



Emission Summary and Dispersion Modelling Report

Colourfast Custom Coatings Ltd.

131 Planchet Road, Concord, Ontario

L4K 2C6

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July 2014

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Executive Summary and Emission Summary Table

Overview of ESDM Report

This Emission Summary and Dispersion Modelling (ESDM) Report was prepared in response to the instructions contained in the Air Facility Inspection Report prepared by the Ministry of the Environment (MOE) in relation to their inspection on May 20, 2014 of the facility located at 131 Planchet Road, Concord (Vaughan), Ontario, operated by Colourfast Custom Coatings Ltd. The ESDM Report was prepared in accordance with s.26 of Ontario Regulation 419/05 ("O. Reg. 419/05" as amended). In addition, guidance in the Ontario Ministry of the Environment (MOE) publication "*Procedure for Preparing an Emission Summary and Dispersion Modelling Report*" dated March 2009 (ESDM Procedure Document) was followed as appropriate.

Colourfast Custom Coatings Ltd. (Client) operates their facility under an existing environmental approval, originally granted in 1993, for which the company name was updated in 2011. The MOE has requested that an updated ESDM report be prepared using current modelling techniques and methodologies.

The North American Industrial Classification (NAICS) code that applies to this facility is 332810 – Coating, Engraving, Heat Treating, and Allied Activity. This NAICS code is listed in Schedule 5 of O. Reg. 419/05. Therefore, Site assessment for compliance for significant contaminants from significant sources was performed using an approved dispersion model (AERMOD) and the standards listed in Schedule 3 of O. Reg. 419/05, as well as the applicable limits listed in the MOE publication "*Summary of O. Reg. 419 Standards and Guidelines to support Ontario Regulation 419: Air Pollution - Local Air Quality*" dated April 2012 (List of MOE POI Limits).

Expected emissions from the operations of the facility include chemicals used in the pre-treatment of parts for powder coating; products from natural gas combustion at the facility; and dry spray powders from a small batch spray booth used to supplement the main production line, for touch up and one off jobs.

The maximum Point of Impingement (POI) concentrations were calculated based on the operating conditions where significant sources are operating simultaneously at their individual maximum rates of production.

Emissions from the pre-treatment of parts, as well as most emissions from the small batch spray booth were identified as negligible. Modelling was conducted for NO_x, particulate matter, and Triglycidyl Isocyanurate emissions.

A POI concentration for each significant contaminant emitted from the Site was calculated based on the calculated emission rates and the output from the approved dispersion model; the results are presented in the following Emission Summary Table in accordance with s.26 of O. Reg. 419/05.

The predicted POI concentrations listed in the Emission Summary Table are below their corresponding limits.

In summary, this ECA (Air and Noise) application demonstrates that the facility complies with applicable regulatory and MOE requirements under Section 9 of the EPA.

Table 4: Emission Summary Table

Contaminant Name	Contaminant CAS #	Maximum Facility Emission Rate (g/s)	Air Dispersion Model Used	Maximum POI Concentration (ug/m3)	Averaging Period (hours)	MOE POI Limit (ug/m3)	Limiting Effect	Regulation Schedule #	Percentage of MOE POI Limit (%)
NOx	11104-93-1	1.05E-01	AERMOD	213.98	1	400	Health	Schedule 3	53%
				83.24	24	200	Health	Schedule 3	42%
Particulate Matter	-	3.13E-02	AERMOD	103.11	24	120	Visibility	Schedule 3	86%
Triglycidyl Isocyanurate	2451-62-9	9.13E-05	AERMOD	0.290	0.5	0.36		JSL	81%
				0.117	24	0.12		JSL	98%

1.0 INTRODUCTION AND FACILITY DESCRIPTION

This ESDM Report was prepared in accordance with s.26 of Ontario Regulation 419/05 ("O. Reg. 419/05" as amended). In addition, guidance in the Ontario Ministry of the Environment (MOE) publication "*Procedure for Preparing an Emission Summary and Dispersion Modelling Report*" dated March 2009 (ESDM Procedure Document) was followed as appropriate.

For ease of review, and to promote clarity this ESDM Report is structured similarly to the items listed in the MOE publication "*Emission Summary and Dispersion Modelling Report Checklist*"

1.1 PURPOSE AND SCOPE OF ESDM REPORT

This Emission Summary and Dispersion Modelling (ESDM) Report was prepared in response to the instructions contained in the Air Facility Inspection Report prepared by the Ministry of the Environment (MOE) in relation to their inspection on May 20, 2014 of the facility located at 131 Planchet Road, Concord (Vaughan), Ontario, operated by Colourfast Custom Coatings Ltd.

The facility includes an office, as well as a manufacturing area housing the company's machinery for cleaning and powder coating of metal products.

The manufacturing facility occupies approximately 1,750 m².

Potential emissions from the operation of the facility include chemical products used to clean and seal the metal parts, as well as combustion products from the burning of natural gas to provide heat for ovens and hot water associated with the metal cleaning and powder coating process. Other emissions from the operation were expected to include chemicals used in the pre-treatment section of the main powder coating line, as well as emissions from a small spray booth which is not part of the main production line.

1.2 DESCRIPTION OF PROCESS AND NAICS CODES

This facility falls under the NAICS Code: 3328 – Coating, Engraving, Heat Treating, and Allied Activity. This NAICS code is listed in Schedule 5 of O. Reg. 419/05, and is therefore subject to the Emission Standards outlined in Schedule 3 of O. Reg. 419/05.

The production process which takes place at the facility is concerned with the powder coating of metal parts and components. The coating process is operated continuously, with metal parts transported on a circuit through a variety of activities.

The main powder coating process involves four stages, pre-treatment, drying, powder coating, and curing. In addition to the main coating process, the facility also operates batch production units, and comfort heating systems.

The Client reported that the equipment in use at the facility was purchased used and/or was of sufficient age that they were unable to provide any information regarding model numbers, manufacturers, or operating parameters. As such, information was obtained directly from the previous environmental approval, ID plates on the equipment, or from manufacturer's specifications where possible; and estimated from similar equipment where precise specifications were unavailable, as noted below.

Information regarding the location and dimensions of stacks was measured directly from the facility roof.

1.2.1 PRE-TREATMENT

The pre-treatment section takes place in an integrated unit which includes both a water heater, and a process chamber where parts are sprayed with heated water mixed with a solution of phosphoric acid. The unit is connected to three vent stacks, one for the combustion unit, and two for the process chamber. The stack dimensions and location were measured on the facility roof.

The ID plate on the unit indicated that the unit was a "3 Stage Power Washer" produced by *Advance Process Equipment*, with a maximum input of 2.5 million BTU; but included no further information regarding operating temperature, or exhaust rates. Advance Process Equipment was unavailable at the contact information listed on the ID plate, and is believed to have gone out of business.

Exhaust rates for the pre-treatment stacks were obtained from the previous environmental approval for the facility. This equipment is reported to be unchanged since the filing of the previous approval.

The water heater was identified as a Maxon model *10-25 Tube-O-Flame* burner, for which a specification sheet was obtained.

The phosphoric acid solution used in the pre-treatment is *Dynaphos IP LAF*, manufactured by Dynamix Inc. The maximum recommended water temperature to use with this compound is 65 °C.

1.2.2 DRYING

The drying section takes place in a drying oven, which is attached to one vent stack, venting hot air and combustion products.

The ID plate on the unit indicated that the oven was a "Dry Off Oven" produced by *Advance Process Equipment*, with a maximum input of 1.5 million BTU, and a temperature rise of 200 °F, but included no further information regarding exhaust rates.

The exhaust rate for the drying stack was obtained from the previous environmental approval for the facility. This equipment is reported to be unchanged since the filing of the previous approval.

The burner was identified as an Eclipse model *120 AH*, for which a specification sheet was obtained.

1.2.3 POWDER SPRAYING

The powder spraying section takes place in an integrated spray booth – dust collector, which exhausts back into the building. Since no emissions are released from the building, this is not considered an emission source.

1.2.4 CURING

The curing section takes place in a baking oven, which is attached to two vent stacks. One vent stack is unpowered, and relies on convection to drive air movement. This stack is located at the exit of the oven, and is intended to reduce hot air emissions into the facility. The other vent stack is powered, and vents hot air and combustion products. Note that for the purposes of modelling, it was assumed that 100% of combustion products would be vented from the powered stack.

The ID plate on the unit indicated that the oven was a “Powder Cure Oven” produced by *Advance Process Equipment*, with a maximum input of 2 million BTU, and a 3 HP exhaust air motor, but included no further information regarding exhaust rates.

The exhaust rate for the powered curing stack was obtained from the previous environmental approval for the facility. This equipment is reported to be unchanged since the filing of the previous approval.

1.2.5 BATCH PROCESSES

In addition to the main production line outlined above, the facility also maintains a small batch curing oven, and batch spray booth. These are used for touch up work, as well as smaller jobs.

The curing oven ID plate indicates that it uses an Eclipse model *80 AH* oven, and a Midco model *G 56* afterburner. The ID plate also indicated that the oven has a maximum temperature of 400 °F, and a maximum heat input of 0.75 million BTU x2 (1.5 million BTU total). Specification sheets were obtained for both burners and the air ventilation exhaust rate was obtained from the previous environmental approval for the facility. This equipment is reported to be unchanged since the filing of the previous approval.

The spray booth was manufactured by *HiTech Air Systems Inc.*, however it is a custom made spray booth, and neither the Client nor the original manufacturer were able to provide specifications for the design. Typical spray booths of this kind manufactured by HiTech have air

flow rates of 100 scfm per square foot of face opening, and use *Andraee* filters, which have paint arrestance efficiencies of at least 99.4%.

1.2.6 COMFORT HEATING

The facility maintains comfort heating equipment including six natural gas fired unit heaters and one natural gas fired RTU. These units are rarely used, as the process ovens typically keep the facility more than comfortably warm, especially in summer months. For the purposes of obtaining a conservative model, it was assumed that the comfort heating equipment operated at all times.

The RTU is a York model *ZF060N10N5AAA2A*, a specification sheet for the unit was obtained.

The six indoor unit heaters were manufactured by *Clare Brothers*, a company which is no longer in business. Product data and specifications sheets were not available from the Client, nor could they be found from third party sources. Estimated maximum BTU input was obtained from known specifications of similar units. Estimated exhaust air flows were obtained based on the *NFPA 54: National Fuel Gas Handbook, 2012 Edition* published by the National Fire Protection Association. Section 9.3 of the handbook indicates that combined air intake for a gas fired furnace will be at least 1,500 ft³/hr for every 100,000 BTU of gas input.

Note that the total maximum heat input of all comfort heating sources at the facility is less than 1.58 million kJ/hr, and therefore the comfort heating systems at the facility are not eligible for the EASR.

1.3 DESCRIPTION OF PRODUCTS AND RAW MATERIALS

The raw materials for the processes are miscellaneous metal parts, metal cleaning and sealing products, and powders used in the powder coating process.

The products of the processes are powder coated metal parts.

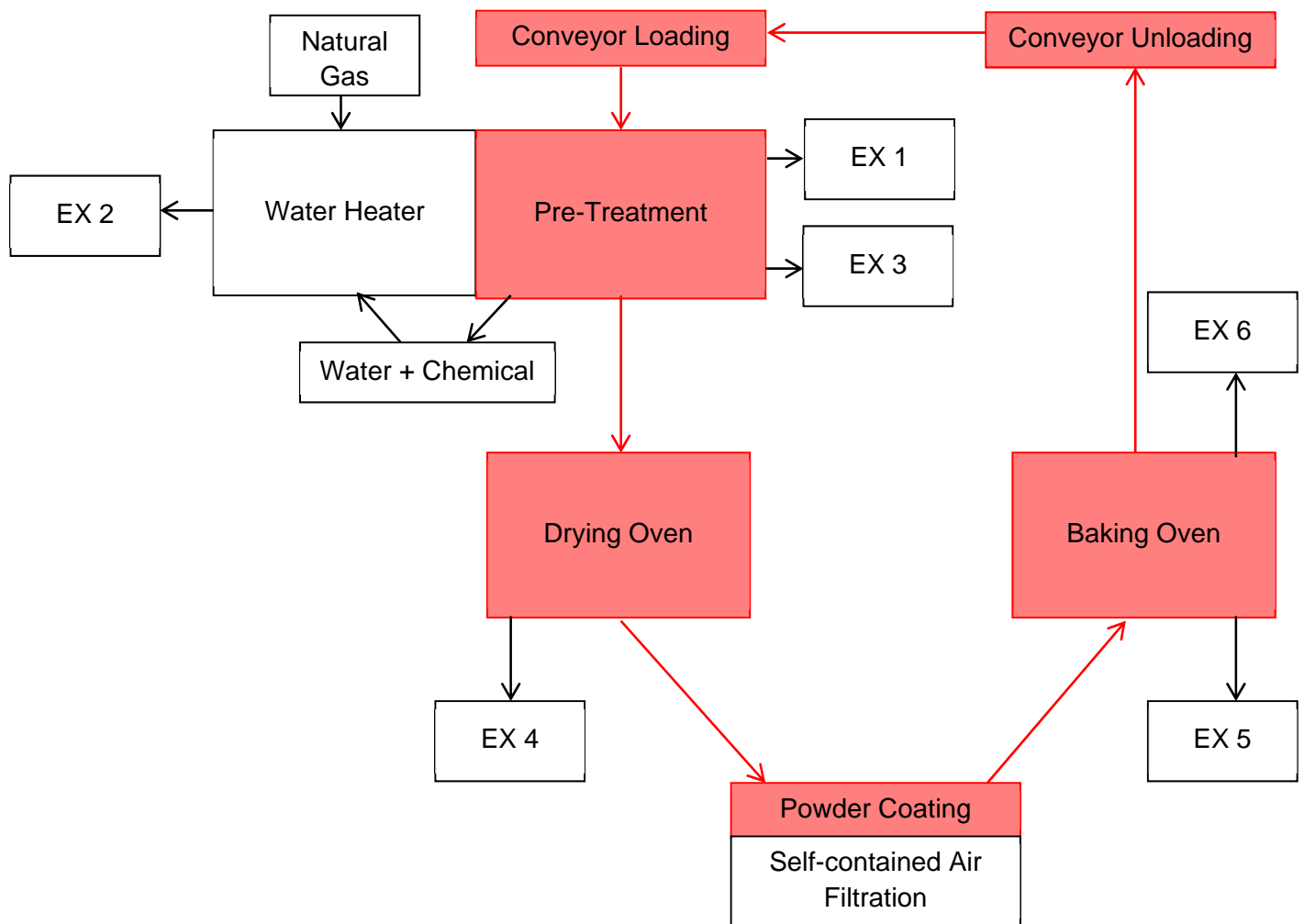
The water and chemicals used for the pre-treatment section are recycled to reduce waste and emissions in the process, with some losses to steam and mist which are replenished as the process operates.

1.4 PROCESS FLOW DIAGRAM

Please see the following process flow diagram for a graphical representation of the process. The diagram is structured similarly to the actual plant layout, and reflects the continuous nature of the operation.

1.4.1 CONTINUOUS PROCESS FLOW

The process flow of actual product is shaded, side streams are unshaded.



1.5 OPERATING SCHEDULE

Normal business hours for the manufacturing facility are between 7 am and 5 pm, Monday to Friday. Normal operating hours were used for the purposes of emission hourly estimation rate estimation, when using data from longer averaging periods, however modelling was conducted under the assumption that the hourly emission rates would take place 24 hours per day, 7 days per week.

NOx emission rates were calculated by an emission factor, independent of operating hours, and were assumed to be emitted 24 hours per day, 7 days per week for the purposes of modelling.

2.0 INITIAL IDENTIFICATION OF SOURCES AND CONTAMINANTS

This section provides an initial identification of the sources and contaminants emitted at the Facility, as required by subparagraph 2 to 4 of s.26 (1) of O. Reg. 419/05.

Table 1: Sources and Contaminants Identification Table

See Appendix A: Tables for Table 1.

Sources associated with this facility are labelled on the attached site plan, and include the stacks associated with pre-treatment, drying, curing, and batch spraying and curing, as well as the comfort heating.

2.1 DESCRIPTION OF SOURCES AND CONTAMINANTS

2.1.1 PRE-TREATMENT CONTAMINANTS

The pre-treatment washing uses a mixture of Dynamix Inc. *Dynaphos IP LAF* and water to clean and treat parts prior to powder coating. Up to 2 L/hr of *Dynaphos IP LAF* is expected to be used in the pre-treatment process. *Dynaphos IP LAF* contains phosphoric acid as the active ingredient, which may be released as a contaminant.

Specific Emissions are as follows:

- Pre-Treatment chemical emissions resulting from the use of *Dynaphos IP LAF*, at a maximum rate of 2 L/hr.

2.1.2 COMBUSTION CONTAMINANTS

Note that in accordance with the *Procedure for Preparing an ESDM Report, Section 7.1.1 Combustion of Natural Gas and Propane*, it was assumed that the only significant emission from natural gas combustion is NOx.

Natural gas combustion occurs in four process areas, and for comfort heating, as outlined below:

- Pre-Treatment Water Heater (Max Input: 2.64 million kJ [2.5 MMBTU])
- Drying Oven (Max Input: 1.58 million kJ [1.5 MMBTU])
- Curing Oven (Max Input: 2.11 million kJ [2 MMBTU])
- Batch Oven (Max Input: 1.58 million kJ [1.5 MMBTU])
- Comfort Heating (Total Max Input: 1.08 million kJ [1.025 MMBTU])

The total estimated heat input of comfort heating equipment subject to this application is less than 1.58 MMkJ/hr, therefore it is not subject to the EASR.

2.1.3 SPRAY BOOTH CONTAMINANTS

Total powder use at the facility was estimated based on monthly consumption data for the month of June, 2014, where approximately 3000 kg of powders were used, or a maximum of 19 kg/hr. Potential emissions from these powders include particulate matter and component chemicals.

Specific Emissions are as follows:

- Particulate and chemical emissions resulting from the use of up to 19 kg/hr of sprayed on powders in the small batch spray booth.

2.1.4 OTHER SOURCES

No odours are anticipated to result from the operation of the facility.

Two stacks at the facility are used to provide indoor air ventilation. As the exhaust from these stacks is not associated with any production process, it is not expected to contain contaminants.

The facility does not fall under a NAICS code for which fugitive dust sources would normally be considered, and no fugitive dust sources were identified at the facility.

3.0 ASSESSMENT OF THE SIGNIFICANCE OF CONTAMINANTS AND SOURCES

This section provides information and rationale for the identification of negligible contaminants and sources. This allows facilities to focus on significant contaminants and sources.

3.1 IDENTIFICATION OF NEGLIGIBLE CONTAMINANTS AND SOURCES

The following contaminant(s) were identified as negligible, and as such were not included in the emission modelling. These contaminants were found to be emitted in amounts lower than the emission thresholds calculated based on the applicable screening concentrations and dispersion factors. Please refer to Appendix C: Detailed Calculations.

- Ex 1, Ex 3 – Pre-treatment exhaust phosphoric acid
- Ex 8 – Chemical contaminants other than total particulate matter from small batch spray booth.

The following source(s) were identified as negligible, they are not predicted to emit any significant contaminants.

- Ex 6 – Curing oven hot air exhaust
- Ex 1 – Pre-treatment exhaust (start)
- Ex 3 – Pre-treatment exhaust (end)
- Ex 16 – Indoor air ventilation
- Ex 17 – Indoor air ventilation
- Ex 15 – Roof top unit

3.2 RATIONALE FOR ASSESSMENT OF NEGLIGIBLE CONTAMINANTS

3.2.1 EX 1, EX 3 – PRE-TREATMENT EXHAUST PHOSPHORIC ACID

The pre-treatment section uses a solution of *Dynaphos IP LAF* in water to clean and prepare the metal parts for powder application. The only component listed on the MSDS for *Dynaphos IP LAF* is phosphoric acid at between 7 and 13 wt%. The process is operated at approximately 60°C.

