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

N506164200

FACILITY: TI Fluid Systems, (Formerly TI Group Auto , Marys)		**SRN / ID:** N5061
LOCATION: 170 - 184 GRATIOT BLVD, MARYSVILLE		**DISTRICT:** Warren
CITY: MARYSVILLE		**COUNTY:** SAINT CLAIR
CONTACT: Mark Eschenburg , Plant Manager		**ACTIVITY DATE:** 06/03/2022
STAFF: Iranna Konanahalli	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** SM OPT OUT
SUBJECT: FY 2022 SM CMS Scheduled Inspection of TI Group Automotive Systems, LLC, DBA TI Fluid Systems, (Formerly TI Group Auto, Marysville)		
RESOLVED COMPLAINTS:		

TI Group Automotive Systems, LLC (N5061)
DBA TI Fluid Systems (Formerly TI Group Auto, Marysville) N5061
184 Gratiot Blvd, Marysville 48040-1147

Name change (1988 acquisition by TI Group for $146.5 million)**:** Bundy Corporation (N5061, founded in 1922 by Harry Bundy in Detroit) ➔ TI Group Automotive Systems, LLC (N5061)

Active permits: PTI Nos. 42-21 (Zinc Plating Process) dated July 16, 2021, and **113-14** (ROP Synthetic Minor, no Rule 201 review, consolidation of previously issued permits to Bundy Corp.) dated September 12, 2014. Potential-to-Emit (PTE), considering the coating line control devices, for all criteria pollutants (VOC PTE = 44.86 (PTI limit is 50) assuming 90% destruction and 85% capture efficiencies) and HAPs (HAP PTE = 21.02 (PTI limit is 18)) are below major source thresholds. PTE without the control devices for HAPs and VOC may be above the Title V / ROP thresholds. The Synthetic Minor permit makes the limits (PTE < Thresholds) and VOC / HAP emissions control devices (two ovens doubling as control devices for Line1 & Line2 and one communal thermal oxidizer / incinerator for Lin3 & Line4) legally, federally, and practically enforceable. Randomly packed bed scrubbers are present as well for acid mist emissions control.

Fee Category: Cat E $250.00

Area NESHAP / MACT 6W: Zinc plating process (PTI No. 42-21, EU-ZINCPLATE) is **not** subject to Subpart WWWWWW (6W)—National Emission Standards for Hazardous Air Pollutants: Area Source Standards for Plating and Polishing Operations, Page 37728, Federal Register / Vol. 73, No. 127 / Tuesday, July 1, 2008 / Rules and Regulations, Final rule. This final rule establishes emission standards in the form of management practices for new and existing tanks, thermal spraying equipment, and mechanical polishing equipment in certain plating and polishing processes. These final emission standards reflect EPA's determination regarding the generally achievable control technology (GACT) and/or management practices for the area source category.

An Area MACT Plating Process Plating and Polishing Facility is subject to Area NESHAP / MACT 6W if it uses or has emissions of compounds of one or more plating and polishing metal HAP, which means any compound of any of the following metals: cadmium, chromium, lead, manganese, and nickel, as defined in § 63.11511. TI Group claimed in its application that the plating process is not subject to this regulation because it does not use materials that would trigger this regulation (materials containing more than 0.1 percent by weight cadmium, chromium, lead or nickel, or more than 1.0 percent by weight manganese).

On **June 03, 2022**, I conducted a level-2 **FY 2022 SM CMS Scheduled Inspection** of TI Group Automotive Systems, LLC, DBA TI Fluid Systems, (Formerly TI Group Auto, Marysville), located at 184 Gratiot Blvd, Marysville 48040-1147. The inspection was conducted to determine compliance with federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451; Michigan Department of Environment, Great Lakes and Energy, Air Quality Division (EGLE-AQD) administrative rules; and Permit-to-Install Nos. **42-21** (Zinc Plating Process) and **113-14** (ROP Synthetic Minor Consolidation Permit).

