

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Self Initiated Inspection

FY 2014 Insp-

N757126320

FACILITY: MIDWEST THERMAL SPRAY		SRN / ID: N7571
LOCATION: 23164 COMMERCE DR, FARMINGTN HLS		DISTRICT: Southeast Michigan
CITY: FARMINGTN HLS		COUNTY: OAKLAND
CONTACT:		ACTIVITY DATE: 07/30/2014
STAFF: Iranna Konanahalli	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: FY 2014 inspection of Midwest Thermal Spray (MTS), a metallizing, automated metal finishing equipment, filtration and service company		
RESOLVED COMPLAINTS:		

E-file: N7571-SAR-2014 07 30

Midwest Thermal Spray (N7571 aka Misc-1436)

aka MTS

23164 Commerce Drive

Farmington Hills, MI 48335-2722

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PTI No. 27-06 dated February 13, 2006; for Arch Spray.

On July 30, 2014, I conducted a level 2 self-initiated inspection of Midwest Thermal Spray (MTS), a metallizing, automated metal finishing equipment, filtration and service company, located at 23164 Commerce Drive, Farmington Hills, MI 48335-2722. The inspection was conducted to determine compliance with the requirements of federal Clean Air Act; Article II, Air Pollution Control, Part 55 of Act 451 of 1994; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) administrative rules; and PTI No. 27-06.

During the inspection, Mr. David Sartor (Phone: 248-442-6540; E-mail: ds@midwestthermal.com), vice president, assisted me.

MTS is a full service supplier of various types of thermal spray equipment, abrasive blasting equipment (this business is down), robotic metal finishing equipment (this business is down as well), spare parts and various types of thermal spray and welding cored wires. MTS specializes in the sales, service, process, and installation of this equipment. In addition, Filtration Sales & Service Division offers maintenance solutions - filter cleaning & replacement. MTS also offers consulting & system evaluations. MTS has been in business since 1982.

The thermal spray equipment gives the user the capability to apply, metal, ceramics or cermet coatings to upgrade, restore, protect and/or extend the life of components.

Arcspray Vs Plasma coating

Arcspray coating (<9,000 °F): Electrodes are consumable and melt as molten metal particles to be sprayed. Compressed air propels the molten metal particles. Temperature is less than 9,000 degrees Fahrenheit.

Plasma coating (>15,000 °F): There is an anode and cathode which are not consumed. Instead, a powder (metallic or ceramic) is supplied as material to be sprayed. High temperature flame (much hotter than arcspray temperature) is conductive. Powder melts in plasma flame as molten metal particles. Nitrogen or helium is used as a carrier gas to effect spray coating of molten metal on a metallic surface; hydrogen is used to achieve even higher temperatures. Temperature is greater than 15,000 degrees Fahrenheit.

Rule 336.1285(i) exempts plasma coating from Rule 336.1201 (Permit-to-Install). MTS uses arcspray coating; AQD has decided that this was not same as plasma coating. Transfer efficiency of molten metal particles sprayed to target part is in the range of 60-75 percent. Overspray particles (35%), which may produce visible emissions, need to be controlled. Tin arcspray produces smaller particles (less than 10 micro meters) which overwhelm many control devices, such as water spray scrubbers, resulting in visible emissions at the exit point.

MTS refurbishes and sells used arcspray equipment (consumable electrodes). It also sells arc (anodes and cathodes) wires. MTS sells and services new equipment as well. MTS generally uses arcspray equipment for testing new or repaired equipment. MTS does NOT do production coating. However, MTS did production tin coating during December 2005; about 1,200 pounds of arc wires were consumed in December 2005.

The production scale operations with respect to tin coating could have produced visible emissions that resulted in CY 2006 neighborhood complaints. Subsequent AQD investigations and inspections culminated in Jan 31, 2006, Notice of Violation.

Grit-blasting machines (2)

One steel grit and one aluminum oxide machines are present; two grit blasting machines in all with one common cartridge filter system.

Two non-production grit-blasting machines (8 ft W x 8 ft T x 15 ft deep) to prepare metal surface for coating are present. This grit-blasting machine is equipped with a Torrit cartridge filter system; cleaned air is not exhausted outside. Pulse-jet air is used to clean the cartridge filters. Steel grit is reused / recycled.

Two Mac cabinet blast machines share one common cartridge filter system with 55-gallon drum hopper. Upon cleaning particulate laden air, cleaned air is released to an in-plant environment.

The grit-blasting machines with cartridge filter is exempt from Rule 336.1201 (Permit-to-Install) pursuant to Rule 336.1285(l).

Flame spray coating (<500 °F)

One flame spray unit (propane and oxygen), which uses compressed air spray molten metal, is also present. This unit operates at lower temperature than arc spray. The unit is hardly used; once per month.