Phosphoric acid has a very low vapour pressure, and vapours emitted from phosphoric acid solutions at temperatures lower than approximately 300°C contain virtually no phosphoric acid, as noted in the *Purified Phosphoric Acid Technical Information Bulletin* published by PotashCorp (Page 20).

Therefore, phosphoric acid is not expected to be released in any significant amount by this process.

3.2.2 EX 8 – POWDER SPRAY CHEMICALS

The facility utilizes hundreds of different powders to colour its products in the small batch spray booth, and typically uses only a small amount of any individual powder.

Powders typically consist of an inert filler material, a colouring agent, and a polymerizing agent. The precise chemical makeup of each powder varies, however a representative sample of the powders most commonly used at the facility was analysed to assess significance.

The representative powders were:

- Protech Oxyplast: HX-622-N53
- Prism Powder Coatings: EB-0182-S
- Prism Powder Coatings: HI-106-M
- Prism Powder Coatings: PW-0765-H
- Sherwin Williams: PE96-E6603

Based on the MSDS for the above noted powders, the following compounds were found to be present in the powders used at the facility, negligibility was assessed by emission thresholds, under the assumption that the full 3000 kg of powder used in the small batch spray booth would have a similar composition proportion to the representative powder sample:

Compound	CAS #	Total Mass (kg)	Wt% Among Representative Powders	Screening Limit Basis	Projected Emissions Above Emission Threshold?
Total Powder	-	962	100%	-	-
Aluminum Hydroxide	21645-51-2	1.56	0.16%	De-Minimus	Yes, but Non-Toxic
Barium Sulphate	7727-43-7	24.00	2.49%	De-Minimus	Yes, but Non-Toxic
Bisphenol-A Epoxy Resin	25036-25-3	11.59	1.21%	De-Minimus	Yes, but Non-Toxic
Calcium Carbonate	471-34-1	0.02	0.00%	JSL	No
Carbon Black	1333-86-4	0.59	0.06%	Schedule 3 Standard (Soiling)	No
Crystalline Syllica	14808-60-7	0.11	0.01%	Schedule 3 Guideline (Health)	No
Pyromellitic Acid	54553-90-1	0.42	0.04%	De-Minimus	No
Silicon Dioxide Amorphous	7631-86-9	1.56	0.16%	JSL	No
Talc	14807-96-6	0.22	0.02%	Schedule 3 Guideline (Health)	No
Titanium Dioxide	13463-67-7	18.74	1.95%	Schedule 3 Guideline (Health)	No
Triglycidyl Isocyanurate	2451-62-9	2.81	0.29%	JSL	Yes

As noted above, most of the potential contaminants were determined to be negligible. This is considered to be a conservative estimation, because the addition of the myriad other powders

used in small amounts, with unique chemical formulations to the wt% averaging formula is expected to have a diluting effect on every individual chemical compound.

Of the compounds which were found to be emitted in significant amounts, Aluminum Hydroxide is non-hazardous, as noted in the MSDS, attached. Barium Sulphate and Bisphenol-A Epoxy Resin are both also non-toxic, though they may cause mild allergic reactions or irritation as noted in their MSDSs, attached. These compounds are therefore considered to be negligible, despite their exceedence of the De-Minimus standard.

The remaining compound, Triglycidyl Isocyanurate, was modelled using AERMOD.

3.3 RATIONALE FOR ASSESSMENT OF NEGLIGIBLE SOURCES

3.3.1 EX 6 – CURING OVEN HOT AIR EXHAUST

The curing oven utilizes two stacks; however only one of the stacks has a fan, the other stack (Ex 6) relies on convection to drive air flow, and is intended primarily to divert hot air which would otherwise enter the facility. For the purposes of modelling, it was assumed that 100% of the emission from the oven would be emitted through the powered stack.

3.3.2 EX 1, EX 3 – PRE-TREATMENT SECTION EXHAUST

As noted above, phosphoric acid used in the pre-treatment section is not expected to result in any significant contaminants, therefore no significant contaminants are expected to be released from these sources.

3.3.3 EX 16, EX 17 – INDOOR AIR VENTILATION

Two of the stacks at the facility are used for indoor air ventilation. As these stacks are not associated with any production processes, they are not expected to be a source of emissions.

3.3.4 EX 15 – ROOF TOP UNIT

The roof top unit has a natural gas heating function, however the total predicted NO_x output from the unit is less than 5% of the total NO_x emissions from the facility, and would not push the facility NO_x POI concentration above the regulated standard. Therefore this source is considered negligible.

4.0 OPERATING CONDITIONS, EMISSION RATE ESTIMATING AND DATA QUALITY

This section provides a description of the operating conditions used in the calculation of the emission estimates and an assessment of the data quality of the emission estimates for each

significant contaminant from the Facility as required by the subparagraphs 6 and 7 of s.26 (1) of O. Reg. 419/05.

4.1 DESCRIPTION OF OPERATING CONDITIONS

Paragraph 1 of s.10 of O. Reg. 419/05 states that the approved dispersion model must be used with operating conditions that result in the maximum POI concentration, according to the averaging period for the relevant MOE POI Limit corresponding to that contaminant.

The following sections describe the operating conditions at the facility which represent actual or theoretical maximum

4.1.1 COMBUSTION EMISSIONS

The operating condition which would result in the maximum POI concentration for NO_x corresponds to all natural gas combusting units operating simultaneously at full capacity. For this reason, NO_x emissions were estimated using emission factors and the maximum thermal inputs of the subject units, as defined by manufacturer's specifications.

4.1.2 SPRAY BOOTH EMISSIONS

The operating condition which would result in the maximum POI concentration for particulate matter emissions from the small batch spray booth was estimated based on the total monthly powder usage for June 2014. Monthly powder usage was reported to be 2867.5 kg in the month of June, 2014; this number was rounded up to 3,000 kg, and divided amongst 20 working days at 8 hours per day. The spray booth filter efficiency was taken to be 99.4%, based on manufacturer's specifications. It was assumed that 100% of the powder used would be vented through the filter.

Actual emissions are predicted to be lower than the predicted levels due to the following reasons:

- Actual powder losses from the process would be significantly less than 100%
- Actual operating hours may exceed 8 per day, resulting in lower average hourly powder use.

4.2 EXPLANATION OF METHODS USED TO CALCULATE EMISSION RATES

The maximum emission rates for each contaminant emitted from the significant sources were calculated in accordance with the requirements of the ESDM Procedure Document.

The emission rate for each contaminant emitted from a significant source was estimated and the methodology for the calculation is documented in Table 2 – Source Summary Table.

4.3 SAMPLE CALCULATIONS

For the processes in use at the facility, emission rates were calculated using mass balances and emission factors. Detailed sample calculations are included below.

4.3.1 SAMPLE CALCULATION 1 (EMISSION FACTORS)

The *Procedure for Preparing an ESDM Report* documents that the US EPA's AP-42 Emission Factors are acceptable forms of emission estimation. For this facility, NOx emissions were estimated using the AP-42 *Table 1.4-1: Emission Factors for Nitrogen Oxides (NOx) and Carbon Monoxide (CO) from Natural Gas Combustion*.

The combustor type referenced was a small, uncontrolled boiler. The formula to be applied is as follows:

$$Q = EF * C * BTU$$

Where:

Q is the emission rate of NOx in [g/s]

EF is the emission factor in [lb/10⁶ scf]

C is a unit conversion

BTU is the thermal output of the boiler or HVAC unit in [MMBtu/hr]

A sample calculation for the NOx emission rate from the water heater is as follows:

$$EF = 100 \text{ lb}/10^6 \text{ scf}$$

$$C = 453.592 \text{ g}/\text{lb}; 3600 \text{ s}/\text{hr}; 1020 \text{ (lb}/10^6 \text{ scf)} / \text{ (lb}/\text{MMBtu})$$

$$BTU = 2.5 \text{ MMBtu}/\text{hr}$$

$$Q = 100 \frac{\text{lb}}{10^6 \text{ scf}} * \frac{1}{1020} \frac{\text{lb}/\text{MMBtu}}{\text{lb}/10^6 \text{ scf}} * 453.592 \frac{\text{g}}{\text{lb}} * 2.5 \frac{\text{MMBtu}}{\text{hr}} * \frac{1}{3600} \frac{\text{hr}}{\text{s}} = 3.09e - 2 \text{ [g/s]}$$

For a summary of all calculations see Appendix C: Detailed Calculations.

4.3.2 SAMPLE CALCULATION 2 (MASS BALANCE, PARTICULATE MATTER)

Emissions from small batch spray booth were calculated by a mass balance, as follows, which is considered a conservative method, due to the assumption that all powder would be lost.

The equation to be used for estimation of mass balance emission rates is as follows:

$$Q = P * (1 - F) * C$$

Where:

Q is the emission rate of a contaminant in [g/s]

P is the quantity of powder used in the reference month [kg/month]

F is the filter efficiency [%]

C is a unit conversion

A sample calculation for particulate matter is as follows:

P = 3,000 kg/month of powder

F = 99.4 % filter efficiency

C = 1/ (20 days/month * 8 hours/day * 60 minutes/hour * 60 seconds/minute)
= 1.73x10⁻⁶ months/second

$$Q = 3000 \frac{kg}{month} * (1 - 0.985) * 1.73e - 6 \frac{months}{s} * 1000 \frac{g}{kg} = 0.93e - 2 [g/s]$$

For a summary of all calculations see Appendix C: Detailed Calculations.

4.3.3 SAMPLE CALCULATION 3 (EMISSION THRESHOLD)

Emission thresholds were identified for each contaminant emitted from a potentially significant source at the facility, and were compared to the actual estimated emission rates to assess the significance of each contaminant, as outlined in the *Procedure for Preparing an ESDM Report, Section 7.1.2: Identifying Significant Contaminants Using an Emission Threshold*.

The following general equation was used in the development of emission thresholds:

$$ET = \frac{SL}{DF}$$

Where:

ET is the emission threshold in [g/s]

SL is the screening limit in [µg/m³]

DF is the dispersion factor in [(µg/m³)/(g/s)]

Screening limits were assessed in three ways:

- For contaminants with Schedule 3 standards, the screening limit was taken to be half of that standard
- For de-minimus concentrations, the screening limit was taken to be the de-minimus concentration (0.1 µg/m³)

Dispersion factors were calculated based on the 20m urban dispersion factor listed in the *Procedure for Preparing an ESDM Report, Table B-1: Guidance for Screening-Out with Dispersion Factors*. The listed dispersion factor for 1hr averaging was 8700 ($\mu\text{g}/\text{m}^3$)/(g/s).

Although the dispersion factor is only listed for 1hr averaging, it can be adjusted to correlate to screening limits based on other averaging periods by using *Procedure for Preparing an ESDM Report, Table 7-1: Averaging Period Correction Factor* as follows:

$$DF_i = DF_1 * \left(\frac{1}{t_i}\right)^{0.28}$$

Where:

DF_i is the corrected dispersion factor for averaging time i in [$(\mu\text{g}/\text{m}^3)$]/(g/s)]

DF₁ is the dispersion factor for 1hr averaging in [$(\mu\text{g}/\text{m}^3)$]/(g/s)]

t_i is the averaging time i in [hr]

A sample calculation for the screening threshold of Bisphenol-A Epoxy Resin, based on the de-minimus limit is as follows:

$$t_i = 24 \text{ hr}$$

$$DF_1 = 8700 (\mu\text{g}/\text{m}^3)/(\text{g}/\text{s})$$

$$\text{de-minimus} = 0.1 \mu\text{g}/\text{m}^3$$

$$SL = 0.1 \mu\text{g}/\text{m}^3$$

$$ET = \frac{0.1 \frac{\mu\text{g}}{\text{m}^3}}{8700 \frac{\mu\text{g}/\text{m}^3}{\text{g}/\text{s}} * \left(\frac{1\text{hr}}{24\text{hr}}\right)^{0.28}} = 2.80\text{e} - 5 [\text{g}/\text{s}]$$

For a summary of all calculations see Appendix C: Detailed Calculations.

4.4 ASSESSMENT OF DATA QUALITY

This section provides an assessment of the data quality of the emission estimates for each significant contaminant from the Facility as required by subparagraph 7iii of s.26 (1) of O. Reg. 419/05. Assessments of data quality are intended to provide verification that the methods of emission estimation employed are unlikely to underestimate the actual emission rates.

The data quality for each of the contaminant(s) is documented in Table 2 – Source Summary Table.

4.4.1 NO_x EMISSIONS

The NO_x emission rates were developed using an EPA emission factor with a rating of B, therefore the emission estimate is considered to be of *Above Average Data Quality*.

4.4.2 MASS BALANCES (PARTICULATE MATTER)

Mass balance based emission estimates for particulate matter are considered to be of *Average Data Quality* because:

- 100% of the material is accounted for (it was assumed that all material put into the process was vented to the atmosphere or captured by the filter working at specified minimum efficiency);
- It is reasonable to assume that the compounds in question would not undergo chemical reactions or transformations through the source or process; but
- The usage averaging period is greater than the averaging period for the air quality standard

4.4.3 MASS BALANCES (POWDER CHEMICALS)

Mass balance based emission estimates for the colouring agents in powder chemicals are considered to be of "Marginal" data quality because:

- 100% of the material is accounted for (it was assumed that all material put into the process was vented to the atmosphere or captured by the filter working at specified minimum efficiency);
- It is reasonable to assume that the compounds in question would not undergo chemical reactions or transformations through the source or process; but
- Chemical compositions of representative individual powders were taken to be representative of the powders in general; and
- The usage averaging period is greater than the averaging period for the air quality standard.

5.0 SOURCE SUMMARY TABLE AND PROPERTY PLAN

This section provides the table required by subparagraph 8 and the site plan required by subparagraph 9 of s.26 (1) of O. Reg. 419/05.

Table 2: Source Summary Table

See Appendix A: Tables for Table 2.

5.1 SITE PLAN

See Appendix B: Drawings for the Site Plan.

6.0 DISPERSION MODELLING

This section provides a description of how the dispersion modelling was completed for contaminants that are emitted by the Facility to predict the maximum POI concentrations, as required by subparagraphs 10 to 13 of s.26 (1) of O.Reg. 419/05.

Dispersion modelling was conducted in accordance with the MOE's "Air Dispersion Modelling Guideline for Ontario" dated March 2009, PIBS 5165e (ADMGO). A general description of the input data used in the dispersion model is provided below and summarized by AERMOD in Table 3.

The use of a more refined model, such as AERMOD, is necessary when assessing air quality against Schedule 3 standards. It is also applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources).

The AERMOD modelling system is made up of the AERMOD dispersion model, the AERMET meteorological pre-processor and the AERMAP terrain pre-processor.

6.1 DISPERSION MODELLING INPUT SUMMARY TABLE

A description of the way in which the approved dispersion model was performed is included in Table 3. This table meets both the requirements of s.26 (91) 11 and Sections 8-17 of O.Reg. 419/05 and follows the format provided in the ESDM Procedure Document.

As per Section 4.5 of the ADMGO, the significant sources at the Facility were classified as point, area, or volume sources. The source data required for each source was determined according to the procedures provided in ADMGO and presented in the Dispersion Modelling Plan. The dispersion modeling input parameters are summarized in Table 3.

Table 3: Dispersion Modelling Input Summary Table

See Appendix A: Tables for Table 3.

6.2 COORDINATE SYSTEM

The Universal Transverse Mercator (UTM) coordinate system, as per Section 5.2.2 of the ADMGO, was used to specify model object sources, buildings and receptors. The coordinates were defined in the North American Datum of 1983 (NAD83).

6.3 METEOROLOGY AND LAND USE DATA

Subparagraph 10 of s.26 (1) of O.Reg. 419/05 requires a description of the local land use conditions if meteorological data described in paragraph 2 of s.13 (1) of O.Reg. 419/05 was used.

The Facility is located at 131 Planchet Road, Vaughan, Ontario, and was modelled using appropriate local information.

The AERMOD model was run using the *Central Region - Toronto, York-Durham, Halton-Peel*, AERMOD Ready Dataset published by the MOE for Urban land use. Surface data is based on readings taken at Toronto Pearson Airport, and upper air data is based on readings taken at Buffalo.

6.4 TERRAIN

Terrain data used in this assessment was obtained from the USGS DEM database for the 15-Minute Format, and has a resolution of approximately 60 meters over the study area.

6.5 RECEPTORS

For contaminants other than odour, receptors were chosen based on recommendations provided in Section 7.1 of the ADMGO, which is in accordance with s.14 of O.Reg. 419/05. Specifically, a nested receptor grid, based on an area that is bounded by a rectangle than encloses every source of contaminants, and spaced out as follows:

- 20m spacing within a distance of 200m from the bounding rectangle;
- 50m spacing from 200m to 500m from the bounding rectangle;
- 100m spacing from 500 to 1000m from the bounding rectangle;
- 200m spacing from 1000m to 2000m from the bounding rectangle; and
- 500m spacing from 2000m to 5000m from the bounding rectangle.

There is no child care facility, health care facility, senior's residence, long-term care facility or an educational facility located at the Facility. As such, same structure contamination was not considered.

Additionally, receptors were placed along the facility boundary at 5 meter intervals.

6.6 BUILDING DOWNWASH

Building wake effects were considered in this assessment. Building wake effects are considered using the USEPA Building Profile Input Program (BPIP-PRIME), another pre-processor to AERMOD. The inputs into this pre-processor include the co-ordinates and heights of the buildings and stacks. The output data from the BPIP is used in the AERMOD building wake effect calculations.

6.7 DEPOSITION

AERMOD has the capability to account for wet and dry deposition of substances that would reduce ground level concentrations at POIs. However, the deposition algorithm has not been implemented as only regulatory defaults have been used.

6.8 AVERAGING TIME AND CONVERSIONS

The averaging time noted in the Schedule 3 standards applied to this Facility are 1 hour and 24 hour periods. AERMOD was run for native 1 hour and 24 hour averaging.

6.9 DISPERSION MODELLING INPUT AND OUTPUT FILES

Please see the attached data storage device for dispersion modelling input and output files.

7.0 EMISSION SUMMARY TABLE AND CONCLUSIONS

7.1 EMISSION SUMMARY TABLE

NO_x emissions were evaluated for 1 and 24 hour averaging periods against the standards set out in Schedule 3, Particulate matter emissions were evaluated for the 24 hour averaging period standard set out in Schedule 3, and Triglycidyl Isocyanurate emissions were evaluated for 0.5 and 24 hour averaging periods set out in the JSL. All other identified contaminants were found to be negligible, and were not modelled.

Table 4: Emission Summary Table

See Appendix A: Tables for Table 4.

7.2 ASSESSMENT OF CONTAMINANTS WITH NO MOE POI LIMITS

The following contaminants emitted by the facility do not have MOE POI limits, and were found to be emitted in amounts greater than the de-minimus screening level:

- Bisphenol-A Epoxy Resin (CAS: 25036-25-3)
- Barium Sulphate (CAS: 7727-43-7)
- Aluminium Hydroxide (CAS: 21645-51-2)

Each of these compounds is non-toxic, and MSDS have been attached to this report.

Additionally, Pyromellitic Acid (CAS: 54553-90-1) does not have an MOE POI limit, but was found to be emitted in amounts lower than the de-minimus screening level.

