

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

P058333059

FACILITY: OTTO BOCK POLYURETHANE TECHNOLOGIES, INC		SRN / ID: P0583
LOCATION: 2923 TECHNOLOGY DRIVE, ROCHESTER HLS		DISTRICT: Southeast Michigan
CITY: ROCHESTER HLS		COUNTY: OAKLAND
CONTACT: Steve Foote , Plant Manager		ACTIVITY DATE: 01/19/2016
STAFF: Francis Lim	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT:		
RESOLVED COMPLAINTS:		

On January 19, 2016, Tyler Salamasick and Francis Lim conducted an inspection at Otto Bock Polyurethane Technologies, Inc. located at 2923 Technology Drive, Rochester Hills. The purpose of the inspection was to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) Administrative Rules; and Permit-to-Install No. 207-14A. Steve Foote (Plant Manager), Matt (Production Manager), and Mohsen Kambod (consultant) assisted during the inspection. A copy of the booklet Environmental Inspections: Rights and Responsibilities was presented to Mr. Foote during the previous inspection.

Otto Bock, a German-based company, started the Rochester Hills operations in April 2011. This facility is a manufacturer of noise/vibration dampening and energy absorbing automotive polyurethane foams, foam mats and foam-based child seats (automotive and retail). Foam products are manufactured using reaction injection molding (RIM) machines. Approximately 65% of their products are auto related. This facility has approximately 55 employees and operates 2 shifts.

Isocyanates (MDI) and Polyols are the main raw materials. The required chemicals are received and stored in totes. The raw materials are weighed and mixed in a chemical blending area (1 – 10 tons capacity blending tanks). The polyol is blended with the other components: surfactant (to lower the surface tension between liquids which allows for penetration rather than beading), catalyst, and blowing agent. Polyol is an alcohol containing multiple hydroxyl groups. Blowing agent is a chemical substance that is used to expand plastics to create foam.

Reaction injection molding is similar to injection molding. Main difference is that the polymers used require a curing reaction to occur within the mold. The blended polyol and isocyanates are transferred to the reaction injection molding area. Each RIM machine has its own material supply station. Chemicals are transferred to a day tank. Chemical usage is tracked through the programmable logic controller (PLC). The two components are mixed through a mix head and the mixture poured into a mold. An open mold is a mold that opens up and then closes after the mixture is poured. A closed mold has a small opening where the mixture is injected to the mold under high pressure. The closed mold then opens up so that the molded foam product can be pulled out. Amount of time before foam starts rising dictates whether a closed-mold or open-mold is appropriate. Average time for curing open foam molding is 6 minutes; 12 minutes for closed molding. Large floor mats are manufactured in closed mold since the foam will rise higher than it should if manufactured in open molds. Solvent-based mold release is applied to the mold to assist release of molded foam. The operators pull the molded foam off the mold and then manually trimmed. The mix head is occasionally cleaned with acetone, and sent out for thorough cleaning every 8 months. The mold is cleaned by blasting with dry ice twice a week.

Foam is a substance that is formed by trapping pockets of gas in a solid. This facility produces flexible open-cell foams (for example, sound absorbing automotive parts) where the gas pockets connect with each other (pinholes appear in the foam surface). Water is used as blowing agent for the open-cell foams. This facility also produces integral skin foam (for example, energy absorbing foam mats) where a high density skin is formed on the foam. Enovate 245fa is used as blowing agent for the integral skin foam. This ozone depleting CFC is expected to be banned soon.

Polyurethanes are in the class of compounds called reaction polymers. Emissions from RIM machines are expected to be small since the diisocyanates are expected to completely react with the polyols to produce the polyurethane.

Some of the molded foam products are spray-coated with solvent based coatings. Overspray is controlled by dry fabric filters.

RIM machines are exempt from permits-to-install under Rule 286(e). RIM machines that involve the use of solvent-based mold release agents and paint spray coatings are not exempt.