Arcspray coating (<9,000 °F)

The wire arcspray gun uses two metallic wires, an anode and a cathode, which are consumed

to produce a molten metal mist to be deposited on the surface to be coated. DC converter converts 230 / 460 volts AC to 20-30 volts DC. A converter delivers 20-30 volts (V) & 50 amperes (amps) to the electrodes and the electrode wires melt under these conditions of arc. That is, two wires are electrically charged with opposing polarity. When the wires are brought together at a contact point, the opposing charges create enough heat to continuously melt the tips of wires; the wires are fed at a steady known speed. Compressed air atomizes and sprays this molten metal as particles to a surface to be coated. Transfer efficiency (TE) is about 60-75%. MTS generally does R&D and testing work; except in December 2005 when some production work was done. Arcspray is done in one big room. Exhaust laden with metal particles passes through water and a system of baffles. The water and baffles do okay to control large particles; iron (Fe), copper (Cu) and zinc (Zn) coatings produce large particles. When particles are small (less than 10 microns) this system breaks down; tin (Sn) coating produces small (< 10 µm) particles. Therefore, PTI No. 27-06 (SC 1.2), as suggested by the district office, requires use of a cartridge filter with unobstructed vertical exhaust discharge.

See the letter of violation (LOV) dated January 31, 2006 for additional details. The LOV was issued for violation of Rule 336.1201 (Permit-to-Install). Permit-to-Install No. 27-06 was approved in January 2006. PTI No. 27-06 requires the use of the blue box (now [03/11/2011] repainted – yellow) containing cartridge filters. This filter system was picked up for a song a couple in CY2004; but was never hooked up until required by the permit (PTI No. 27-06).

The cartridge filter uses pulse-jet air to clean the filters.

Two separate robotic booths for arch spray are present. While one booth is used for tin coating, the other is used for Fe, Cu and Zn.

One of two baghouses located outside is used for tin (Sn) coating that produces submicron (< 10 µm) particles resulting in visible emissions with water spray control. The baghouse equipped with 4 55-gallon hoppers is used by MTS. Other baghouse equipped with two 55-gallon hoppers used by University of Michigan (Dearborn) Professor (Pravansu Mohanty).

When coating iron (Fe), copper (Cu) and zinc (Zn) that result in emissions of relatively large particles, water spray control continued to be used.

Archspray coating emissions are discharged via two stacks. One stack corresponds to baghouse and other corresponds to water spray scrubber (Fe, Cu, Zn). If tin coating uses water spray control, the visible emissions appear at the stack due small tin particles (< 10 µm).

Two robotic arch spray rooms are present: one uses water wash booth and the other uses either water wash or UM-Dearborn baghouse. In conclusion, MTS uses either cartridge filter baghouse or water wash system as particulate control system.

According to PTI No. 27-06, SC 1.2, MTS uses cartridge filter system for twin wire arch spray (EU-Arch-Spray).

Cold-cleaner

There is one Safety-Kleen 2'x3' parts cold-cleaner with spray a brush and a solvent tank. The cold-cleaners are subject rule 336.611 or 336.1707 depending on if it is new or existing. A cold-cleaner is exempt from Rule 336.1201 pursuant to Rule 281(h) or Rule 285(r)

(iv). Existing cold cleaners were placed into operation prior to July 1, 1979. New cold cleaners were placed into operation on or after July 1, 1979.

Safety-Kleen unit may be described as a "sink on a drum". The solvent is stored in the drum (enclosure reservoir) of about 40 gallons capacity. Parts are placed in the sink area and solvent is pumped over the part. Spray brush is present. The solvent then drains back into the drum. Mineral spirits, a low vapor pressure organic solvent, is used as a cleaner.

Mechanically assisted lid was kept closed at all times. Operating procedures were not posted. On July 30, 2014, I gave DEQ's decals for "cold-cleaner operating procedures" for posting and complying with work-practice rules. I asked the company to follow the common sense work practice in the procedures.

Safety-Kleen supplies the solvents and services the cold-cleaners. Mineral spirits containing no halogenated solvents is used. Once a month, dirty solvent is picked up for disposal or recovery.

The Cold-cleaners are NOT Subject to: 40 CFR, Part 63, Subpart T, NESHAP/ MACT T, since solvents containing halogenated compounds are not used.

Safety-Kleen)800-669-5740) Product Code 6605, 6616

100% VOC solvent. Flash Point (FP) = 148 °F TCC. Auto Ignition = 480 °F. Boiling Point (BP) = 350 °F @ 760 mm Hg. Vapor Pressure (VP) = 0.2 mm Hg at 68 °F and 0.6 mm Hg at 100 °F. Specific Gravity (SG, Water = 1.0) = 0.77. Density (ρ) @ 68 °F = 6.4-6.7 lbs / gallon (0.80 kg /L). Flammability range = 0.7 %v (LEL) – 5%v (UEL).