8.0 CONCLUSIONS

The results of the calculated maximum concentrations of each contaminant at POIs are lower than the O. Reg. 419/05 Schedule 3 criteria, or the appropriate screening limit, therefore the facility is in compliance with the regulatory requirements in regards to air emissions.

Appendix A: Tables

Table 1: Sources and Contaminants Identification Table

Source ID	Source Information Source Description	General Location	Expected Contaminants Contaminants	Included in Modeling? Significant (Yes or No)	Reason
Ex 2	Wash Section Water Heater	Roof	NOx	Yes	
Ex 4	Dry Off Oven	Roof	NOx	Yes	
Ex 5	Powder Cure Oven	Roof	NOx	Yes	
Ex 6	Poder Cure Oven (Hot Air)	Roof	None	No	Assumed All Process Emissions Are Vented From Ex 5
Ex 7	Batch Oven	Roof	NOx	Yes	
Ex 9	Unit Heater	Roof	NOx	Yes	
Ex 10	Unit Heater	Roof	NOx	Yes	
Ex 11	Unit Heater	Roof	NOx	Yes	
Ex 12	Unit Heater	Roof	NOx	Yes	
Ex 13	Unit Heater	Roof	NOx	Yes	
Ex 14	Unit Heater	Roof	NOx	Yes	
Ex 15	Rooftop Unit	Roof	NOx	No	<5% Total NOx Emissions
Ex 16	Ambient Air Ventilation	Roof	None	No	No Contaminants
Ex 17	Ambient Air Ventilation	Roof	None	No	No Contaminants
Ex 1	Wash Section Exhaust (start)	Roof	Phosphoric Acid	No	Low Vapour Pressure
Ex 3	Wash Section Exhaust (end)	Roof	None	No	Assumed All Process Emissions Are Vented From Ex 1
Ex 8	Dry Spray Powders	Roof	Particulate Matter	Yes	
			Carbon Black	No	Maximum Predicted POI Lower Than Screening Threshold
			Talc	No	Maximum Predicted POI Lower Than Screening Threshold
			Crystalline Syllica	No	Maximum Predicted POI Lower Than Screening Threshold
			Bisphenol-A Epoxy Resin	No	Non-Toxic, Low Emissions
			Barium Sulphate	No	Non-Toxic, Low Emissions
			Pyromellitic Acid	No	Maximum Predicted POI Lower Than Screening Threshold
			Calcium Carbonate	No	Maximum Predicted POI Lower Than Screening Threshold
			Titanium Dioxide	No	Maximum Predicted POI Lower Than Screening Threshold
			Triglycidyl Isocyanurate	Yes	
			Silicon Dioxide Amorphous	No	Maximum Predicted POI Lower Than Screening Threshold
Aluminum Hydroxide	No	Non-Toxic, Low Emissions			

Table 2: Source Summary Table

Source Identifier	Source Description	Source Data							Emission Data							
		Stack Volumetric Flow Rate (m ³ /s)	Stack Exit Gas Temperature (°F) (°C)		Stack Inner Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Roof (m)	Source Co-Ordinates	Contaminant	CAS #	Maximum Emission Rate (g/s)	Averaging Period (hrs)	Emission Rate Estimating Technique	Sample Calculation Identifier	Emissions Data Quality	% Overall Emissions (%)
Ex 2	Wash Section Water Heater	0.31	180	82	0.28	9.28	1.78	620686.78, 4853341.06	NOx	11104-93-1	3.09E-02	24/1	Emission Factor	S1	Abv. Ave.	29%
Ex 4	Dry Off Oven	0.71	300	149	0.13	11.20	3.70	620660.86, 4853334.09	NOx	11104-93-1	1.85E-02	24/1	Emission Factor	S1	Abv. Ave.	18%
Ex 5	Powder Cure Oven	0.94	425	218	0.13	11.20	3.70	620671.01, 4853343.50	NOx	11104-93-1	2.47E-02	24/1	Emission Factor	S1	Abv. Ave.	23%
Ex 6	Poder Cure Oven (Hot Air)	-	425	218	0.26	8.23	0.73	620686.23, 4853345.19	-	-	-	-	-	-	-	-
Ex 7	Batch Oven	0.23	400	204	0.10	9.10	1.60	620639.28, 4853338.29	NOx	11104-93-1	1.85E-02	24/1	Emission Factor	S1	Abv. Ave.	18%
Ex 9	Unit Heater	0.02	120	49	0.23	9.05	1.55	620641.98, 4853334.56	NOx	11104-93-1	1.85E-03	24/1	Emission Factor	S1	Abv. Ave.	2%
Ex 10	Unit Heater	0.02	120	49	0.23	8.96	1.46	620651.79, 4853330.98	NOx	11104-93-1	1.85E-03	24/1	Emission Factor	S1	Abv. Ave.	2%
Ex 11	Unit Heater	0.02	120	49	0.23	9.07	1.57	620674.26, 4853337.95	NOx	11104-93-1	1.85E-03	24/1	Emission Factor	S1	Abv. Ave.	2%
Ex 12	Unit Heater	0.02	120	49	0.23	9.25	1.75	620663.84, 4853365.82	NOx	11104-93-1	1.85E-03	24/1	Emission Factor	S1	Abv. Ave.	2%
Ex 13	Unit Heater	0.02	120	49	0.23	9.21	1.71	620684.00, 4853371.85	NOx	11104-93-1	1.85E-03	24/1	Emission Factor	S1	Abv. Ave.	2%
Ex 14	Unit Heater	0.02	120	49	0.23	9.10	1.60	620685.56, 4853348.57	NOx	11104-93-1	1.85E-03	24/1	Emission Factor	S1	Abv. Ave.	2%
Ex 15	Rooftop Unit	-	-	-	-	-	-	-	NOx	11104-93-1	Negligible	24/1	Emission Factor	S1	Abv. Ave.	1%
Ex 16	Ambient Air Ventilation	-	Ambient	25	1.40	10.00	2.50	-	-	-	-	-	-	-	-	-
Ex 17	Ambient Air Ventilation	-	Ambient	25	0.13	8.95	1.45	-	-	-	-	-	-	-	-	-
Ex 1	Wash Section Rinse Exhaust	1.41	140	60	0.3	9	1.5	-	Phosphoric Acid	7664-38-2	Negligible	24	-	-	-	100%
Ex 3	Wash Section Exhaust	1.41	140	60	0.47	9.45	1.95	-	-	-	-	-	-	-	-	-
Ex 8	Paint Spray Booth	2.27	Ambient	25	0.52	9.36	1.86	620658.90, 4853364.40	Particulate Matter	-	3.13E-02	24	Mass Balance	S2, S3	Ave.	100%
									Carbon Black	1333-86-4	Negligible	24	Mass Balance	S2, S3	Marg.	100%
									Talc	14807-96-6	Negligible	24	Mass Balance	S2, S3	Marg.	100%
									Crystalline Silica	14808-60-7	Negligible	24	Mass Balance	S2, S3	Marg.	100%
									Bisphenol-A Epoxy Resin	25036-25-3	Negligible	24	Mass Balance	-	-	100%
									Barium Sulphate	7727-43-7	Negligible	24	Mass Balance	-	-	100%
									Pyromellitic Acid	54553-90-1	Negligible	24	Mass Balance	S2, S3	Marg.	100%
									Calcium Carbonate	471-34-1	Negligible	24/0.5	Mass Balance	S2, S3	Marg.	100%
									Titanium Dioxide	13463-67-7	Negligible	24	Mass Balance	S2, S3	Marg.	100%
									Triglycidyl Isocyanurate	2451-62-9	9.13E-05	24/0.5	Mass Balance	S2, S3	Marg.	100%
									Silicon Dioxide Amorphous	7631-86-9	Negligible	24/0.5	MB	S2, S3	Marg.	100%
Aluminum Hydroxide	21645-51-2	Negligible	24	MB	-	-	100%									

Table 3: Dispersion Modelling Input Summary Table

Relevant Section of the Regulation	Section Title	Description of How the Approved Dispersion Model Was Used
Section 8	Negligible Sources	Section 8, (1) and (2) does apply, please see section 3 of the ESDM Report.
Section 9	Same Structure Contamination	This section does not apply.
Section 10	Operating Conditions	All equipment was assumed to be operating at maximum production rates at the same time.
Section 11	Source of Contaminant Emission Rates	The emission rate for each significant contaminant emitted from a significant source was estimated, the methodology for the calculation is documented in Table 2 - Source Summary Table.
Section 12	Combined Affect of Assumptions for Operating Conditions and emission Rates	The operating conditions were estimated in accordance with s.10(1) and 1 and s.11(1) of O. Reg. 419 and are therefore considered to result in the highest concentration at POI that the Facility is capable of for the contaminants emitted.
Section 13	Meteorological Conditions	A 5 year meteorological dataset provided by the MOE was loaded in AERMOD.
Section 14	Area of Modeling Coverage	Model coverage set to match MOE guidelines
Section 15	Stack Height for Certain New Sources of Contaminant	All stacks meet the requirement of s.15
Section 16	Terrain Data	USGS DEM Terrain Data provided by WebGIS
Section 17	Averaging Periods	1 and 24 Hour standards - Schedule 3 (for section 19 of O. Reg. 419/05)

Table 4: Emission Summary Table

Contaminant Name	Contaminant CAS #	Maximum Facility Emission Rate (g/s)	Air Dispersion Model Used	Maximum POI Concentration (ug/m3)	Averaging Period (hours)	MOE POI Limit (ug/m3)	Limiting Effect	Regulation Schedule #	Percentage of MOE POI Limit (%)
NOx	11104-93-1	1.05E-01	AERMOD	213.98	1	400	Health	Schedule 3	53%
				83.24	24	200	Health	Schedule 3	42%
Particulate Matter	-	3.13E-02	AERMOD	103.11	24	120	Visibility	Schedule 3	86%
Triglycidyl Isocyanurate	2451-62-9	9.13E-05	AERMOD	0.290	0.5	0.36		JSL	81%
				0.117	24	0.12		JSL	98%

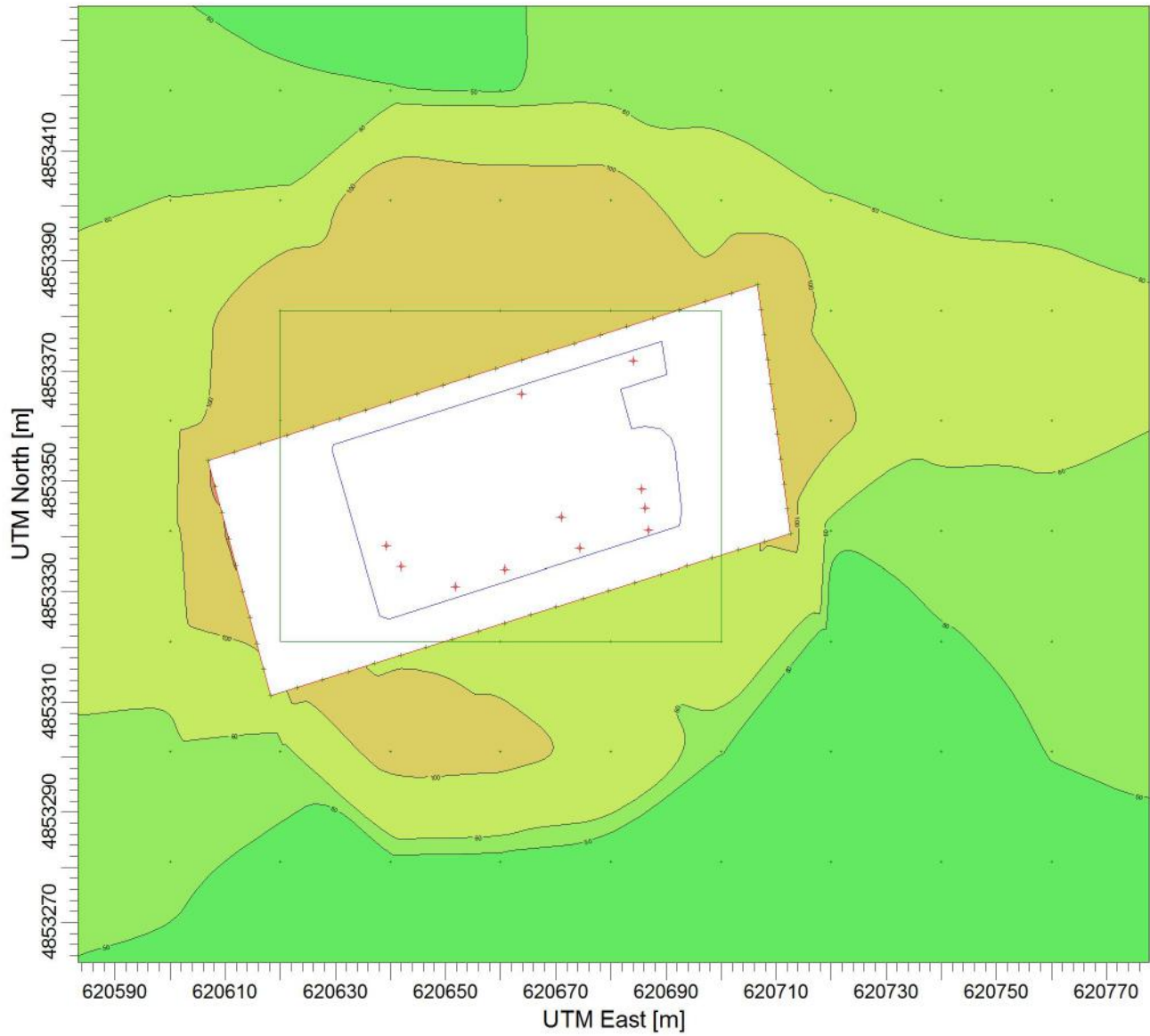


Appendix B: Drawings

Drawing 1: AERMOD NOx 1 Hour Averaging, 1st Highest Concentrations

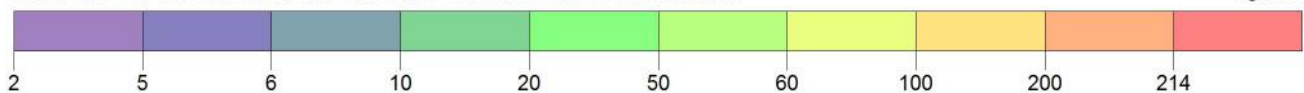
PROJECT TITLE:

131 Planchet - NOx - 1hr



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

ug/m³



COMMENTS:

SOURCES:

11

COMPANY NAME:

Safetech Environmental

RECEPTORS:

2086

MODELER:

Robert Fuller

OUTPUT TYPE:

Concentration

SCALE:

1:1,223

0  0.04 km

MAX:

213.9786 ug/m³

DATE:

7/8/2014

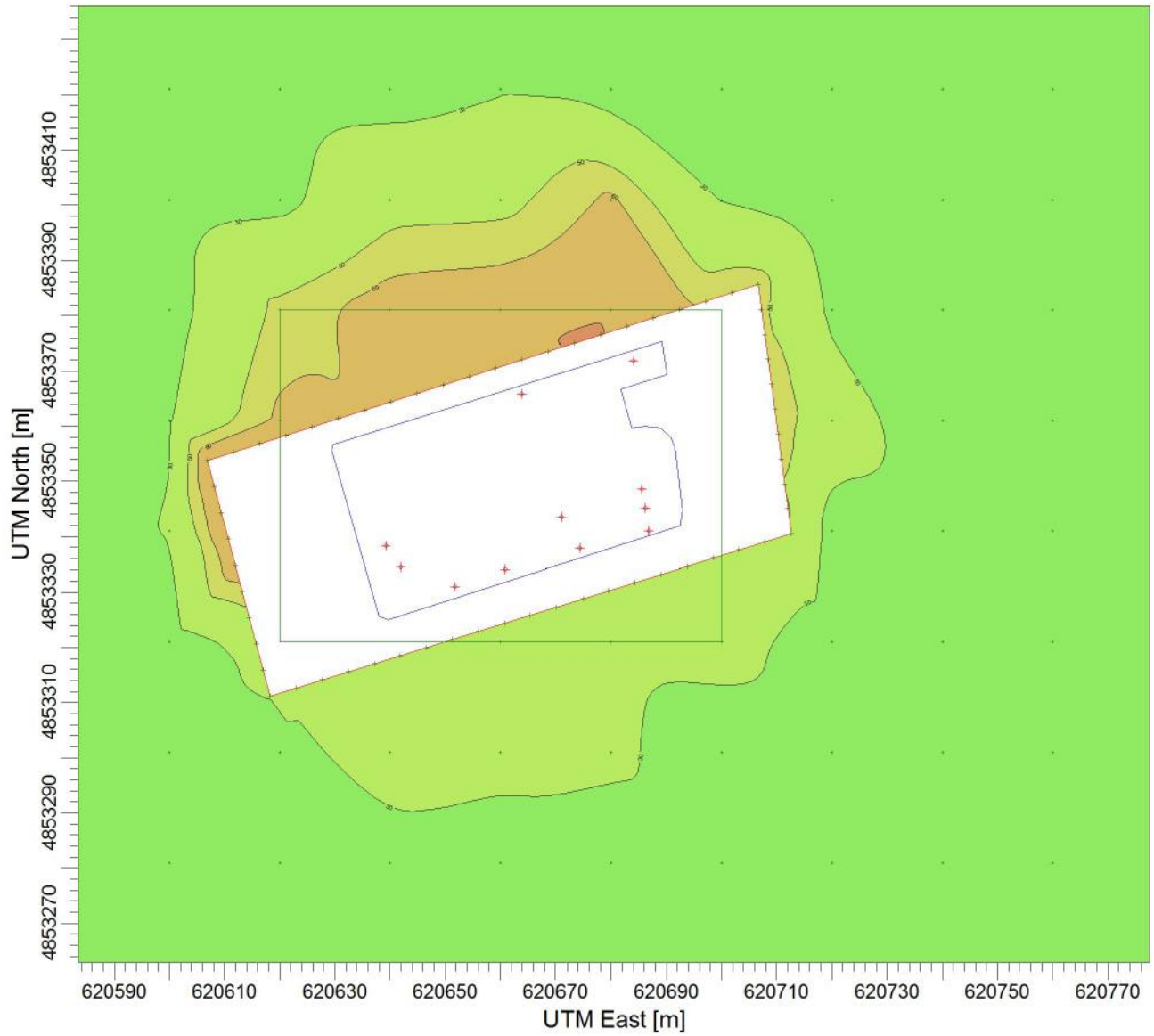
PROJECT NO.:

602814

Drawing 2: AERMOD NOx 24 Hour Averaging, 1st Highest Concentrations

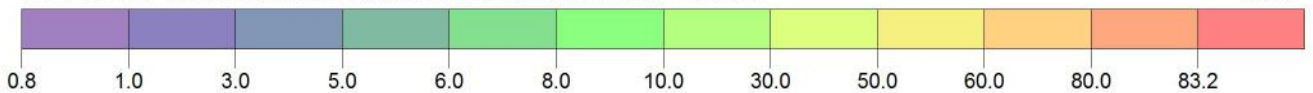
PROJECT TITLE:


131 Planchet - NOx - 24hr



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m³

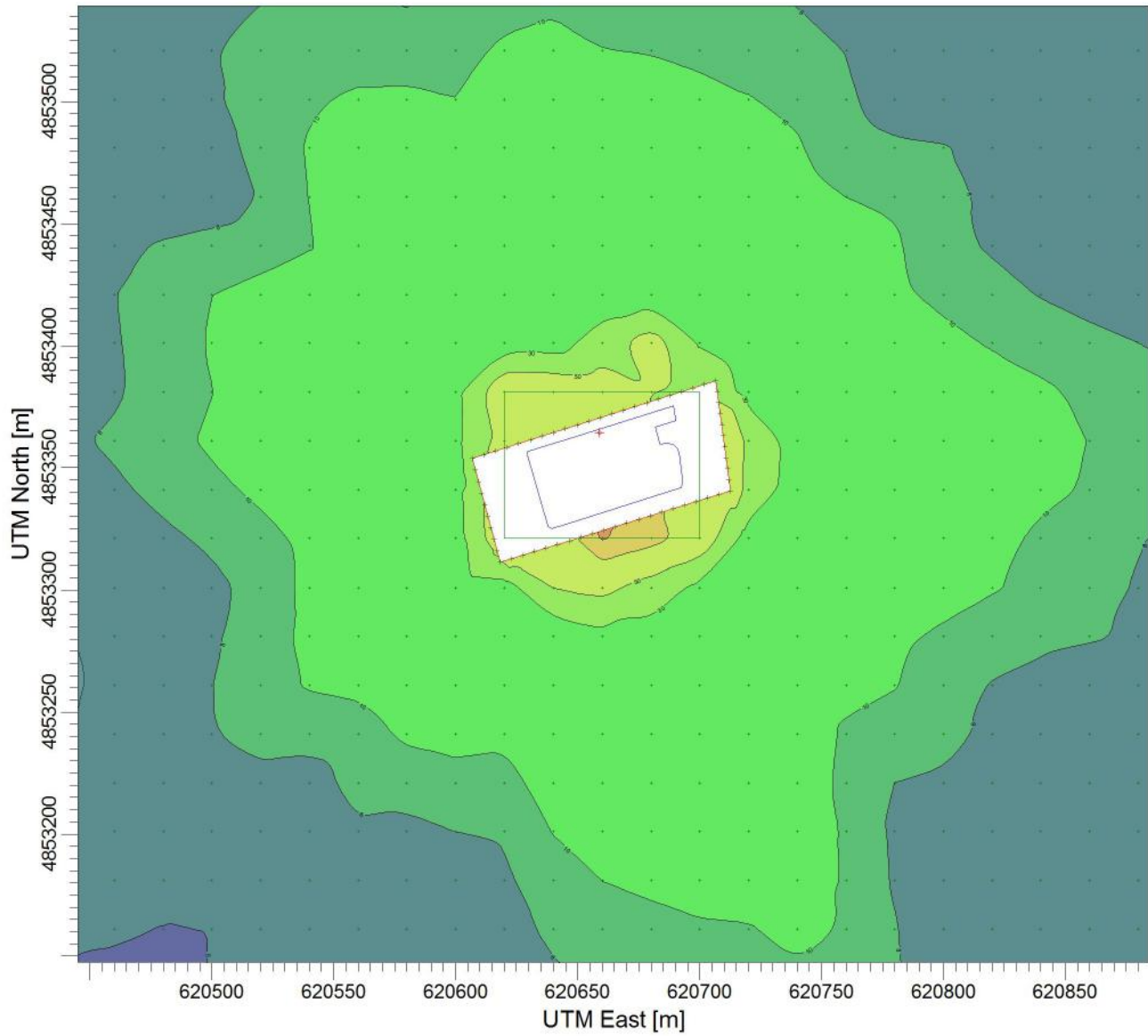


COMMENTS:	SOURCES: 11	COMPANY NAME: Safetech Environmental	
	RECEPTORS: 2086	MODELER: Robert Fuller	
	OUTPUT TYPE: Concentration	SCALE: 1:1,221 0  0.04 km	
	MAX: 83.23616 ug/m³	DATE: 7/8/2014	PROJECT NO.: 602814

Drawing 3: AERMOD Particulate Matter 24 Hour Averaging, 1st Highest Concentrations


PROJECT TITLE:

131 Planchet - PM 44 - 24hr



PLOT FILE OF 1ST-HIGHEST MAX DAILY 24-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ug/m³

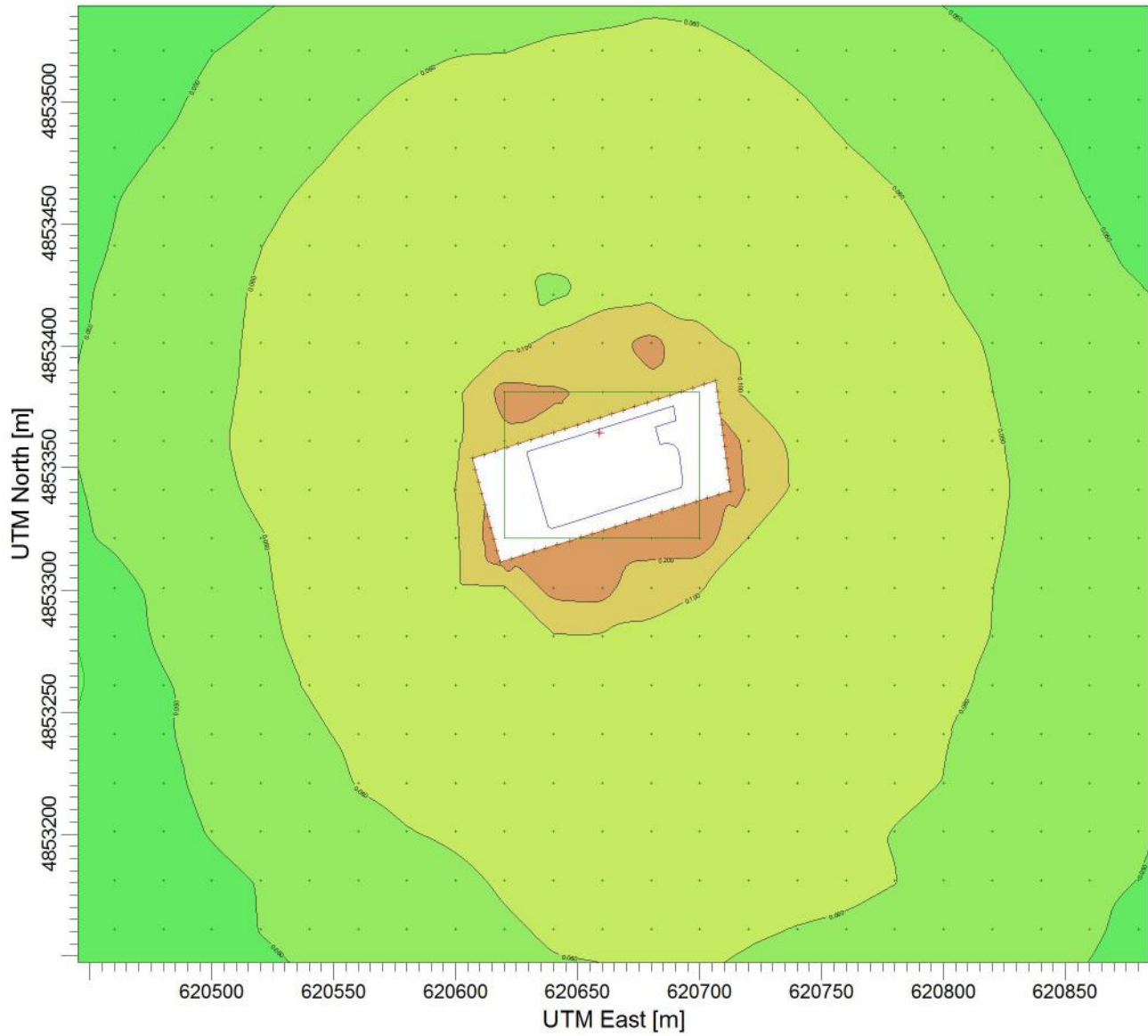


COMMENTS:	SOURCES:	COMPANY NAME:	
	1	Safetech Environmental	
	RECEPTORS:	MODELER:	
	2086	Robert Fuller	
OUTPUT TYPE:	SCALE:	1:2,763	
Concentration	0  0.1 km		
MAX:	DATE:	PROJECT NO.:	
103.1131 ug/m³	7/8/2014	602814	

Drawing 4: AERMOD Triglycidyl Isocyanurate 0.5 Hour Averaging, 1st Highest Concentrations

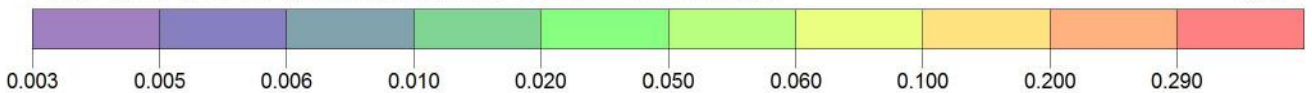
PROJECT TITLE:

131 Planchet - CAS 2451-62-9 - 0.5hr



PLOT FILE OF HIGH 1ST HIGH 0.5-HR VALUES FOR SOURCE GROUP: ALL

ug/m³



COMMENTS:

SOURCES:

1

COMPANY NAME:

Safetech Environmental

RECEPTORS:

2086

MODELER:

Robert Fuller

OUTPUT TYPE:

Concentration

SCALE:

1:2,763

0  0.1 km

MAX:

0.2897 ug/m³

DATE:

7/8/2014

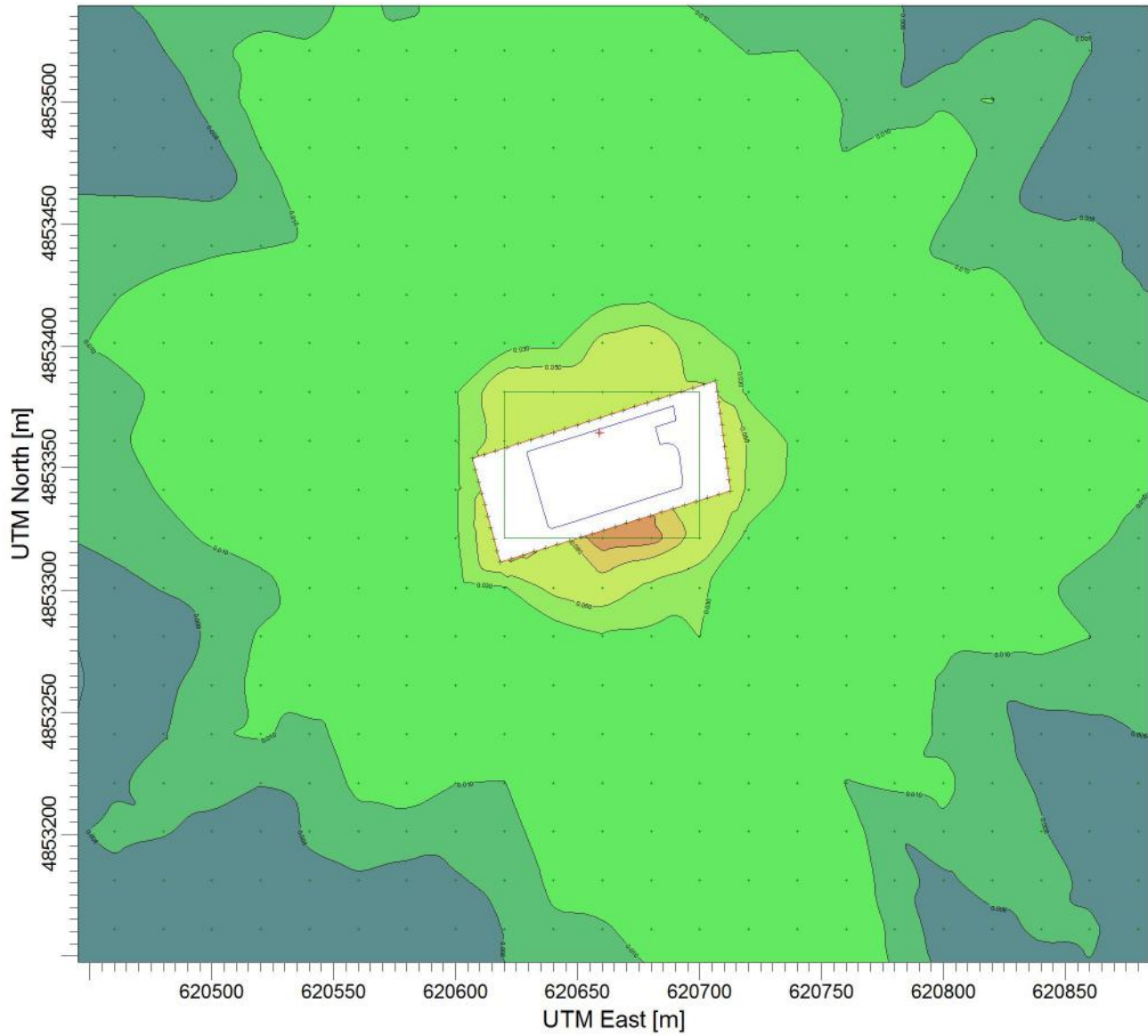
PROJECT NO.:

602814

Drawing 5: AERMOD Triglycidyl Isocyanurate 24 Hour Averaging, 1st Highest Concentrations

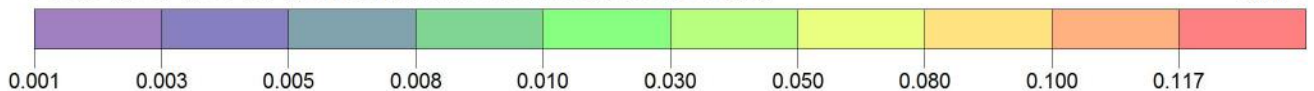
PROJECT TITLE:

131 Planchet - CAS 2451-62-9 - 24hr



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m³



COMMENTS:

SOURCES:

1

COMPANY NAME:

Safetech Environmental

RECEPTORS:

2086

MODELER:

Robert Fuller

OUTPUT TYPE:

Concentration

SCALE:

1:2,763

0  0.1 km

MAX:

0.11681 ug/m³

DATE:

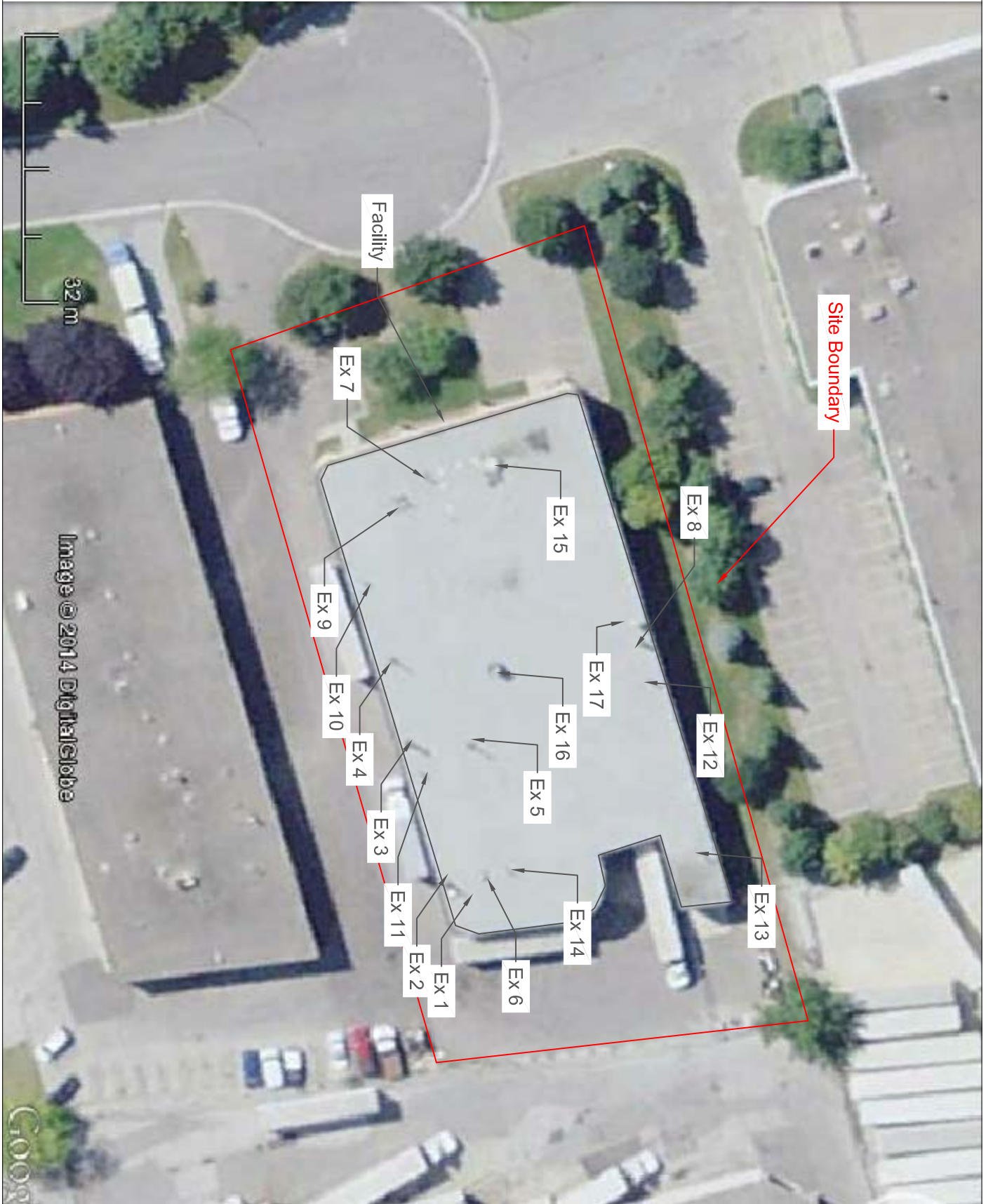
7/8/2014

PROJECT NO.:

602814



Drawing 6: Site Plan



Site Plan



PROJECT:

131 Planchet Road
ESDM Report

DATE OF DRAWING:

07/08/2014

SET PROJECT NUMBER:

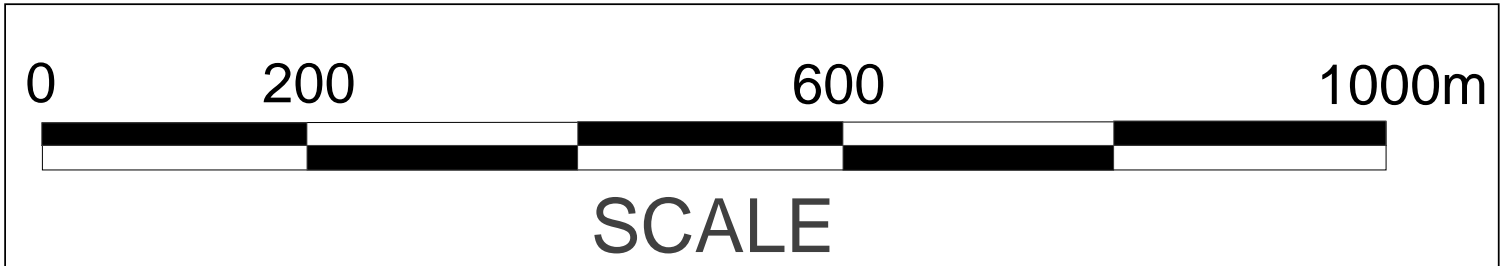
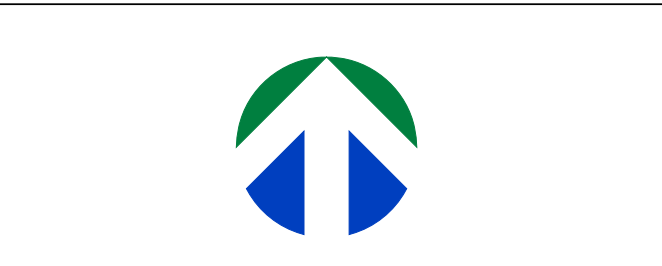
602814

IMAGE SOURCE:

Google Earth



Drawing 7: Land Use Zoning Designation Plan



KEY MAP 3C

TO BYLAW 1-88 REVISED JANUARY 2014

- b) Notwithstanding Subsection 5.14, a drive-through is not permitted.
- c) Notwithstanding Subsection 5.14 and Section 2.0, Subsection 57(a), a Regulated Health Care Professional shall not include a body rub parlour as an accessory use.
- d) Notwithstanding the definition of an Office Building in By-law 1-88, as amended, a storey above the first storey may be used for business or professional offices.