During the previous inspection conducted on June 3, 2015, staff verified that facility was using noncompliance coatings. F988 and F953 are non-compliant coatings (Rule 632 and Rule 702) containing 6.2-6.4 pounds VOC/gallon of coating (less water). A Notice of Violation was issued to the facility. Otto Bock obtained a permit modification allowing the facility to operate using a coating with a high VOC content. More rigorous permit conditions were added to the permit. The permit modification PTI No. 207-14A was issued on August 18, 2015. The NOV for using noncompliance coatings has been resolved.

**Permit-to-Install No. 207-14-A**

This permit is for the 10 RIM machines currently installed. All machines use mold release agents. EUPOLY1, EUPOLY4, EUPOLY5, EUPOLY7, and EUPOLY8 are permitted to use paint spray coatings. Currently, 2 coatings are used: F988 (contains Dimethylformamide, DMF) which can be used at EUPOLY1, EUPOLY4, and EUPOLY8; F953 (non-DMF) which can be used at EUPOLY5 and EUPOLY7. Most of the coatings are applied at EUPOLY4. Facility is trying to eliminate DMF from the coating formulation, but has been unsuccessful in finding an acceptable alternative. DMF makes the floor mats elastic yet strong.

The following emission units are covered by this permit.

EUPOLY1 RIM machine with coating application installed in April 2011  
EUPOLY2 Turntable RIM machine installed in August 2011  
EUPOLY3 Turntable RIM machine installed in April 2012  
EUPOLY4 Turntable RIM machine with coating application installed in September 2012  
EUPOLY5 Turntable RIM machine with coating application installed in February 2013  
EUPOLY6 Turntable RIM machine installed in September 2014  
EUPOLY7 Turntable RIM machine with coating application installed in October 2014  
EUPOLY8 RIM machine with coating application installed in July 2014  
EUPOLY9 RIM machine installed in December 2014  
EUPOLY10 RIM machine installed in October 2013

Special Condition I.1. VOC, acetone and methyl acetate combined limit of 89.7 tpy, based on a rolling 12-month period and calculated at the end of each calendar month, for all 10 machines. Since permit was only issued August 12, 2015, facility only has 6 months emissions data (July-December 2016). Facility calculated 27.5 tons of emissions. See attached records.

Special Condition I.2. VOC limit of 50.0 tpy, based on a rolling 12-month period and calculated at the end of each calendar month, for EUPOLY6. Since permit was only issued August 12, 2015, facility only has 6 months emissions data (July-December). Facility calculated 8.4 tons of emissions. See attached records.

Special Condition I.3. VOC limit of 47.0 tpy, based on a rolling 12-month period and calculated at the end of each calendar month, for EUPOLY2, EUPOLY3 and EUPOLY5. Since permit was only issued August 12, 2015, facility only has 6 months emissions data (July-December). Facility calculated 16.7 tons of emissions. See attached records.

Special Condition I.4. VOC limit of 43.0 tpy, based on a rolling 12-month period and calculated at the end of each calendar month, for EUPOLY7, EUPOLY9 and EUPOLY10. Since permit was only issued August 12, 2015, facility only has 6 months emissions data (July-December). 12-month projection (0.1 ton) is below limit. See attached records.

Special Condition I.5. VOC limit of 36.0 tpy, based on a rolling 12-month period and calculated at the end of each calendar month, for EUPOLY1 and EUPOLY8. Since permit was only issued August 12, 2015, facility only has 6 months emissions data (July-December). 12-month projection (0.1 ton) is below limit. See attached records.

Special Condition I.6. Dimethylformamide (DMF) limit of 58.5 lbs./day for EUPOLY4 and EUPOLY8. Only coating F988 contains DMF. DMF emissions are calculated daily based on production records. Staff conducted random check of daily records for October 2015. Daily DMF emission is below limit. See attached records.