During the inspection, **Mohsen Kambod** (Cell: 586-489-5641;; E-mail: mKambod@gmail.com), Environmental Technology and Consultants, Consultant of Harrison Twp., **Mark Eschenburg** (Phone: 810-941-6132; Cell: 248-877-7434; E-mail: mEschenburg@tifs.com), Plant Manager, **Jered Pulaskey** (Cell: 810-305-3180; E-mail: jPulaskey@tifs.com), Eng. Manager, **Mike Mackin** (Cell: 810-388-4059; E-mail: mMackin@tifs.com), Eng. Manager, assisted me.

TI Fluid Systems' Fluid Carrying Systems Division designs and manufactures a wide range of products designed to move fluid, such as gasoline, brake fluid, etc., throughout the vehicle. The systems are designed and manufactured to meet the complex assembly, design and performance challenges of today's vehicles, using a wide range of materials and manufacturing processes in order to improve performance, maximize durability and optimize packaging and installation. TI Fluid System has developed specialty internal and external coatings designed to withstand corrosion, abrasion and other environmental hazards on all of its fluid carrying systems products. At Marysville, Michigan, TI Fluid Systems manufactures coated steel tubes used for automotive brake lines, fuel lines, and other fluid carrying systems. The facility operates four metal tube coating lines and four metal tube rolling lines. There are approximately 150 employees that operate these lines continuously during three shifts. The products include:

1. Double-wall and single-wall steel fluid carrying lines and bundles for brake and fuel systems
2. Multi-layer plastic lines for vapor, thermal management and exhaust treatment
3. A wide range of quick-connectors – including sensor-integrated connectors – for easy installation and system assembly
4. Heated plastic lines for selective catalyst reduction (SCR) urea fluids

PTI No. 113-14 (ROP Synthetic Minor – four Coating Lines)

There are four emission units in this Synthetic Minor (SM) permit (EU-COATINGLINE1 thru EU-COATINGLINE4). Each emission unit is a metal tube coating line that was previously addressed in other permits issued to Bundy Corporation before being consolidated in this ROP Opt-Out or Synthetic Minor permit. All four lines are parallel and practically identical, with some minor differences. Each line consists of a pretreatment section, a primary coating section, and a secondary coating section. Uncoated metal tubing arrives to the coating process wound to a vertical axis revolving cylinder known as a capstan. The capstan unwinds and feeds tubing to the coating line horizontally and continuously through all sections of this coating process at a speed that appeared to be about walking speed (3-4 mph). In this manner, many miles of finL tubing are produced each day.

PTI No. 113-14 Emission Units (EU)

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Flexible Group ID
EU-COATINGLINE1	Metal tube coating line 1 consisting of pretreatment via wash stations and a pickling unit, primary coating, and secondary coating including a natural gas fired oven. The pickling unit is controlled by a scrubber and the coating application is controlled by the oven.	FG-FACILITY
EU-COATINGLINE2	Metal tube coating line 2 consisting of pretreatment via wash stations and a pickling unit, primary coating, and secondary coating including a natural gas fired oven. The pickling unit is controlled by a scrubber and the coating application is controlled by the oven.	FG-FACILITY
EU-COATINGLINE3	Metal tube coating line 3 consisting of pretreatment via wash stations and an acid bath unit; primary coating; pretreatment and secondary coating including a natural gas fired oven, incinerator, and an electric curing oven. The acid bath unit is controlled by a scrubber and the coating application is controlled by the incinerator.	FG-FACILITY
EU-COATINGLINE4	Metal tube coating line 4 consisting of pretreatment via wash stations and an acid bath unit; primary coating; pretreatment and secondary coating including a natural gas fired oven, incinerator, and an electric curing oven. The acid bath unit is controlled by a scrubber and the coating application is controlled by the incinerator.	FGFACILITY
EU-COATINGLINE1 and EU-COATINGLINE2 (Line1 & Line2) are permitted as "ALGAL" (Aluminum-Galfan coating) lines. EU-COATINGLINE3 and EU-COATINGLINE4 (Line3 & Line4) are permitted as "NYGAL" (Nylon-Galfan) lines. Currently (CY 2022) ALGAL is hardly used. All coating lines are used for NYGAL as ALGAL is practically obsolete. Incidentally, this results in less VOC emissions. The air permit allows TI Group to run either ALGAL or NYGAL on any of the four lines because both coatings have nearly equivalent emission rates. ALGAL is now considered old technology. The automotive industry has moved to "NYGAL" (Nylon-Galfan coating) lines that are more resistant to corrosion from water, salt, and other elements that automobiles are subject to. Concerning VOC emissions, while Line1 & Line2 are controlled by each corresponding and dedicated oven operating at minimum1600°F, Line3 & Line4 are controlled by one communal thermal oxidizer operating at minimum 1450°F.		
Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1290.		