5.14.1.2 Existing Buildings

Where a building has been legally erected on or before the effective date of this By-law on a lot having less than one or more of the requirements related to minimum frontage, minimum lot area, minimum depth, minimum side yard, minimum front yard or minimum rear yard setback under this By-law, the building may be enlarged, repaired or renovated in accordance with the provisions of the Planning Act and this By-law provided that:

- a) the enlargement, repair or renovation does not further reduce any yard that does not conform to this By-law;
- b) the enlargement, repair or renovation does not create a building or part of a building that exceeds the maximum lot coverage provisions of this By-law;
- c) the enlargement, repair or renovation does not create a building or part of a building that exceeds the maximum gross floor area provisions of this By-law;
- d) the enlargement, repair or renovation does not create a building or part of a building that exceeds the maximum height provisions of this By-law; and
- e) all other applicable provisions of this By-law are satisfied.

5.14.1.3 Location of Parking Areas

Except for a required driveway in conformity with the provisions of By-law 1-88, as amended, a parking area shall not be located closer to a street line than the main building on the lot.

5.14.1.4 Patios

Notwithstanding Subparagraph 5.1.6(h), unless required by any other applicable law, a patio is not required to be completely enclosed by a physical barrier.

5.14.1.5 Use of Basements / Cellars

- a) A cellar or basement shall be used for no other purpose than storage, mechanical and/or laundry facilities or parking.

6.0 EMPLOYMENT AREA ZONES

6.1 GENERAL PROVISIONS

The following provisions shall apply to all Employment Area Zones.

6.1.1 Permitted Uses in all Employment Area Zones:

The following uses shall be permitted in all employment area zones except the EM4, "Employment Area Transportation Zone":

- Day Nursery
- Technical School
- Parks and Open Space
- Recreational Uses
- Wayside Pit
- Wayside Quarry

6.1.2 Employment Area Zone Requirements

No person shall, within an Employment Area Zone, use any lands, or erect, alter or use any building or structure except for a purpose set forth in the Section referring to that Zone and in accordance with its provisions and with any applicable provisions contained in Subsection 6.1, in Section 3.0, and in Schedule "A".

6.1.3 Accessory Retail Sales

Where retail sales accessory to an industrial employment use are permitted, the floor area of the accessory retail use shall not exceed thirty percent (30%) of the gross floor area of the entire unit devoted to the industrial employment use or a maximum of 930 m², whichever is the lesser, and this floor area shall be separated from the rest of the unit by a solid partition.

6.1.4 Accessory Office Use

Where office uses accessory to an industrial employment use are permitted, the floor area of the accessory office use shall not exceed forty-nine percent (49%) of the gross floor area of the entire unit devoted to the industrial employment use and this floor area shall be separated from the rest of the unit by a solid partition.

6.1.5 Combination Accessory Office and Retail Uses

Where office and retail uses accessory to an industrial employment use are permitted, the combined total floor area of the accessory office and retail uses shall not exceed forty-nine percent (49%) of the gross floor area of the entire unit devoted to the industrial employment use, subject to Subsection 6.1.3.

6.1.6 Landscaping Requirements

- a) A strip of land no less than three (3) metres in width shall be provided along a lot line which abuts a street line, and shall be used for no other purpose than landscaping. This shall not prevent the provision of access driveways across the said strip.
- b) Notwithstanding Paragraph 6.1.6(a) above, a strip of land not less than nine (9) metres in width shall be provided along a lot line of a provincial highway or an arterial road, and shall be used for no purpose other than landscaping. This shall not prevent the provision of access driveways across the said strip.
- c) Unless otherwise provided, a minimum of five (5%) percent of the entire lot area of every lot in an Employment Area Zone, on which a building or structure is erected, shall be used for no purpose other than landscaping.
- d) Where an Employment Area Zone abuts the boundary of lands zoned Open Space or Residential, a strip of land not less than 7.5 metres in width and inside the Employment Area Zone and abutting its boundary, shall be used for no purpose other than landscaping. Such landscaped area shall not be used in computing the minimum landscaping requirements as set out in Subsection 6.1.6 c) of this By-law.

6.1.7 Eating Establishment, Eating Establishment Convenience, Eating Establishment Take-Out in Multi-Unit Buildings

Notwithstanding any other provisions of this By-law, except Section 9, one Eating Establishment, or Eating Establishment Convenience, or Eating Establishment Take-Out shall only be permitted in all Employment Area Zones in a multi-unit building provided that the total floor area of such uses, in a multi unit building shall not exceed 185 m².

Notwithstanding Subsection 6.2.1(a), only outdoor patio uses accessory to an eating establishment, including take-out and convenience, shall be permitted outside of a wholly enclosed building.

6.1.8 Commercial Complex

In addition to the uses permitted in Employment Area Zones, where Council prior to the passage of this by-law, has deemed a site to be a commercial complex, pursuant to Sections 4(2)(b) of By-law 2961, then the following uses shall also be permitted:

- Bank
- Business Office
- Eating Establishment
- Place of Amusement

provided the development is in accordance with a site plan approved by Council. Commercial complexes are identified with the letters "cc" on the attached Key Maps.

Notwithstanding Subsection 6.2.1(a), only outdoor patio uses accessory to an eating establishment, including take-out and convenience, shall be permitted outside of a wholly enclosed building.

6.1.9 Accessory Buildings

No accessory building or structure shall be located in any yard, or area abutting a yard, which abuts Jane Street, Langstaff Road, Highway #400, Highway #7, Weston Road, Rutherford Road or a reserve abutting same.

6.1.10 Deleted.

6.1.11 Satellite Dishes

Notwithstanding Subsection 3.14(g) a satellite dish shall be permitted in any Employment Area or C7 Service Commercial Zone provided:

- a) The satellite dish shall not be located in the front or exterior side yard or between any main building and a streetline;
- b) The satellite dish shall comply with the minimum yard and maximum height requirements of the Zone as shown in Schedule "A";
- c) Notwithstanding paragraph (b) above, a satellite dish may encroach a maximum of 1.5 m into the minimum side yard requirement, except where there is a mutual driveway, provided the satellite dish is located a minimum of 6 metres above finished grade.

6.1.12 Outdoor Patio

An outdoor patio shall only be permitted as an accessory use to an "Eating Establishment", "Eating Establishment Convenience" and "Eating Establishment Take-Out" in accordance with Section 6.1.7.

6.1.13 Outdoor Patio Provisions:

- a) The outdoor patio shall not exceed fifty percent (50%) of the gross floor area of the eating establishment in conjunction with which the outdoor patio use is permitted;
- b) The parking required for the outdoor patio shall be equal to that required for the main eating establishment use;
- c) An outdoor patio shall not be permitted in any yard located between the building containing the main eating establishment and any Residential Zone;
- d) Any lighting facilities illuminating an outdoor patio shall be arranged so as to deflect light away from adjoining properties and streets;
- e) The use of musical instruments, or other mechanical or electrical music equipment, and dancing, theatrical performances or audiovisual presentations, music concerts and shows, shall not be permitted in areas designated for outdoor patio use;
- f) Deleted;
- g) The ground surface of an outdoor patio shall be of concrete or other hard surface;
- h) The outdoor patio shall be completely enclosed by a physical barrier with access only from the interior of the eating establishment with the exception of at least one (1) exit to be used only in cases of emergency and which is not from the interior of the main building; and,

An outdoor patio shall not be developed except in accordance with an approved site plan.

6.2 EM1 - PRESTIGE EMPLOYMENT AREA ZONE

6.2.1 Uses Permitted

- a) The uses permitted are as follows, provided they are within a wholly enclosed building and with no outside storage:

- Employment Use
- Accessory Retail Sales to an Employment Use
- Accessory Office Uses to an Employment Use
- Banquet Hall, in a Single Unit Building, subject to Section 3.8
- Bowling Alley, subject to Section 3.8
- Business and Professional Offices, not including regulated health professional
- Club, Health Centre, provided that the use is not located in a building which abuts a provincial highway, excepting Highway #7
- Convention Centre, Hotel, Motel, subject to Section 3.8
- Funeral Home in a Single Unit building and subject to Section 3.8
- Car Brokerage
- Office Building
- Recreational Uses, including a golf driving range and miniature golf course
- Service and Repair Shop
- Any public garage legally existing as of the date of enactment of By-law 80-95.

b) A multi unit building as defined in Section 2.0 other than office building, shall be permitted on a lot abutting:

- i) Highway #400 and Highway #427, provided that the minimum unit size shall be 465 sq.m;
- ii) Highway #7, Highway #407, Weston Road, Jane Street, Rutherford Road and Pine Valley Drive provided that the minimum unit size shall be 274 sq.m;
- iii) Notwithstanding i) and ii) above, one eating establishment, or eating establishment convenience, or eating establishment take-out having a maximum floor area of 185 sq.m shall only be permitted.

Notwithstanding Subsection 6.2.1 (a), only outdoor patio uses accessory to an eating establishment, including take-out and convenience, shall be permitted outside of a wholly enclosed building.

- iv) Notwithstanding i) and ii) above, one Personal Service Shop having a maximum floor area of 185m2 shall be permitted.

Institutional

CORRECTIONAL OR CRISES CARE GROUP HOME as defined in Section 2

6.3 EM2 - GENERAL EMPLOYMENT AREA ZONE

6.3.1 Uses Permitted

a) The uses permitted with or without accessory outside storage are as follows:

- All uses Permitted in an EM1 Zone, except Hotel, Motel, Convention Centre and Personal Service Shop, subject to Section 3.8.
- All Season Sports Facility, subject to Section 3.8
- Autobody Repair Shop
- Building Supply Outlet
- Car Brokerage, including trucks
- Club or Health Centre
- Contractor's Yard
- Equipment Sales/ Rental Establishment
- Meat Packing and Processing, not including accessory outside storage
- Public Garage
- Scrap Paper Storage, sorting or Baling
- Service or Repair Shop, including repair of heavy equipment
- Truck Terminal

6.3.2 Accessory Outside Storage

Notwithstanding any other provision of By-law 80-95, where accessory outside storage of goods or materials is a permitted use, it shall be permitted only in accordance with the following provisions:

- i) Outside accessory storage to a permitted use, shall not exceed thirty (30%) of the lot area;
- ii) Outside storage is not permitted on any lot unless there is an existing building with a gross floor area of at least 550 square metres;
- iii) No outside storage shall be located in any front yard, exterior side yard or between any main building and a street line, and further shall be no closer than twenty (20) metres to any street line;
- iv) The outside storage area shall be completely enclosed by a stone or masonry wall or chain link fence with appropriate landscaping screen and no such enclosure shall be less than two (2) metres in height;
- v) If a lot has a frontage of less than 45.5 metres, no part of any open storage shall be in the side yard;
- vi) No outside storage shall be permitted on any corner lot;
- vii) If a lot upon which outside storage is permitted abuts the boundary of a Residential or Open Space Zone, screening shall be provided along such boundary within the Industrial Zone. Screening shall consist of a solid fence a minimum of two (2) metres in height;
- viii) No outside storage other than the storage of machinery and equipment shall exceed three (3) metres in height;
- ix) The outside storage of any goods or materials which are obnoxious, visually or otherwise, including derelict or scrap motor vehicles or machinery and worn-out appliances or equipment shall not be permitted.

6.4 EM2-A - RESTRICTED GENERAL EMPLOYMENT AREA ZONE (Large Lot)

6.4.1 Uses Permitted

- a) The uses permitted include all uses permitted in the EM2 "General Employment Area Zone".

6.5 EM3 - RETAIL WAREHOUSE EMPLOYMENT AREA ZONE

6.5.1 a) Uses Permitted

- All uses permitted in an EM1 Zone
- Building Supply Outlet
- Catalogue Sales
- Convention Centre
- Retail Warehouse
- Retail Nursery
- Swimming Pool, Recreational Vehicles Leasing/Rental/Sales

- b) Limited outdoor display of merchandise, goods or materials shall be permitted provided that the display of goods and materials is accessory to a permitted use, and such display shall not exceed an area equal to 0.25 times the gross floor area of the buildings or structures on the lot devoted to the use to which the display is accessory.

6.6 EM4 - EMPLOYMENT AREA TRANSPORTATION ZONE

6.6.1 Uses Permitted

- Airport
- Landing Field
- Railway Classification Yard including accessory office, warehousing, distribution and repair facilities
- Intermodal Yard and uses accessory thereto

6.7 INDUSTRIAL ZONES

6.8 GENERAL PROVISIONS

Appendix C: Detailed Calculations



Calculations 1: NOx Emission Rate Estimation

**NOx
Emission
Factors**

**Nox Emissions calculated using Small Boiler, Uncontrolled Emission Factor From EPA Table 1.4-1

Source ID	Source Description	Max Input		Compound	CAS #	Emission Rate of Compound (lb/hr)	Maximum Rate: Emission Factor (g/s)	% Overall Emissions (%)
		BTU/hr	MMBTU/hr					
Ex 2	Wash Section Water Heater	2,500,000	2.5	NOx	11104-93-1	2.45E-01	3.09E-02	29%
Ex 4	Dry Off Oven	1,500,000	1.5	NOx	11104-93-1	1.47E-01	1.85E-02	18%
Ex 5	Powder Cure Oven	2,000,000	2	NOx	11104-93-1	1.96E-01	2.47E-02	23%
Ex 6	Poder Cure Oven (Hot Air)	-	-	-	-	-	-	-
Ex 7	Batch Oven	1,500,000	1.5	NOx	11104-93-1	1.47E-01	1.85E-02	18%
Ex 9	Unit Heater	150,000	0.15	NOx	11104-93-1	1.47E-02	1.85E-03	2%
Ex 10	Unit Heater	150,000	0.15	NOx	11104-93-1	1.47E-02	1.85E-03	2%
Ex 11	Unit Heater	150,000	0.15	NOx	11104-93-1	1.47E-02	1.85E-03	2%
Ex 12	Unit Heater	150,000	0.15	NOx	11104-93-1	1.47E-02	1.85E-03	2%
Ex 13	Unit Heater	150,000	0.15	NOx	11104-93-1	1.47E-02	1.85E-03	2%
Ex 14	Unit Heater	150,000	0.15	NOx	11104-93-1	1.47E-02	1.85E-03	2%
Ex 15	Rooftop Unit	125,000	0.125	NOx	11104-93-1	1.23E-02	1.54E-03	1%

Calculations 2: Spray Powder Emissions

Powder	kg	Component	CAS	wt%	Total Use June 2014 (kg)
HX622N53 (Hybrid)	178	Carbon Black	1333-86-4	2%	0.22
		Talc	14807-96-6	2%	0.22
		Crystalline Syllica	14808-60-7	1%	0.11
EB-0182-S (Satin Black Epoxy)	284.25	Bisphenol-A Epoxy Resin	25036-25-3	40%	11.27
		Barium Sulphate	7727-43-7	40%	11.27
		Pyromellitic Acid	54553-90-1	1.5%	0.42
		Carbon Black	1333-86-4	1.3%	0.37
HI-0106-M (Nevada Hybrid)	55.5	Bisphenol-A Epoxy Resin	25036-25-3	30%	0.32
		Barium Sulphate	7727-43-7	20%	0.21
PE96-E6603 (Platinum Hybrid)	21	Calcium Carbonate	471-34-1	11%	0.02
		Barium Sulphate	7727-43-7	14%	0.02
		Titanium Dioxide	13463-67-7	2%	0.00
PW-0765-H (Polyester)	423.25	Titanium Dioxide	13463-67-7	30%	18.74
		Barium Sulphate	7727-43-7	20%	12.49
		Triglycidyl Isocyanurate	2451-62-9	5%	2.81
		Silicon Dioxide Amorphous	7631-86-9	3%	1.56
		Aluminum Hydroxide	21645-51-2	3%	1.56

Emissions By Compound		Total Use (June 2014) kg	Usage Rate g/s	wt% of Representative Sample
Carbon Black	1333-86-4	0.59	0.001019601	0.06%
Talc	14807-96-6	0.22	0.000383658	0.02%
Crystalline Syllica	14808-60-7	0.11	0.000191829	0.01%
Bisphenol-A Epoxy Resin	25036-25-3	11.59	0.020126962	1.21%
Barium Sulphate	7727-43-7	24.00	0.041669771	2.49%
Pyromellitic Acid	54553-90-1	0.42	0.000733781	0.04%
Calcium Carbonate	471-34-1	0.02	2.93701E-05	0.00%
Titanium Dioxide	13463-67-7	18.74	0.032543222	1.95%
Triglycidyl Isocyanurate	2451-62-9	2.81	0.004880682	0.29%
Silicon Dioxide Amorphous	7631-86-9	1.56	0.00271149	0.16%
Aluminum Hydroxide	21645-51-2	1.56	0.00271149	0.16%

Paint Spray Booth Mas Balance (Based on Representative Data from June 2014)

Source ID	Source Description	Compound	CAS #	Working Days Per Month (June)	Working Hours Per Day	Average wt% from representative MSDS	Filter Efficiency	Total Powder Emissions
				days/month	hours/day	wt%	(%)	(g/s)
Ex 8	Spray Powders	Particulate Matter	-	20	8	100%	99.4%	3.13E-02
		Carbon Black	1333-86-4	20	8	0.06%	99.4%	1.91E-05
		Talc	14807-96-6	20	8	0.02%	99.4%	7.18E-06
		Crystalline Syllica	14808-60-7	20	8	0.01%	99.4%	3.59E-06
		Bisphenol-A Epoxy Resin	25036-25-3	20	8	1.21%	99.4%	3.77E-04
		Barium Sulphate	7727-43-7	20	8	2.49%	99.4%	7.80E-04
		Pyromellitic Acid	54553-90-1	20	8	0.04%	99.4%	1.37E-05
		Calcium Carbonate	471-34-1	20	8	0.00%	99.4%	5.50E-07
		Titanium Dioxide	13463-67-7	20	8	1.95%	99.4%	6.09E-04
		Triglycidyl Isocyanurate	2451-62-9	20	8	0.29%	99.4%	9.13E-05
		Silicon Dioxide Amorphous	7631-86-9	20	8	0.16%	99.4%	5.07E-05
Aluminum Hydroxide	21645-51-2	20	8	0.16%	99.4%	5.07E-05		