Special Condition I.7. Dimethylformamide (DMF) limit of 20.9 lbs./day for EUPOLY1 and EUPOLY8. Only coating F988 contains DMF. DMF emissions are calculated daily based on production records. Staff conducted random check of daily records for October 2015. Daily DMF emission is below limit. See attached records.

Special Condition II.1. Non-automotive paint coatings has a VOC limit of 6.5 lbs./gal, minus water, as applied. Coatings are used as applied. If ever a solvent is needed, acetone is used. Facility uses 2 coatings, Performix F988 (6.2 lbs. VOC/gallon, less water) and F953 (6.4 lbs. VOC/gallon, less water).

Special Condition II.2. Mold release has a VOC content limit of 6.4 lbs./gal (minus water), as applied. Facility has 2 suppliers for the mold release: Stoner and Chem Trend. Stoner has a VOC content of 5.44 lbs./gal, less water; Chem Trend has a VOC content of 6.24 lbs./gal, less water. The mold release consists of aliphatic hydrocarbons and VM & P Naphta, no Hazardous Air Pollutants.

Special Condition III.1. All waste materials are stored in closed containers. This facility generates approximately one drum per year of hazardous waste.

Special Condition III.2. Spent filters are disposed of properly in the dumpster.

Special Condition III.3. VOC and HAP containing materials are handled properly to minimize fugitive emissions.

Special Condition IV.1. Facility uses HVLP spray guns.

Special Condition IV.2. Dry filters are installed properly on the paint spray booths and the molding machines. Dry filters are replaced weekly.

Special Condition V.1. Facility presented manufacturer's MSD information to verify VOC content of coatings and mold release. Facility also states that paint supplier conducted an MS/GC analysis to verify VOC content.

Special condition VI.1 to VI.4. Facility keeps adequate information to verify compliance with the VOC limits. Coatings and mold release are tracked monthly through inventory. Daily production records are used to verify daily DMF emissions.

Special Condition VII. NA

Special Condition VIII. Staff did not verify stack dimensions but relied on company information for proper stack dimensions. Otto Bock stated that they actually climbed up the roof to verify stack dimensions.

Facility-wide Permit Conditions for Hazardous Air Pollutants (HAPS)

Special Condition I.1. Limit for each facility-wide individual HAP is less than 9.0 tpy based on a rolling time period and calculated at the end of each calendar month. Since permit was only issued August 12, 2015, facility only has 6 months emissions data (July-December). 12-month aggregate HAP projection (2.3 tons) is below limit; each individual HAP projection is not more than 2.3 tons. See attached records.

Special Condition I.2. Limit for facility-wide aggregate HAPs is less than 22.5 tpy, based on a rolling 12-month period and calculated at the end of each calendar month. Since permit was only issued August 12, 2015, facility only has 6 months emissions data (July-December). 12-month aggregate HAP projection (2.3 tons) is below limit. See attached records.

Special Condition I.3. Limit for facility-wide VOC is less than 90.0 tpy, based on a rolling 12-month period and calculated at the end of each calendar month. Since permit was only issued August 12, 2015, facility only has 6 months emissions data (July-December). 12-month facility-wide VOC projection (45.2 tons) is below limit. See attached records.

Special Condition II.1 Material usage limit for VOC containing materials is 258,500 lbs./year, based on a rolling 12-month period. Since permit was only issued August 12, 2015, facility only has 6 months material usage data. 12-month projection (95,000 lbs) is below limit. See attached records.

Special Condition III. NA

Special Condition IV. NA

Special Condition V.1. Facility presented manufacturer's formulation information to verify HAP content of coatings. There are no HAPs in the mold release agent.

Special Condition VI.1. Facility has a spreadsheet to enable them to calculate emissions on a monthly basis.

Special Condition VI.2 and VI.3. Facility keeps adequate information to verify compliance with the HAPs and VOC limits.

Special Condition VII, VIII, and IX. NA

NAME J. A. Z.

DATE 02-26-16

SUPERVISOR CJE