The coating process starts with large coils of copper coated steel tubing that is partially manufactured in four separate tube rolling machines at this facility. A zinc coated steel tubing that is manufactured at another facility is also used for certain customers. Much of this tubing is “double walled” to make it more capable of handling high pressure fluids. The tubing is generally around 3/8’’ in diameter.

The tubing is uncoiled from the capstan and fed to the coating lines where it first enters a hot water bath to wash the tubing. After washing, the tube is submerged in a pickling tank containing approximately 20 percent hydrochloric acid (20% HCl). The pickling unit prepares the surface of the tubing for the primer coating by removing any scale/oxidation. Before the tubing exits the pickling unit, high pressure inert gas (N_2) is used to air-wipe the hydrochloric acid off the tubing. This air-wiping generates a hydrochloric acid mist that is controlled by a caustic wet packed bed scrubber (pH > 7, usually pH ≈ 9). Each coating line has its own dedicated caustic wet scrubber. Each packed bed scrubber is equipped with a process control system that automatically adds caustic liquor to the scrubber when the pH falls below 8.5.

After pickling, the tubing is again rinsed in hot water and heated to approximately 1000°F using an electric induction unit. The heated tubing is then coated with liquid Galfan (proprietary zinc/aluminum alloy). The Galfan exists as a molten metal inside an insulated tank that the tubing is fed through. There are no solvents mixed with the liquid Galfan.

The Galfan coated tubing is quenched with water to cool, and then dried with hot air. Once the tubing is dry, it is pretreated with the water-based surface activator Bonderite 1402W. After the Bonderite treatment, the tubing is coated with a nylon primer that is mixed with PM Acetate (VOC). PM Acetate is added to the primer as needed based on the viscosity of the solution. Viscosity is monitored by operators on an hourly basis using a Zahn cup. Excess nylon primer is removed by passing the tube through a mechanical wiper. Excess primer thus recovered is reused / recycled.

After receiving the solvent-based nylon primer coating, the tubing is fed through a four-zone natural gas fired oven to cure the coatings. Each coating line has a dedicated oven. In coating lines 1 and 2, this oven is run at 1650**°F** (PTI Minimum1600°F) and doubles as a thermal oxidizer for VOC emission control. In coating lines 3 and 4 the oven is run at approximately 1200°F. Unlike Line1 & Line2, coating lines 3 and 4 are equipped with one shared / communal incinerator downstream of the oven exhaust that operates at 1650°F (PTI Minimum 1450°F) to achieve VOC destruction.

The tubing receives the nylon coating after the curing oven. There are several layers of nylon with slightly differing compositions. The differing nylon compositions are applied so that if one nylon layer is penetrated by some corrosive agent, then another layer may be more resistant to that agent A small amount of oily byproduct is emitted from the nylon coating process. A capture system is in place to suck up any oil emissions and catch them in a mist eliminator/oil catch system.

The nylon coated tubing is heated/cured using an induction coil and quenched in water to set the coating. The finished product is re-coiled and shipped to various automotive manufacturers.

When the occasional ALGAL coating is applied the only difference is that instead of the nylon primer, an aluminum-rich primer is used. The aluminum rich primer is also mixed with PM Acetate. No nylon or Bonderite 1402W is used in ALGAL.

