
August	31	744	744	744
September	30	720	720	720
October	31	744	744	744
November	30	720	720	720
December	31	744	744	744

2020 **Hours of Operation In Month**

	DAYS	1053	1100	1106
January	31	744	744	744
February	29	696	696	696
March	31	744	744	744
April	30	720	720	720
May	31	744	744	744
June	30	720	720	720
July	31	744	744	744
August	31	744	744	744
September	30	720	720	720
October	31	744	744	744
November	30	720	720	720
December	31	744	744	744
TOTAL	366	8784	8784	8784

2021 **Hours of Operation In Month**

	DAYS	1053	1100	1106
January	31	744	744	744
February	29	696	696	696
March	31	744	744	744
April	30	720	720	720
May	31	744	744	744
June	30	720	720	720
July	31	744	744	744
August	31	744	744	744
September	30	720	720	720
October	31	744	744	744
November	30	720	720	720
December	31	744	744	744
TOTAL	366	8784	8784	8784