Calculations 3: Negligibility Calculations

Source Identifier	Source Description	Contaminant	Emission Data				Critical Effect	Screening Data					Screening Calculations		
			CAS #	Maximum Emission Rate (g/s)	% Overall Emissions (%)	Averaging Period (hrs)		Schedule 3 Standard (ug/m3)	Schedule 3 Guideline (ug/m3)	Schedule 3 Screening Limit (ug/m3)	JSL Limit (ug/m3)	De-Minimus Concentration (ug/m3)	Screening Level (ug/m3)	Emission Threshold (g/s)	% of Emission Threshold (%)
Ex 2	Wash Section Water Heater	NOx	11104-93-1	3.09E-02	29%	Health	24	200	100			100	2.80E-02	110.35%	
							1	400	200			200	2.30E-02	134.34%	
Ex 4	Dry Off Oven	NOx	11104-93-1	1.85E-02	18%	Health	24	200	100			100	2.80E-02	66.21%	
							1	400	200			200	2.30E-02	80.60%	
Ex 5	Powder Cure Oven	NOx	11104-93-1	2.47E-02	23%	Health	24	200	100			100	2.80E-02	88.28%	
							1	400	200			200	2.30E-02	107.47%	
Ex 7	Batch Oven	NOx	11104-93-1	1.85E-02	18%	Health	24	200	100			100	2.80E-02	66.21%	
							1	400	200			200	2.30E-02	80.60%	
Ex 9	Unit Heater	NOx	11104-93-1	1.85E-03	2%	Health	24	200	100			100	2.80E-02	6.62%	
							1	400	200			200	2.30E-02	8.06%	
Ex 10	Unit Heater	NOx	11104-93-1	1.85E-03	2%	Health	24	200	100			100	2.80E-02	6.62%	
							1	400	200			200	2.30E-02	8.06%	
Ex 11	Unit Heater	NOx	11104-93-1	1.85E-03	2%	Health	24	200	100			100	2.80E-02	6.62%	
							1	400	200			200	2.30E-02	8.06%	
Ex 12	Unit Heater	NOx	11104-93-1	1.85E-03	2%	Health	24	200	100			100	2.80E-02	6.62%	
							1	400	200			200	2.30E-02	8.06%	
Ex 13	Unit Heater	NOx	11104-93-1	1.85E-03	2%	Health	24	200	100			100	2.80E-02	6.62%	
							1	400	200			200	2.30E-02	8.06%	
Ex 14	Unit Heater	NOx	11104-93-1	1.85E-03	2%	Health	24	200	100			100	2.80E-02	6.62%	
							1	400	200			200	2.30E-02	8.06%	
Ex 15	Rooftop Unit	NOx	11104-93-1	1.54E-03	1%	Health	24	200	100			100	2.80E-02	5.52%	
							1	400	200			200	2.30E-02	6.72%	
		Total NOx	11104-93-1	1.05E-01	100%	Health	24	200	100			100	2.80E-02	376.29%	
							1	400	200			200	2.30E-02	458.09%	
Ex 8	Spray Powders	Particulate Matter	-	3.13E-02	100%	Visibility	24	120	60			60	1.68E-02	186.11%	
		Carbon Black	1333-86-4	1.91E-05	100%	Soiling	24	10	5			5	1.40E-03	1.36%	
		Talc	14807-96-6	7.18E-06	100%	Health	24		2	1		1	2.80E-04	2.57%	
		Crystalline Silica	14808-60-7	3.59E-06	100%	Health	24		5	2.5		2.5	7.00E-04	0.51%	
		Bisphenol-A Epoxy Resin	25036-25-3	3.77E-04	100%		24				0.1	0.1	2.80E-05	1345.66%	
		Barium Sulphate	7727-43-7	7.80E-04	100%		24				0.1	0.1	2.80E-05	2785.98%	
		Pyromellitic Acid	54553-90-1	1.37E-05	100%		24				0.1	0.1	2.80E-05	49.06%	
		Calcium Carbonate	471-34-1	5.50E-07	100%		0.5					72	6.82E-03	0.01%	
							24					24	6.72E-03	0.01%	
		Titanium Dioxide	13463-67-7	6.09E-04	100%	Health	24		34	17			17	4.76E-03	12.80%
		Triglycidyl Isocyanurate	2451-62-9	9.13E-05	100%		0.5				0.36	0.36	3.41E-05	267.97%	
							24				0.12	0.12	3.36E-05	271.93%	
		Silicon Dioxide Amorphous	7631-86-9	5.07E-05	100%		0.5				9	9	8.52E-04	5.95%	
					24				3	3	8.40E-04	6.04%			
Aluminum Hydroxide	21645-51-2	5.07E-05	100%		24					0.1	0.1	2.80E-05	181.29%		

Appendix D: Manufacturer's Specifications & MSDSs

Manufacturer's Specifications:

Maxxon Tube-O-Flame

Eclipse Burners

Eclipse Burner Blowers

Midco Burners

Dynaphos IP LAF MSDS & Technical Data

Purified Phosphoric Acid Technical Information Bulletin

MSDSs:

Protech Oxyplast: HX-622-N53

Prism Powder Coatings: EB-0182-S

Prism Powder Coatings: HI-106-M

Prism Powder Coatings: PW-0765-H

Sherwin Williams: PE96-E6603

Bisphenol-A Epoxy Resin (CAS: 25036-25-3)

Barium Sulphate (CAS: 7727-43-7)

Aluminum Hydroxide (CAS: 21645-51-2)

Installation and Service Instructions



Unipower G-Series Power Burners

In the United States, installation must conform with local codes or in the absence of local codes, with the **National Fuel Gas Code, ANSI Z223.1-latest edition** available from American National Standard Institute. Further reference should be made to the recommendation of your fuel supplier.

In Canada, installation must conform with local codes or in the absence of local codes, with **Installation Codes for Gas Burning Appliances and Equipment, CGA Standard CAN/CGA 1-B-149.1 or 2**. When the conversion burner is used on a Forced Air Central Furnace, the two yellow and black warning labels in the literature envelope shall be attached in accordance with **Installation Code, CGA Standard CAN/CGA 1-B149, Clause 5.4.4.4**. Further reference should be made to the recommendation of your fuel supplier.

WARNING: Additions, changes, conversions and service must be performed by an authorized Midco representative, service agency or the fuel supplier. Use only MIDCO specified and approved parts.

INSTALLER: Inform and demonstrate to the user the correct operation and maintenance of the gas utilization equipment. Inform the user of the hazards of storing flammable liquids and vapors in the vicinity of this gas utilization equipment and remove such hazards. Affix this manual and associated literature to the conversion burner.

CODE COMPLIANCE IS THE SOLE RESPONSIBILITY OF THE INSTALLER.

USER: Retain this manual for future reference. If other than routine service or maintenance as described in this manual and associated literature is required, contact a qualified service agency. **DO NOT ATTEMPT REPAIRS.** An inadvertent service error could result in a dangerous condition.

Warning: If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in the building.
- Immediately call your gas supplier from another building's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

BURNER
MODEL _____

BILL OF MAT'L
NUMBER _____

DATE CODE _____

WIRING DIAGRAM _____

FOR SERVICE CONTACT:

name _____

address _____

phone _____

SAFETY INFORMATION TERMS: The following terms are used to identify hazards, safety precautions or special notations and have standard meanings throughout this manual. When you see the safety alert symbol and one of the safety information terms as shown below, be aware of the hazard potential.



DANGER: Identifies the most serious hazards which **will** result in severe personal injury or death.

WARNING: Signifies a hazard that **could** result in personal injury or death.

CAUTION: Identifies unsafe practices which would result in minor personal injury or product and property damage.

Specifications

Burner Style	Power Type
Pilot Type	Intermittent, Spark Ignition (Standard) Interrupted, Spark Ignition (Optional)
Pilot Safety	Instantaneous Electronic Flame Safeguard
Standard Voltage	
Controls	120/1/60
Motor	115/1/60 (except G69-115/230/1/60)
U.L. Listed-U.L.C. Listed	

Model		Maximum Input¹ MBTU/HR.*	Maximum Air SCFM⁶	Inlet Gas Pressure Required²	
Natural Gas (1,000 BTU/cu.ft.)	Propane Gas (2,500 BTU/cu.ft.)			Natural	Propane
G56	G56P	1075	224	5.0" W.C.	5.0" W.C.
G57	G57P	1500	313	7.0" W.C.	5.0" W.C.
G58	G58P	1850	385	6.7" W.C.	6.0" W.C.
G69	G69P	2500	521	7.5" W.C.	8.0" W.C.

Model		Burner Manifold Pressure^{1,4,5}		Minimum Input³ MBTU/HR.*	Motor HP (3450 RPM)	Recommended Combustion Chamber Size
Natural Gas (1,000 BTU/cu.ft.)	Propane Gas (2,500 BTU/cu.ft.)	Natural	Propane			
G56	G56P	2.2" W.C.	1.2" W.C.	300	1/6	42" x 18"
G57	G57P	4.1" W.C.	2.6" W.C.	300	1/3	48" x 21"
G58	G58P	4.6" W.C.	3.8" W.C.	500	1/2	50" x 24"
G69	G69P	4.2" W.C.	3.3" W.C.	800	3/4	60" x 27"

1. Values given based on 0" W.C. firebox pressure, altitudes to 2,000 feet. Derate burner for altitudes over 2,000 feet by 4% for each 1,000 feet over sea level.
2. Maximum inlet pressure both gases: 14" W.C. Refer to Section VI *Piping* for high pressure.
3. Modulating and two-step burners are limited to a 3 to 1 turndown ratio.
4. Manifold pressures are approximate and will vary slightly according to job condition. See Section VII *Initial Start-Up* paragraph 11.
5. Pressures are based on 25% excess combustion air.
6. SCFM=Standard Cubic Feet/Minute

Table 1: Burner Specifications

Model	Minimum Firing Rate MBH*	Maximum Capacity in MBH at Combination Chamber- Back Pressure			Maximum Back Pressure in " W.C.	Maximum MBH* at Maximum B.P.
		0" W.C.	.25" W.C.	.50" W.C.		
G56	300	1075	950	875	0.7	700
G57	300	1500	1400	1325	0.8	1325
G58	500	1850	1750	1650	1.0	1400
G69	800	2500	2375	2275	1.0	2100

*1 MBH=1,000 BTU/HR.

Table 2: Maximum Capacity at Specified Back Pressures

I Ventilation

CAUTION: Unipower G-Series are not intended for outdoor installation and must be protected from excessive moisture. Provide adequate clearance for service and proper operation.

□ Open basements will generally allow sufficient air infiltration, so special provisions will seldom be required. If the heating plant is located in a separate furnace room or in an unusually tight basement, permanent means must be provided to supply an ample volume of fresh air for combustion and boiler room ventilation. A direct opening to the outside air should be provided sized on the basis of 1/2 square foot of free opening for each 1,000,000 BTU of burner rating when the vent connector is equipped



MATERIAL SAFETY DATA SHEET

DYNAPHOS IP LAF

SECTION 1: COMPANY and PRODUCT INFORMATION

Product Description: DYNAPHOS IP LAF

Product Use: Surface finishing chemistry

Prepared By: **Dynamix Inc.**
91 Esna Park Drive, Unit #7
Markham, Ontario, Canada
L3R 2S2
(905) 477-0900

Emergency Number: Canutec @ (613) 996-6666

SECTION 2: HAZARDOUS INGREDIENTS

INGREDIENT	CAS NUMBER	WT %	LD ₅₀	LC ₅₀	LDL ₀
Phosphoric acid	7664-38-2	7 – 13	1530 mg/kg (oral, rat)	Not available	220 mg/kg (unk, man)

SECTION 3: PHYSICAL and CHEMICAL PROPERTIES

Appearance: Clear light amber liquid	pH: 3 – 4.5	Specific Gravity: 1.1 – 1.2
Odour: Slight acid	Solubility: Complete in water	Freezing Point: n/a
Boiling Point: n/a	Vapour Density: n/a	Evaporation Rate: n/a

SECTION 4: FIRE AND EXPLOSION HAZARD

Flammable: No.

Extinguishing Media: Use agent suitable for surrounding fires.

Flashpoint (method): None.

Auto Ignition Temperature: None.



MATERIAL SAFETY DATA SHEET

DYNAPHOS IP LAF

Flammability Limits In Air (% b.v.): None.

Hazardous Combustion Products: Oxides of phosphorous.

Sensitivity to Impact: Not applicable

Sensitivity to Static Discharge: Not applicable.

SECTION 5: STABILITY and REACTIVITY DATA

Stability: Stable.

Conditions to Avoid: None known.

Incompatible Materials: Strong alkalis, oxidizers.

Hazardous Decomposition Products: Will not decompose under normal conditions.

Hazardous Polymerization: Will not occur.

SECTION 6: TOXICOLOGICAL INFORMATION

Potential Effects of Acute Exposure

Skin Contact: May cause burns to the skin.

Eye Contact: Corrosive to eyes.

Inhalation: Mist or vapor may severely irritate respiratory tract.

Ingestion: Harmful if swallowed. May cause burns to mouth, throat and stomach.

Potential Effects of Chronic Exposure

Precautions: Do not ingest, avoid contact with skin and eyes.

Occupational Exposure Limits: Phosphoric acid – IUPAC: 1 mg/m³.



MATERIAL SAFETY DATA SHEET

DYNAPHOS IP LAF

SECTION 7: PREVENTIVE MEASURES

Personal Protective Equipment

Hand Protection: Chemical resistant gloves.

Eye Protection: Safety eyewear / face shield.

Skin Protection: Personal protective equipment based upon task being performed and the risk involved.

Respiratory Protection: Wear appropriate respirator when ventilation is inadequate.

Engineering Controls: Local exhaust ventilation recommended.

Handling and Storage: Avoid contact with incompatible substances (strong alkalis, oxidizers). Keep container closed when not in use.

Spill Control and Disposal: Contain spilled material to ensure run-off does not reach a waterway. Absorb with an inert material and transfer to an appropriate disposal container. Dispose in accordance with all applicable regulations.

Transportation Information: Not TDG Regulated.

SECTION 8: FIRST AID MEASURES

Eye Contact: Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.

Skin Contact: Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash skin with soap and water. Do not re-use clothing or shoes until cleaned. If irritation develops, seek medical attention.

Inhalation: Move exposed person to fresh air. Provide oxygen if breathing is difficult. Seek immediate medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical attention.



MATERIAL SAFETY DATA SHEET

DYNAPHOS IP LAF

SECTION 9: PREPARATION INFORMATION

Prepared By: Technical department

Date: November 22, 2013

Revision: 03

Phone No.: (905) 477-0900

Notice: While the information and recommendations provided are believed to be accurate, Dynamix Inc., makes no warranty, express or implied and assumes no liability with respect to use of this information.



DYNAPHOS IP LAF

Liquid Multi-Metal Cleaner/Iron Phosphate

DYNAPHOS IP LAF is a low foaming, liquid, dual-purpose concentrate used to simultaneously clean and deposit a corrosion inhibitive phosphate coating on steel, galvanized steel and aluminum surfaces. Dynaphos IP LAF will leave an iridescent, blue coating and is an ideal surface for paint bonding.

FEATURES

- Provides excellent bonding properties for paint.
- Improves the impact resistance and flexibility of applied paint.
- Prevents the under-rusting of paint when the paint film is scored or chipped.
- Effectively cleans and produces a corrosion resistant coating on steel, galvanized steel and aluminum surfaces.
- Suitable for use in immersion and spray applications.
- Applied coating weights: 20 – 50 mg/ft².
- Very economical system.

EQUIPMENT

TANKS: Tanks should be 304 or 316 stainless steel.

HEATING AND COOLING: Heating coils should be fabricated from 304 or 316 stainless steel.

VENTILATION: Consult local environmental agencies.

Other optional equipment: Automatic chemical feeder.

REQUIRED INVENTORY

DYNAPHOS IP LAF: Main additive used for make-up and replenishment.

OPERATING CONDITIONS

In multi-stage systems, **DYNAPHOS IP LAF** can be applied in the first or third stage as a cleaner and phosphatizer.

CONCENTRATION DYNAPHOS IP LAF:

SPRAY APPLICATION: 1 – 4 % v/v

IMMERSION APPLICATION: 2 – 5 % v/v

TEMPERATURE: 50 – 65°C (120 – 150°F)

pH: 4.5 – 5.0

IMMERSION TIME:

SPRAY APPLICATION: 45 seconds – 2 minutes

IMMERSION APPLICATION: 1 - 4 minutes.

TYPICAL CYCLE

Dynaphos IP LAF

Rinse

DYNAFIN ICS OR DYNAFIN NC – Recommended for maximum corrosion protection

READ THE MSDS BEFORE USING THIS PRODUCT.



PURIFIED PHOSPHORIC ACID



TECHNICAL INFORMATION BULLETIN

Vapor Composition

The composition of the vapor which exists over a boiling solution of phosphoric acid is depicted in Figure 12.⁽¹³⁾ An aqueous solution of H_3PO_4 will give off almost pure water for temperatures up to about 300°C at which point the acid strength is about 103%. As the temperature of the solution increases, the vapor evolved will contain increasing amounts of P_2O_5 . For example, the approximate composition of the vapor at 760 mm pressure over a boiling solution at 600°C is 25% P_2O_5 .

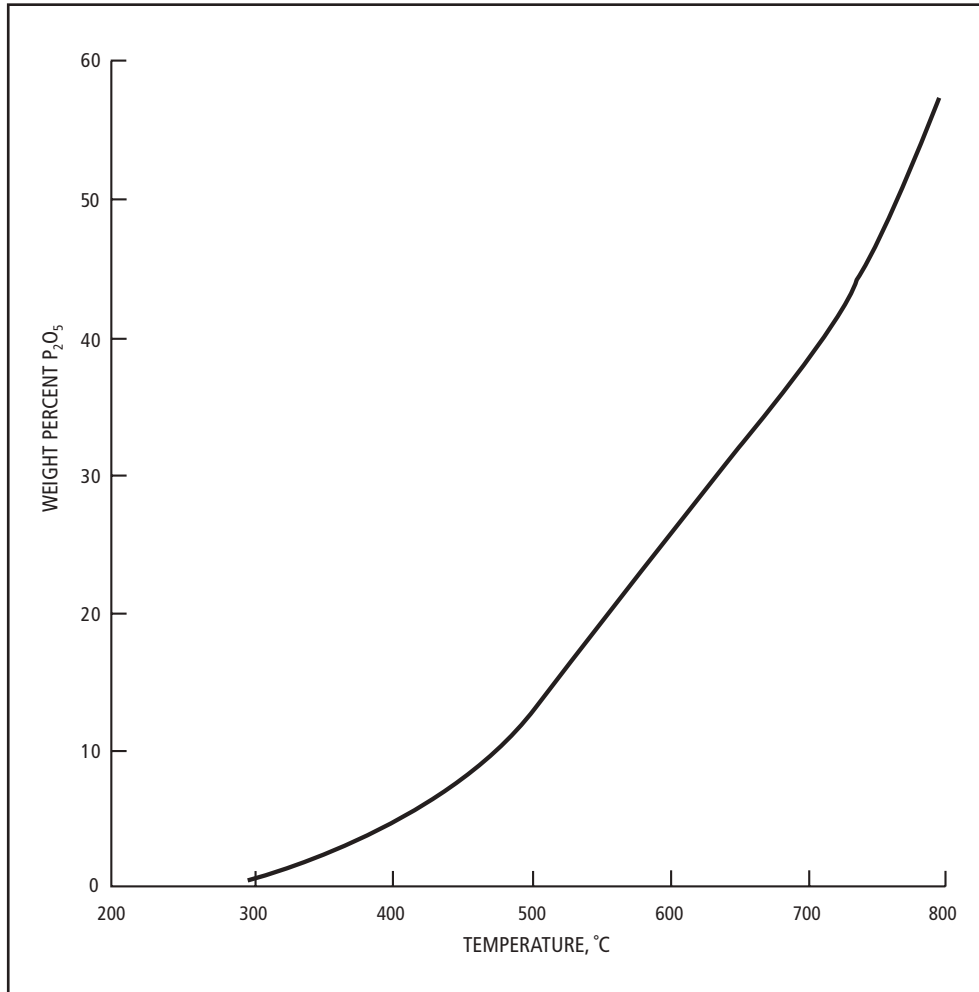


FIGURE 12: Vapor Composition Over Boiling Solutions

ENDNOTES

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20. U.S. Patent No. 4,113,502.
21. U.S. Patent No. 4,066,467.