There have not been any major changes to the coating lines since the AQD inspection of 2014. The most recent changes include a circular shaping die that the tubing passes through before the coating that ensures that the tubing is the correct shape. A brush has also been installed before the coating process to create micro scorings on the surface of the metal, aiding in coating adhesion. Dryers have been installed to dry the nylon pellets before they are melted and used as coating. Since the special conditions of each of the four coating lines are essentially the same, I am going to address them simultaneously in the following paragraphs.

During the inspection, only Line1 was operating and Line2, Line3 & Line4 were idle. The acid scrubber has random packing to increase mass transfer area. The liquor pH is maintained at pH > 7 (usually pH ≈ 9) using a probe that measures pH and NaOH is automatically added (PTI No. 113-14, EU-COATINGLINE1, III.3 & IV.3,4). During the FY 2022, inspection, the Line1 coating oven was operating at **1650 >**1600 °F (PTI No. 113-14, EU-COATINGLINE1, III.1).

The temperature monitoring device in the coating oven is installed and operating properly. Data Acquisition System for temperature data is present. The coating line shuts down if T < 1600 °F. For April 3, 2022, Line1 temperature (T) summaries were T_{max} = 1657 °F, T_{min} = 1647 °F, T_{avg} = 1650 °F, $T_{StdDevi}$ = 1.13709 °F. For June 2022 month, Line1 temperature (T) summaries were Tmax = 1660.5°F, Tmin = 1637.4°F, Tavg = 1649.9°F, TStdDevi = 1.6°F. (PTI No. 113-14, EU-COATINGLINE1, IV.1: T>1600 °F). The statistical data for June 2022 is based about temperatures readings for the entire month, one reading per minute.

TI Group continuously monitors and records pH and has shown it to be consistently pH > 7 (PTI No. 113-14, EU-COATINGLINE1, VI.2). TI Group is performing the required calculations using the records kept: VOC lb/day, hours of operation per day, VOC lb/hour (PTI No. 113-14, EU-COATINGLINE1, VI.3-4). For April 2022, Line1 emissions are 290.86 pounds of VOC per month or 0.15 tons per month based on 284 hours of operation of Line1 per month.

For all coating lines (1-4) the 12-month emissions for the month April 2022, are: 5.78 tons of VOC per 12-month (Line1 =1.34 PLUS Line2 =1.45 PLUS Line3 =1.72 PLUS Line4 =1.27) and 0.69 tons of HAPs per 12-month (PTI No. 113-14, FG-FACILITY, I.1-3: VOC < 50, Single HAP < 8 & Aggregate HAPs < 18 tons per year) (PTI No. 113-14, EU-COATINGLINE1, I.2: VOC < 7.9 tons per year) (PTI No. 113-14, EU-COATINGLINE2, I.2: VOC < 7.9 tons per year) (PTI No. 113-14, EU-COATINGLINE3, I.2: VOC < 13.4 tons per year) (PTI No. 113-14, EU-COATINGLINE4, I.2: VOC < 13.4 tons per year). The emissions are after applying **72 percent overall control efficiency** (capture and destruction efficiencies together). Performance tests have never been done as the permit does not mandate it.

Based upon MAERS-2021, 2 tons VOC per year emitted based on 80 percent control efficiency for ovens of Lines 1-2 and incinerators of Lines 3-4. Also, 47 pounds of HCl emitted per year based on 80 percent control for the packed bed scrubbers. While the above calculations used 72 percent overall control efficiency, MAERS-2021 calculations used 80 percent control efficiency. Stack test has never been performed and control efficiency has not been determined. Besides 2 tons VOC per year is an insignificant emission.

The coating lines are equipped with an enclosure system. While Lines 1-2 maintain oven temperatures at 1600°F destroying VOC, Lines 3-4 are equipped with an add-on control, one communal thermal oxidizer / incinerator, because oven temperature is not high enough. All four lines are practically identical.

The communal incinerator (corresponding to Line3 & Line4) is maintained at 1600 > 1550 > 1450 °F (PTI No. 113-14, EU-COATINGLINE3, & EU-COATINGLINE4, III.1: a minimum temperature of 1450°F) with minimum VOC destruction efficiency of 95% by weight. No stack test has been done to demonstrate minimum VOC destruction efficiency of 95 percent (DE ≥ 95%) as PTI does not mandate testing.