UM-Dearborn Project.

University of Michigan-Dearborn mechanical engineering Prof. Pravansu Mohanty's Start-up Company CSquared conducts R & D activities at this site using plasma coating. UM-Dearborn uses one of two baghouses (with two 55-gallon hoppers) located outside. CSquared Innovations is a UM-Dearborn spin-out. CSquared Innovations develops Concept-to-Component ("C2") manufacturing solutions for energy generation and storage applications. The laser-assisted atmospheric plasma deposition technology offers a high speed, cost effective, and scalable "platform" approach to the synthesis of nanostructured materials and films for large area Li-ion battery electrodes, supercapacitors, photovoltaics, fuel cells, and functional coatings.

UM uses one of two baghouses. The laboratory is always locked up to prevent technology and trade secrets espionage.

Complaints and VN

The FY 2006 inspection was a result of a complaint (C-06SE-69), which resulted in January 31, 2006, Notice of Violation (Rule 336.1201), regarding visible emissions due to tin coating. The FY 2011 inspection is to ensure compliance with the permit.

Conclusion:

Complaint No. C-06SE-69 is resolved. AQD issued a letter of violation (LOV) dated January 31, 2006. Please refer to the LOV for additional details. PTI No. 27-06 requires the use of the cartridge filters.

Fyi

January 31, 2006

CERTIFIED MAIL

Mr. David Sartor, VP
 Midwest Thermal Spray (MTS)
 23164 Commerce Drive
 Farmington Hills, Michigan 48335-2722

SRN: N7571, Oakland County

Dear Mr. Sartor:

LETTER OF VIOLATION

On January 19, 2006, the Department of Environmental Quality (DEQ), Air Quality Division (AQD), conducted an inspection of the Midwest Thermal Spray (MTS) facility located at 23164 Commerce Drive, Farmington Hills, Michigan. The purpose of this inspection was to determine your facility's compliance with the requirements of the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451) and to investigate a recent complaint (C-06SE-69) which we received on January 12, 2006, regarding gray/yellow smoke, attributed to your company's operations.

During the inspection, the following air pollution violations were identified:

Process Description	Rule/Permit Condition Violated	Comments
Electric arc spray process	Rule 336-1201	MTS installed this process without first obtaining a Permit-to-Install

During this inspection, it was noted that MTS had installed and commenced operation of an unpermitted electric arc spray process at your facility. The AQD staff advised you on January 19, 2006, this is a violation of Act 451, Rule 201, which states in part;

"A person shall not install, construct, reconstruct, relocate, alter, or modify any process or process equipment, including control equipment pertaining thereto, which may emit an air contaminant, unless a Permit to Install which authorizes such action is issued by the department."

Your program for compliance should include a completed air use permit application for the electric arc spray process equipment. As we discussed during the inspection, permit application forms, instructions and guidance documents are available at our website (michigan.gov/deq)

Be advised that Rule 201 requires that an air use permit be obtained prior to installation, construction, reconstruction, relocation, or alteration of any process or process equipment which may be a source of an air contaminant.

Be advised that the AQD may initiate appropriate enforcement action for your unpermitted installation and operation of this process equipment. Furthermore, continued operation of unpermitted equipment is not authorized.

You should immediately initiate necessary actions to correct the cited violations. **Additionally, please**

submit a report of your program for compliance with the Rule 336.1201 by February 24, 2006. At a minimum, this report should explain the causes and duration of the violations, whether the violations are ongoing, remedial action taken, and what steps are being taken to prevent a reoccurrence. If the violations are not resolved by the date of your response, describe what equipment you will install, procedures you will implement, processes or process equipment you will shut down, or other actions you will take and by what dates these actions will take place.

Notwithstanding your response to the preceding citations, the AQD may initiate further enforcement action to address violations of state and federal Clean Air Acts, rules and regulations.

Thank you for your attention to resolving the violations cited above and for the cooperation that was extended to me during my inspection of your facility. If you have any questions regarding the violations or the actions necessary to bring your facility into compliance, please call me at the number listed below.

Sincerely,

Iranna S Konanahalli

Air Quality Division
586-753-3741

ISK:JMS
Enclosures

cc: Mr. Gerald Avery, DEQ
Mr. Thomas Hess, DEQ
Ms. Teresa Seidel, DEQ
Ms. Diane Kavanaugh Vetort, DEQ
Mr. Christopher Ethridge, DEQ
Mr. Richard Taszreak, DEQ

NAME *Iranna S Konanahalli*

DATE *08/08/2014* SUPERVISOR *CTE*