PCS SALES AND SERVICE

PCS Contact List

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<p>Purchasing PCS Products</p>	<p>Customer Service customer.service@potashcorp.com (800) 654-4514 (Toll Free)</p>
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<p>Technical Support – Aurora Plant</p>	<p>Barrie Winn bwinn@pcsphosphate.com (252) 322-8188</p> <p>Ann Lang alang@pcsphosphate.com (252) 322-8123</p> <p>Tim Fau tafau@pcsphosphate.com (252) 322-8159</p> <p>Barbara James bjames@pcsphosphate.com (252) 322-8122</p>
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<p>Web site</p>	<p>www.potashcorp.com</p>

 **PotashCorp** 1101 Skokie Blvd., Northbrook, IL 60062
www.potashcorp.com

CAN Version 1.0 - Not Valide Without Verified Date

Print Date : 17-Aug-12
 Verified Date : 17-Aug-12

1. Product and Company Identification

Product Name : **HX622N53**
Chemical Name : Hybrid
Supplier / Manufacturer : Protech Chemicals Ltd.
 7600 Henri-Bourassa West
 Saint-Laurent, Québec
 Canada, H4S 1W3
 Tel:514-745-0200
 Fax:514-745-5774
Material Uses : Powder Coating.
Verified by : Protech Chemical Ltd.
Anti-Poison Centre : **1-800-463-5060 / (418) 656-8090**



2. Hazards Identification

WHMIS Status : This material is considered hazardous by WHMIS.
Routes of Entry : Dermal contact. Inhalation. Eye contact. Ingestion.
Potential Health Effects
Acute : Slightly irritating the respiratory system, skin or eyes.
Chronic : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

3. Composition / Information on Ingredients

<u>Component name</u>	<u>CAS No.</u>	<u>% by weight</u>
Carbon black	1333-86-4	1 - 2
Talc	14807-96-6	1 - 2
Crystalline silica	14808-60-7	0.1 - 1.0

4. First - Aid Measures

General : In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.
Inhalation : Remove to fresh air, keep patient warm. Keep at rest. If breathing is irregular or stopped, administer artificial respiration. Give nothing by mouth. If unconscious place in recovery position and seek medical advice.
Skin Contact : Immediately remove all contaminated clothing. Wash skin thoroughly with soap and water or use recognised skin cleanser. DO NOT use solvents or thinners.
Eye Contact : Remove contact lenses, keep eyelids open. Flush with plenty of clean, fresh water (10 - 15 min.). If irritation persists, seek medical attention.
Ingestion : If swallowed, do not induce vomiting. Keep at rest. Get medical attention immediately. Never give anything by mouth to an unconscious person.

5. Fire - Fighting Measures

Flammability of the Product : Finely divided powders are potentially explosive when suspended in air. Precautions should be taken to prevent the formation of dust in concentration above flammable, explosive or occupational exposure limits. (LEL: 30 g/m³)
Extinguishing Media : Use dry chemicals, CO₂, water spray or foam. If aluminum or zinc appears in section 3, use dry chemicals only. DO NOT use water jet.

1/4

- Special Exposure Hazards** : Promptly isolate the scene by removing all persons from vicinity of the incident if there is a fire. No action should be taken without suitable training.
- Hazardous Combustion Products** : Decomposition products may contain:
- Carbon Oxides
 - Nitrogen Oxides
 - Sulphur Oxides
 - Metal Oxide / Oxides

6. Accidental Release Measures

- Small Spill & Leak** : Move containers from spill area. Use appropriate tools to put spilled solid in an identified waste disposal container. Dispose of according to local and regional authority requirements.
- Large Spill & Leak** : Move containers from spill area. Prevent entry into sewers, water courses or confined areas. Avoid creating dusty conditions, use water spray to reduce dust. Eliminate all source of ignition. Use appropriate tools to put spilled solid in an identified waste disposal container. Dispose of according to local and regional authority requirements.
- Environmental Precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

7. Handling and Storage

- Handling** : Use appropriate personal protective equipment (see section 8). Precautions should be taken to prevent formation of dust in concentrations above flammable, explosive or occupational exposure limits. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Preparation may charge electrostatic: always use earth leads when transferring from one container to the other. Use only with adequate ventilation. Eating, drinking and smoking should be prohibited in areas where this material is handled, stores and processed. Wash hands and face before eating, drinking and smoking. Avoid contact with skin and eyes. Avoid inhalation of dust, particulates and spray mist arising from the application of this powder.
- Storage** : Store between 5°C and 25°C in a dry, well ventilated place away from sources of heat and direct sunlight. Keep container tightly close and sealed until ready to use. Isolate from source of heat, sparks and open flame. Do not store in unlabeled containers. Containers which are opened must be carefully released and kept upright to prevent leakage.

8. Exposure Controls / Personal Protection

Exposure Controls

<u>Component name</u>	<u>CAS No.</u>	<u>Exposure guidelines</u>
Carbon black	1333-86-4	TLV: 3.5 mg/m ³
Talc	14807-96-6	TLV: 2 mg/m ³
Crystalline silica	14808-60-7	TLV: 0.05 mg/m ³ (ACGIH)

Personal Protection

- Eye Protection** : Safety eye-wear should be used when there is a likelihood of exposure.
- Skin Protection** : Personal should wear protective clothing. Avoid prolonged contact with skin. Use gloves when handling powder. Barrier creams applied before powder use may help to protect the exposed areas of the skin but they should not be applied once exposure has occurred.
- Respiratory Protection** : Avoid breathing dust. Mechanical exhaust is recommended. Use a NIOSH approved respirator to remove particles. Respirator selection must be based on known or anticipated exposure levels.
- Hygiene Measures** : Use good personal hygiene practices. Wash hands before eating, drinking and using the lavatory and at the end of the working period. Wash contaminated clothing before reuse. Contaminated clothing should be washed independently of all other types of clothing.



9. Physical and Chemical Properties

- Physical State** : Solid Powder
- Flash Point** : Closed cup > 300°C
- Colour** : Black
- Relative Density** : 1.2 - 1.9 g/cm³

Solubility in Water	: Insoluble in cold or hot water.
pH	: Neutral
VOC	: 0 (g/l)

10. Stability and Reactivity

Stability	: The product is stable under recommended storage and handling conditions.
Hazardous Decomposition Products	: When exposed to high temperatures may produce hazardous decomposition products such as carbon monoxide and dioxide, smoke, oxides of nitrogen.

11. Toxicological Information

Acute Toxicity

<u>Component name</u>	<u>Result LD50/LC50</u>
Carbon black	LD50/oral/rat: >15400 mg/kg LD50/dermal/rabbit: >3000 mg/kg
Talc	LD50/oral/rat: >500 mg/kg
Crystalline silica	LD50/oral/rat: >500 mg/kg

Carcinogenicity Classification

<u>Component name</u>	<u>ACGIH</u>	<u>IARC</u>	<u>EPA</u>	<u>NIOSH</u>	<u>NTP</u>	<u>OSHA</u>
Carbon black	A4	2B				
Talc	A4	3				
Crystalline silica	A2	1		CA	K	

Chronic Toxicity	: Contain material which may cause target organ damage: upper respiratory tract, lungs, skin or eye.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Reproductive Toxicity	: No known significant effects or critical hazards.

12. Ecological Information

Aquatic Ecotoxicity	: Not available
Biodegradability	: Not available.

13. Disposal Considerations

Waste Disposal	: Disposal should be in accordance with applicable regional, national and local laws and regulations.
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14. Transport Information

TDG	: Not a TDG controlled material.
IMDG	: Not controlled material.
IATA	: Not controlled material.

15. Regulatory Information

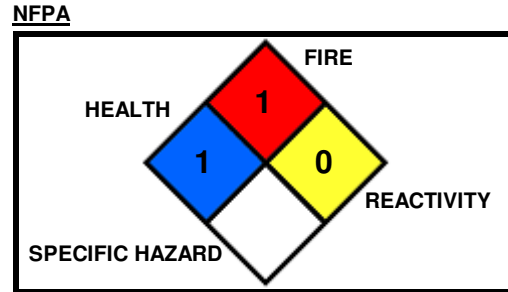
DSL	: All components of this product are included in the Domestic Substance List (DSL).
WHMIS Classification	: D2A - Very Toxic Material Causing Other Toxic Effects

16. Other Information

HMIS

HX622N53		
HEALTH	*	1
FLAMMABILITY		1
PHYSICAL HAZARD		0
PERSONAL PROTECTION		F

* - Chronic Hazard	2 - Moderate Hazard
0 - Minimal Hazard	3 - Serious Hazard
1 - Slight Hazard	4 - Severe Hazard



Health (Blue)	Fire Hazard (Red)	Reactivity (Yellow)	Specific Hazard
4- Deadly	4- Below 73F - v.flam.	4- May detonate	OXY- Oxidizer
3- Extreme danger	3- 73 to 100F -flam.	3- Shock or heat may detonate	ACID- Acid
2- Hazardous	2- 101 to 200F -comb.	2- violent chem. reaction	ALK- Alkali
1- Slightly hazardous	1- Over 200F -slightly comb.	1- Unstable if heated	COR- Corrosive
0- Normal material	0- Will not burn	0- Stable	W- Use no water
			RAD- Radiation haz.

To the best of knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazard and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Prism Powder Coatings Ltd.
www.PrismPowder.com

Material Safety Data Sheet

Date Printed:

2013-05-10

Prepared By:

Chris Ashour

Technical Information:

1800-774-7611 or sales@prispowder.com

Head Office:

321 Edgeley Blvd Concord, ON, L4K 3Y2

Emergency:

Phone Technical Director (905) 660-5361

Prism Powder Coatings Ltd.
321 Edgeley Blvd.
Concord Ontario, Canada
L4K 3y2

WWW.PRISMPOWDER.COM

Prism Powder Coatings Ltd.
2890 Carquest Drive
Brunswick, Ohio USA
44212

Section 1: PRODUCT IDENTIFICATION

Product Code:	EB-0182-S	Product Name:	SATIN BLACK EPOXY	Product Type:	EPOXY
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Section 2: HAZARDS AND EXPOSURE LIMITS

Component/Exposure Limits	CAS#	% by Wt.
BISPHENOL-A EPOXY RESIN	25036-25-3	30 - 40%
Oral Toxicity: LD50 rat > 2000 mg/kg - Expected to be low toxicity		
Dermal Toxicity: LD50 rat > 2000 mg/kg - Expected to be low toxicity		
BARIUM SULPHATE	7727-43-7	30 - 40%
TWA-ACGIH 10 MG/M3		
TWA-OSHA 15 MG/M3		
PYROMELLITIC ACID	54553-90-1	1 - 1.5%
Oral Toxicity: LD50 rat: 7400 mg/kg		
Dermal Toxicity: LD50 rat > 2000 mg/kg		
CARBON BLACK	1333-86-4	0.1 - 1.3%
3.5 MG/M3		
LD50 >8000MG/KG RAT ORAL		

Section 3: HAZARDS IDENTIFICATION

HMIS CODES: H1:F0:R0:PE

Acute Overexposure Effects

EYE: Causes eye irritation by abrasion.

SKIN: May cause slight skin irritation. Dryness, itching, cracking, burning, redness, and swelling are conditions associated with excessive skin contact. Prolonged or repeated contact may cause an allergic skin reaction.

INGESTION: May be harmful if swallowed.

INHALATION: Dusts generated during application of powder coatings harmful if inhaled.

CHRONIC (CANCER) INFORMATION: Yes, see chronic effects below

TERATOLOGY (BIRTH DEFECT) INFORMATION: N/A

REPRODUCTION INFORMATION: Not tested

Chronic Overexposure Effects

None known

Section 4: FIRST AID MEASURES

EYES: Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. If irritation persists, contact a

poison control center, emergency room, or physician as further treatment may be necessary.

SKIN: Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. If any symptoms persist, contact a poison control center, emergency room, or physician as further treatment may be necessary.

INGESTION: Gently wipe or rinse the inside of the mouth with water. Sips of water may be given. Never give anything by mouth to an unconscious person. Contact a poison control center, emergency room or physician right away as further treatment may be necessary.

INHALATION: Remove from area to fresh air. If symptomatic, contact a poison control center, emergency room or physician for treatment information.

NOTE TO PHYSICIANS: If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available.

Section 5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT: Not applicable

FLAMMABLE LIMITS: Not Available

Lower flammable limit: N/A

Upper flammable limit: N/A

AUTOIGNITION TEMPERATURE: N/A

HAZARDOUS COMBUSTION PRODUCTS: See section 10 hazardous decomposition

EXTINGUISHING MEDIA: Use extinguishers appropriate for surrounding fire.

FIREFIGHTING INSTRUCTIONS: PROTECTION OF FIREFIGHTERS:

Water spray may be ineffective. Water spray may be used to cool closed containers that are exposed to extreme heat. If water is used, fog nozzles are preferable. Firefighters should wear self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Dust can form explosive mixture in air. May produce hazardous decomposition products when exposed to extreme heat.

Extreme heat includes, but is not limited to, flame cutting, brazing, and welding.

Section 6: ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL:

Sweep up and return to container or dispose of as in section 13.

Section 7: HANDLING AND STORAGE

HANDLING: Store in cool, dry, well ventilated place.

STORAGE: For better shelf life, store in sealed container and not above 80°F (26°C).

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Overexposure to powder coatings dust may be prevented by ensuring ventilation controls, dust exhaust, or fresh air entry. Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below

the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

RESPIRATORY PROTECTION: Use an appropriate NIOSH-approved particulate filter respirator. Read the respirator manufacturer's instructions and literature carefully to determine the type of airborne contaminants against which the respirator is effective, its limitations, and how it is to be properly fitted and used. Overexposure to powder coatings dust may be prevented by ensuring ventilation controls, dust exhaust, or fresh air entry. Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

SKIN PROTECTION: This coating does not pose a skin absorption hazard. Gloves selection should be based on the work task to prevent skin irritation. Clean contaminated clothing and shoes.

EYE PROTECTION: Wear sufficient eye protection to prevent contact with powdered materials.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: n/a
MELTING POINT: N/A
VAPOR PRESSURE: N/A
VAPOR DENSITY: N/A
SOLUBILITY IN WATER: Less than 0.5%
SPECIFIC GRAVITY: 1.61
pH: Not applicable
ODOR: N/A
APPEARANCE: N/A

Section 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY : Product is stable
INCOMPATIBILITY: High concentrations of airborne dust may ignite explosively. All ignition sources should be eliminated when this product is dispersed in air. Avoid contact with strong alkalis, strong mineral acids, or strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: - Oxides of Carbon - Oxides of Barium - Oxides of Sulfur - Oxides of Nitrogen - Lower molecular weight polymer fractions - Smoke and Soot.

HAZARDOUS POLYMERIZATION: Will not occur

Section 11: TOXICOLOGICAL INFORMATION

EYE: See section 3 acute toxicity effects
SKIN: See section 3 acute toxicity effects
INGESTION: See section 3 acute toxicity effects
INHALATION: N/A
CHRONIC/CARCINOGENICITY: Yes, See section 3 chronic toxicity warnings
TERATOLOGY: Product not tested
REPRODUCTION: Product not tested
MUTAGENICITY: Product not tested
OTHER INFORMATION:
None known

Section 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: No data available
CHEMICAL FATE INFORMATION: None known, no data available

Section 13: DISPOSAL CONSIDERATIONS

Provide maximum ventilation, only personnel equipped with proper respiratory and skin and eye protection should be permitted in the area. Take up spilled material with sawdust, vermiculite, or other absorbent material and place in containers for disposal. Waste material must be disposed of in accordance with federal, state, provincial and local environmental control regulations. Empty containers should be recycled by an appropriately licensed reconditioner/salvager or disposed of through a permitted waste management facility.

Section 14: TRANSPORT INFORMATION

Proper Shipping Name: Paint, Dry - Non-Regulated
NOS Technical Name: None
Hazard Class: None
Subsidiary Class(es): None
UN Number: None
Packing Group: None
USA - RQ Hazardous Substances: None
USA-RQ Hazardous Substance
Threshold Ship Weight: None
Marine Pollutant Name: None

Section 15: REGULATORY INFORMATION(Not meant to be all inclusive)

U.S. TSCA INVENTORY: This product and/or all of its components are listed on the U.S. TSCA Inventory or is otherwise exempt from TSCA Inventory reporting requirements.

OSHA: N/A

CERCLA: SARA HAZARD CATEGORY: N/A

SECTION 313: *** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

INTERNATIONAL REGULATIONS:

CANADIAN WHMIS: Class D, Division 2, Subdivision A

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): N/A

EINECS: N/A

STATE REGULATIONS:

VOLATILE ORGANIC COMPOUNDS: No test method established, generally regarded as <1%

Section 16: OTHER INFORMATION

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH : 1

FLAMMABILITY: 0

REACTIVITY: 0

PHYSICAL HAZARDS: E

HMIS RATING SYSTEM: 0=MINIMAL, 1=SLIGHT, 2=MODERATE, 3=SERIOUS, 4=SEVER, *=CHRONIC EFFECTS

Caution: HMIS ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS ratings are not required on MSDSs the preparer may choose to provide them. HMIS ratings are to be used with a fully implemented HMIS program. HMIS is a registered mark of the National Paint & Coatings Association.

PREPARED BY PRISM POWDER COATINGS LTD.: 2013-05-10

To the best of our knowledge, the information contained herein is accurate. Final determination of suitability of any material is the responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guaranty that these are the only hazards that exist.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200), the supplier notification requirements of SARA Title III, Section 313 and other applicable right-to-know regulations.

*****END OF MSDS*****



Prism Powder Coatings Ltd.
www.PrismPowder.com

Material Safety Data Sheet

Date Printed:

2013-05-10

Prepared By:

Chris Ashour

Technical Information:

1800-774-7611 or sales@prispowder.com

Head Office:

321 Edgeley Blvd Concord, ON, L4K 3Y2

Emergency:

Phone Technical Director (905) 660-5361

Prism Powder Coatings Ltd.
321 Edgeley Blvd.
Concord Ontario, Canada
L4K 3y2

WWW.PRISMPOWDER.COM

Prism Powder Coatings Ltd.
2890 Carquest Drive
Brunswick, Ohio USA
44212

Section 1: PRODUCT IDENTIFICATION

Product Code:	HI-0106-M	Product Name:	NEVADA HYBRID	Product Type:	HYBRID
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Section 2: HAZARDS AND EXPOSURE LIMITS

Component/Exposure Limits	CAS#	% by Wt.
BISPHENOL-A EPOXY RESIN	25036-25-3	20 - 30%
Oral Toxicity: LD50 rat > 2000 mg/kg - Expected to be low toxicity		
Dermal Toxicity: LD50 rat > 2000 mg/kg - Expected to be low toxicity		
BARIUM SULPHATE	7727-43-7	10 - 20%
TWA-ACGIH 10 MG/M3		
TWA-OSHA 15 MG/M3		

Section 3: HAZARDS IDENTIFICATION

HMIS CODES: H1:F0:R0:PE

Acute Overexposure Effects

EYE: Causes eye irritation by abrasion.

SKIN: May cause slight skin irritation. Dryness, itching, cracking, burning, redness, and swelling are conditions associated with excessive skin contact. Prolonged or repeated contact may cause an allergic skin reaction.

INGESTION: May be harmful if swallowed.

INHALATION: Dusts generated during application of powder coatings harmful if inhaled.

CHRONIC (CANCER) INFORMATION: No

TERATOLOGY (BIRTH DEFECT) INFORMATION: N/A

REPRODUCTION INFORMATION: Not tested

Chronic Overexposure Effects

None known

Section 4: FIRST AID MEASURES

EYES: Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. If irritation persists, contact a poison control center, emergency room, or physician as further treatment may be necessary.