For April 2021 thru April 2022 (one random day each month, T reading every minute), Line3 & Line4 communal thermal oxidizer temperature (T) summaries were T_{max} = 1649.0°F, T_{min} = 1609.0°F, T_{avg} = 1619.4°F, $T_{StdDevi}$ = 5.8°F. (PTI No. 113-14, EU-COATINGLINE3, EU-COATINGLINE4, III.1, IV.1: T>1450°F, a temperature monitoring device).

PTI 42-21 Zinc plating process

The zinc plating process, which has been installed by July 1, 2022, but not operating yet, would plate zinc coatings on metal tubing made of copper, nickel, or steel. The process steps, with water rinses between steps, include:

1. **Physical preparation of metal:** Before chemical treatment, the metal tubing is decoiled via the use of up to eight decoilers. The tubes are then straightened and joined, then straightened once again. The tubes are then drawn down to reduce their outer diameter, if necessary, before entering the tube puller. No emissions are expected from any of these actions.

2. **Degreasing raw metal:** Raw metal tubing is drawn into an electrolytic 3M sodium hydroxide bath at 65°C to remove any residual oils that remain from the metal tubing manufacturing and preparation steps. The bath is heated with an electric heater, so there are no fuel combustion emissions. The bath has a polypropylene hood and manual sliding door to maintain good vapor capture. The ventilation system routes emissions to an induced draft demister to remove vapor mist and particulates. Degreased metal tubing is sent through a water cascade rinse before pickling.

3. **Pickling of the degreased metal:** The degreased metal tubing enters an electrolytic pickling bath of **1.5M sulfuric acid at 25°C** to remove any surface rust or scale, which allows for more complete zinc plating of the underlying metal. The bath has a polypropylene hood and manual sliding door to maintain good vapor capture. The ventilation system routes emissions to an induced draft demister to remove vapor mist and particulates. Pickled metal tubing is sent through a water cascade rinse before plating.

4. **Zinc Plating:** The pickled metal tubing is sent through six zinc sulfate electrolytic plating cells containing a mixture of **0.75M zinc sulfate and 0.6M sulfuric acid solutions at 45°C.** The bath is heated with an electric heater, so there are no fuel combustion emissions. The bath has a polypropylene cover and manual sliding door to maintain good vapor capture. The ventilation system routes emissions to an

induced draft demister to remove vapor mist and particulates and cooling tower to recover plating solvents ($ZnSO_4$ and H_2SO_4). Plated metal tubing exiting this section is sent through a water cascade rinse, hot water rinse, and hot air dryer, and is then encoded and coiled.

5. **Zinc sulfate preparation:** Zinc sulfate preparation consists of adding solid zinc into an acid bath and letting it dissolve at ambient conditions. Emissions from this step are assumed to be *de minimus* because it is not heated or agitated.

The degreasing step and pickling steps are controlled with induced-draft demisters.

For the plating step, acid vapor mist and particulate matter exhaust initially passes through an evaporative cooling tower. In the tower, the exhaust interacts with liquid from the plating bath, providing a reduction in temperature of the plating bath solution from a design inlet temperature of 45°C to a design outlet temperature of 37°C. The cooling tower liquid inlet and outlet process temperatures will be monitored during operation of the cooling tower. While the primary role of the cooling tower is to provide evaporative cooling to the bath solution, and is better defined as a process control, the air-liquid interaction may provide a scrubbing effect to the exhaust.

After the cooling tower, the exhaust passes through an induced-draft demister. This demister is the primary air emission control for the plating bath and operates like the demisters on the exhaust from the degreasing and pickling baths.

PTI No. 42-21 Emission Unit (EU): EU-ZINCPLATE

Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1291.

The Zinc plating process is not operating yet. Hence, its compliance will be determined during the next inspection.

Conclusion

Zinc plating process (PTI No. 42-21) has been installed in June 2022; but NOT operational yet. TI Group is compliance with its Synthetic Minor permit (PTI No. 113-14).

NAME [signature] DATE August 25, 2022 SUPERVISOR [signature]