SKIN: Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. If any symptoms persist, contact a poison control center, emergency room, or physician as further treatment

may be necessary.

INGESTION: Gently wipe or rinse the inside of the mouth with water. Sips of water may be given. Never give anything by mouth to an unconscious person. Contact a poison control center, emergency room or physician right away as further treatment may be necessary.

INHALATION: Remove from area to fresh air. If symptomatic, contact a poison control center, emergency room or physician for treatment information.

NOTE TO PHYSICIANS: If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available.

Section 5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT: Not applicable

FLAMMABLE LIMITS: Not Available

Lower flammable limit: N/A

Upper flammable limit: N/A

AUTOIGNITION TEMPERATURE: N/A

HAZARDOUS COMBUSTION PRODUCTS: See section 10 hazardous decomposition

EXTINGUISHING MEDIA: Use extinguishers appropriate for surrounding fire.

FIREFIGHTING INSTRUCTIONS: PROTECTION OF FIREFIGHTERS:

Water spray may be ineffective. Water spray may be used to cool closed containers that are exposed to extreme heat. If water is used, fog nozzles are preferable. Firefighters should wear self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Dust can form explosive mixture in air. May produce hazardous decomposition products when exposed to extreme heat.

Extreme heat includes, but is not limited to, flame cutting, brazing, and welding.

Section 6: ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL:

Sweep up and return to container or dispose of as in section 13.

Section 7: HANDLING AND STORAGE

HANDLING: Store in cool, dry, well ventilated place.

STORAGE: For better shelf life, store in sealed container and not above 80°F (26°C).

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Overexposure to powder coatings dust may be prevented by ensuring ventilation controls, dust exhaust, or fresh air entry. Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

RESPIRATORY PROTECTION: Use an appropriate NIOSH-approved particulate filter respirator. Read the respirator manufacturer's instructions and literature carefully to determine the type of airborne contaminants against

which the respirator is effective, its limitations, and how it is to be properly fitted and used. Overexposure to powder coatings dust may be prevented by ensuring ventilation controls, dust exhaust, or fresh air entry. Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

SKIN PROTECTION: This coating does not pose a skin absorption hazard. Gloves selection should be based on the work task to prevent skin irritation. Clean contaminated clothing and shoes.

EYE PROTECTION: Wear sufficient eye protection to prevent contact with powdered materials.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: n/a
MELTING POINT: N/A
VAPOR PRESSURE: N/A
VAPOR DENSITY: N/A
SOLUBILITY IN WATER: Less than 0.5%
SPECIFIC GRAVITY: 1.62
pH: Not applicable
ODOR: N/A
APPEARANCE: N/A

Section 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY : Product is stable
INCOMPATIBILITY: High concentrations of airborne dust may ignite explosively. All ignition sources should be eliminated when this product is dispersed in air. Avoid contact with strong alkalies, strong mineral acids, or strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: - Oxides of Carbon - Oxides of Barium - Oxides of Sulfur - Oxides of Nitrogen - Lower molecular weight polymer fractions - Smoke and Soot.

HAZARDOUS POLYMERIZATION: Will not occur

Section 11: TOXICOLOGICAL INFORMATION

EYE: See section 3 acute toxicity effects
SKIN: See section 3 acute toxicity effects
INGESTION: See section 3 acute toxicity effects
INHALATION: N/A
CHRONIC/CARCINOGENICITY: No
TERATOLOGY: Product not tested
REPRODUCTION: Product not tested
MUTAGENICITY: Product not tested
OTHER INFORMATION:
None known

Section 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: No data available
CHEMICAL FATE INFORMATION: None known, no data available

Section 13: DISPOSAL CONSIDERATIONS

Provide maximum ventilation, only personnel equipped with proper respiratory and skin and eye protection should be permitted in the area. Take up spilled material with sawdust, vermiculite, or other absorbent material and place

in containers for disposal. Waste material must be disposed of in accordance with federal, state, provincial and local environmental control regulations. Empty containers should be recycled by an appropriately licensed reconditioner/salvager or disposed of through a permitted waste management facility.

Section 14: TRANSPORT INFORMATION

Proper Shipping Name: Paint, Dry - Non-Regulated
NOS Technical Name: None
Hazard Class: None
Subsidiary Class(es): None
UN Number: None
Packing Group: None
USA - RQ Hazardous Substances: None
USA-RQ Hazardous Substance
Threshold Ship Weight: None
Marine Pollutant Name: None

Section 15: REGULATORY INFORMATION(Not meant to be all inclusive)

U.S. TSCA INVENTORY: This product and/or all of its components are listed on the U.S. TSCA Inventory or is otherwise exempt from TSCA Inventory reporting requirements.

OSHA: N/A

CERCLA: SARA HAZARD CATEGORY: N/A

SECTION 313: *** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

INTERNATIONAL REGULATIONS:

CANADIAN WHMIS: Class D, Division 2, Subdivision A

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): N/A

EINECS: N/A

STATE REGULATIONS:

VOLATILE ORGANIC COMPOUNDS: No test method established, generally regarded as <1%

Section 16: OTHER INFORMATION

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH : 1

FLAMMABILITY: 0

REACTIVITY: 0

PHYSICAL HAZARDS: E

HMIS RATING SYSTEM: 0=MINIMAL, 1=SLIGHT, 2=MODERATE, 3=SERIOUS, 4=SEVER, *=CHRONIC EFFECTS

Caution: HMIS ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS ratings are not required on MSDSs the preparer may choose to provide them. HMIS ratings are to be used with a fully implemented HMIS program. HMIS is a registered mark of the National Paint & Coatings Association.

PREPARED BY PRISM POWDER COATINGS LTD.: 2013-05-10

To the best of our knowledge, the information contained herein is accurate. Final determination of suitability of any material is the responsibility of

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This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200), the supplier notification requirements of SARA Title III, Section 313 and other applicable right-to-know regulations.

*****END OF MSDS*****



Prism Powder Coatings Ltd.
www.PrismPowder.com

Material Safety Data Sheet

Date Printed:

2/14/14

Prepared By:

Chris Ashour

Technical Information:

1800-774-7611 or sales@prispowder.com

Head Office:

321 Edgeley Blvd Concord, ON, L4k 3Y2

Emergency:

Phone Technical Director (905) 660-5361

Prism Powder Coatings Ltd.
321 Edgeley Blvd.
Concord Ontario, Canada
L4K 3y2

WWW.PRISMPOWDER.COM

Prism Powder Coatings Ltd.
2890 Carquest Drive
Brunswick, Ohio USA
44212

Section 1: PRODUCT IDENTIFICATION

Product Code: PW-0765-H

Product Name: W 2 WHITE
POLYESTER

Product Type: POLYESTER

Section 2: HAZARDS AND EXPOSURE LIMITS

Component/Exposure Limits	CAS#	% by Wt.
TITANIUM DIOXIDE TWA-ACGIH 10 MG/M3	13463-67-7	20 - 30%
BARIUM SULPHATE TWA-ACGIH 10 MG/M3 TWA-OSHA 15 MG/M3	7727-43-7	10 - 20%
TRIGLYCIDYL ISOCYANURATE TWA - ACGIH 0.05 MG/M3	2451-62-9	2.6 - 4.5%
SILICON DIOXIDE AMORPHOUS TWA-ACGIH 10MG/M3 TWA-OSHA 6MG/M3	7631-86-9	1.5 - 2.5%
Aluminum Hydroxide TWA-ACGIH 10 mg/m3	21645-51-2	1.5 - 2.5%

Section 3: HAZARDS IDENTIFICATION

HMIS CODES: H2:F0:R0:PE

Acute Overexposure Effects

EYE: Causes eye irritation by abrasion.

SKIN: May cause slight skin irritation. Dryness, itching, cracking, burning redness, and swelling are conditions associated with excessive skin contact. Prolonged or repeated contact may cause an allergic skin reaction.

INGESTION: May be harmful if swallowed.

INHALATION: Dusts generated during application of powder coatings harmful if inhaled.

CHRONIC (CANCER) INFORMATION: No

TERATOLOGY (BIRTH DEFECT) INFORMATION: N/A

REPRODUCTION INFORMATION: Not tested

Chronic Overexposure Effects

None known

Section 4: FIRST AID MEASURES

EYES: Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. If irritation persists, contact a poison control center, emergency room, or physician as further treatment may be necessary.

SKIN: Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. If any symptoms persist, contact a poison control center, emergency room, or physician as further treatment may be necessary.

INGESTION: Gently wipe or rinse the inside of the mouth with water. Sips of water may be given. Never give anything by mouth to an unconscious person. Contact a poison control center, emergency room or physician right away as further treatment may be necessary.

INHALATION: Remove from area to fresh air. If symptomatic, contact a poison control center, emergency room or physician for treatment information.

NOTE TO PHYSICIANS: If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available.

Section 5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT: Not applicable

FLAMMABLE LIMITS: Not Available

Lower flammable limit: N/A

Upper flammable limit: N/A

AUTOIGNITION TEMPERATURE: N/A

HAZARDOUS COMBUSTION PRODUCTS: See section 10 hazardous decomposition

EXTINGUISHING MEDIA: Use extinguishers appropriate for surrounding fire.

FIREFIGHTING INSTRUCTIONS: PROTECTION OF FIREFIGHTERS:

Water spray may be ineffective. Water spray may be used to cool closed containers that are exposed to extreme heat. If water is used, fog nozzles are preferable. Firefighters should wear self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Dust can form explosive mixture in air. May produce hazardous decomposition products when exposed to extreme heat.

Extreme heat includes, but is not limited to, flame cutting, brazing, and welding.

Section 6: ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL:

Sweep up and return to container or dispose of as in section 13.

Section 7: HANDLING AND STORAGE

HANDLING: Store in cool, dry, well ventilated place.

STORAGE: For better shelf life, store in sealed container and not above 80°F (26°C).

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Overexposure to powder coatings dust may be prevented by ensuring ventilation controls, dust exhaust, or fresh air entry. Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

RESPIRATORY PROTECTION: Use an appropriate NIOSH-approved particulate filter respirator. Read the respirator manufacturer's instructions and literature carefully to determine the type of airborne contaminants against which the respirator is effective, its limitations, and how it is to be properly fitted and used. Overexposure to powder coatings dust may be prevented by ensuring ventilation controls, dust exhaust, or fresh air entry. Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

SKIN PROTECTION: This coating does not pose a skin absorption hazard. Glove selection should be based on the work task to prevent skin irritation. Clean contaminated clothing and shoes.

EYE PROTECTION: Wear sufficient eye protection to prevent contact with powdered materials.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: n/a
MELTING POINT: N/A
VAPOR PRESSURE: N/A
VAPOR DENSITY: N/A
SOLUBILITY IN WATER: Less than 0.5%
SPECIFIC GRAVITY: 1.74
pH: Not applicable
ODOR: N/A
APPEARANCE: N/A

Section 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY : Product is stable
INCOMPATIBILITY: High concentrations of airborne dust may ignite explosively. All ignition sources should be eliminated when this product is dispersed in air. Avoid contact with strong alkalies, strong mineral acids, or strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: - Oxides of Carbon - Oxides of Barium - Oxides of Sulfur - Oxides of Nitrogen - Lower molecular weight polymer fractions - Smoke and Soot.

HAZARDOUS POLYMERIZATION: Will not occur

Section 11: TOXICOLOGICAL INFORMATION

EYE: See section 3 acute toxicity effects
SKIN: See section 3 acute toxicity effects
INGESTION: See section 3 acute toxicity effects
INHALATION: N/A
CHRONIC/CARCINOGENICITY: No
TERATOLOGY: Product not tested
REPRODUCTION: Product not tested
MUTAGENICITY: Product not tested
OTHER INFORMATION:

Titanium Dioxide: Oral LD50 (rat) >10,000 g/kg

Section 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: No data available

CHEMICAL FATE INFORMATION: None known, no data available

Section 13: DISPOSAL CONSIDERATIONS

Provide maximum ventilation, only personnel equipped with proper respirator skin and eye protection should be permitted in the area. Take up spilled material with sawdust, vermiculite, or other absorbent material and place in containers for disposal. Waste material must be disposed of in accordance with federal, state, provincial and local environmental control regulations. Empty containers should be recycled by an appropriately licensed reconditioner/salvager or disposed of through a permitted waste management facility.

Section 14: TRANSPORT INFORMATION

Proper Shipping Name: Paint, Dry - Non-Regulated

NOS Technical Name: None

Hazard Class: None

Subsidiary Class(es): None

UN Number: None

Packing Group: None

USA - RQ Hazardous Substances: None

USA-RQ Hazardous Substance

Threshold Ship Weight: None

Marine Pollutant Name: None

Section 15: REGULATORY INFORMATION(Not meant to be all inclusive)

U.S. TSCA INVENTORY: This product and/or all of its components are listed on the U.S. TSCA Inventory or is otherwise exempt from TSCA Inventory reporting requirements.

OSHA: N/A

CERCLA: SARA HAZARD CATEGORY: N/A

SECTION 313: *** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

INTERNATIONAL REGULATIONS:

CANADIAN WHMIS: Class D, Division 2, Subdivision A

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): N/A

EINECS: N/A

STATE REGULATIONS:

VOLATILE ORGANIC COMPOUNDS: No test method established, generally regarded as <1%

Section 16: OTHER INFORMATION

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH : 2

FLAMMABILITY: 0

REACTIVITY: 0

PHYSICAL HAZARDS: E

HMIS RATING SYSTEM: 0=MINIMAL, 1=SLIGHT, 2=MODERATE, 3=SERIOUS, 4=SEVER, *=CHRONIC EFFECTS

Caution: HMIS ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS ratings are not required on MSDSs the preparer may choose to provide them. HMIS ratings are to be used with a fully implemented HMIS program. HMIS is a registered mark of the National Paint & Coatings Association.

PREPARED BY PRISM POWDER COATINGS LTD.: 2/14/14

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This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200), the supplier notification requirements of SARA Title III, Section 313 and other applicable right-to-know regulations.

*****END OF MSDS*****

MATERIAL SAFETY DATA SHEET

PE96-E6603
19 00

DATE OF PREPARATION
May 27, 2013

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

PE96-E6603

PRODUCT NAME

POWDURA® Hybrid Powder Coating, PE9-62305E DB T-29 PLATINUM

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
<i>*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)</i>	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
11	471-34-1	Calcium Carbonate		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	15 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
14	7727-43-7	Barium Sulfate		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
2	13463-67-7	Titanium Dioxide		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of dust.
EYE or SKIN contact with the product or dust.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure to dust may cause irritation.

INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

May cause allergic skin reaction in susceptible persons or skin sensitization.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	1*
Flammability	1
Reactivity	1

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.

If irritation persists or occurs later, get medical attention.

Remove contaminated clothing and launder before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT Not Applicable	LEL Not Applicable	UEL Not Applicable	FLAMMABILITY CLASSIFICATION Not Applicable
	Applicable	Applicable	EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Dust at sufficient concentrations can form explosive mixtures with air. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition.
Sweep up material taking care not to generate airborne dust.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in a cool, dry area out of direct sunlight.
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.
Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.
Avoid eye and prolonged skin contact with dust. Avoid generating or breathing airborne dust.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use of barrier cream on exposed skin is recommended.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.44 lb/gal	1490 g/l
SPECIFIC GRAVITY	1.50	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	7.0	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

0.00 lb/gal 0 g/l Less Water and Federally Exempt Solvents
 0.00 lb/gal 0 g/l Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

High concentrations of airborne dust which may ignite explosively.

INCOMPATIBILITY

Contamination with Water, Acids, or Alkalis can cause evolution of hydrogen, which may result in dangerously increased pressures in closed containers.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
471-34-1	Calcium Carbonate	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
7727-43-7	Barium Sulfate	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	Titanium Dioxide	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

Not Regulated for Transportation.

Canada (TDG)

Not Regulated for Transportation.

IMO

Not Regulated for Transportation.

IATA/ICAO

Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
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No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

PE96-M6601
20 00

DATE OF PREPARATION
May 27, 2013

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

PE96-M6601

PRODUCT NAME

POWDURA® Hybrid Powder Coating, PE9-6336M T97 MICA SILVER

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
11	1317-65-3	Calcium Carbonate		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
21	7727-43-7	Barium Sulfate		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
9	13463-67-7	Titanium Dioxide		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
0.2	1333-86-4	Carbon Black		
		ACGIH TLV	3.5 MG/M3	
		OSHA PEL	3.5 MG/M3	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of dust.
EYE or SKIN contact with the product or dust.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure to dust may cause irritation.

INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

May cause allergic skin reaction in susceptible persons or skin sensitization.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	1*
Flammability	1
Reactivity	1

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.
If irritation persists or occurs later, get medical attention.
Remove contaminated clothing and laundry before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Applicable	Applicable	EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam			

UNUSUAL FIRE AND EXPLOSION HAZARDS

Dust at sufficient concentrations can form explosive mixtures with air.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition.

Sweep up material taking care not to generate airborne dust.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in a cool, dry area out of direct sunlight.

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.

Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid eye and prolonged skin contact with dust. Avoid generating or breathing airborne dust.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use of barrier cream on exposed skin is recommended.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	14.24 lb/gal	1705 g/l
SPECIFIC GRAVITY	1.71	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	Not Available	
VAPOR DENSITY	Not Available	
SOLUBILITY IN WATER	Not Available	
pH	7.0	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
0.00 lb/gal	0 g/l	Less Water and Federally Exempt Solvents
0.00 lb/gal	0 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

High concentrations of airborne dust which may ignite explosively.

INCOMPATIBILITY

Contamination with Water, Acids, or Alkalis can cause evolution of hydrogen, which may result in dangerously increased pressures in closed containers.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on experimental animal data, however, there is insufficient evidence in humans for its carcinogenicity.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
1317-65-3	Calcium Carbonate	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
7727-43-7	Barium Sulfate	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	Titanium Dioxide	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
1333-86-4	Carbon Black	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

Not Regulated for Transportation.

Canada (TDG)

Not Regulated for Transportation.

IMO

Not Regulated for Transportation.

IATA/ICAO

Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
---------	-------------------	---------	-----------

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

SAFETY DATA SHEET

Version 5.2
Revision Date 05/07/2014
Print Date 07/08/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Poly(Bisphenol A-co-epichlorohydrin), glycidyl end-capped

Product Number : 406821

Brand : Aldrich

Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich Canada Co.
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 9058299500

Fax : +1 9058299292

Emergency Phone # (For both supplier and manufacturer) : 1-800-424-9300

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

WHMIS Classification

D2B Toxic Material Causing Other Toxic Effects Skin sensitiser

GHS Classification

Skin sensitisation (Category 1)

GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H317 May cause an allergic skin reaction.

Precautionary statement(s)
P280 Wear protective gloves.

HMIS Classification

Health hazard: 2
Flammability: 1
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	EC-No.	Index-No.	Concentration
Poly(Bisphenol A-co-epichlorohydrin), glycidyl end-capped			
25036-25-3	-	-	<=100%

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

Explosion data - sensitivity to mechanical impact

no data available

Explosion data - sensitivity to static discharge

no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.

Environmental precautions

Do not let product enter drains.

Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature: 2 - 8 °C

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Specific engineering controls

Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	viscous liquid
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	no data available
Boiling point	no data available
Flash point	113 °C (235 °F) - closed cup
Ignition temperature	no data available
Auto-ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	1.169 g/cm ³ at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

Bases, Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

no data available

Inhalation LC50

no data available

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

May cause allergic skin reaction.

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

no data available

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION**Toxicity**

no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS**Product**

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION**WHMIS Classification**

D2B Toxic Material Causing Other Toxic Effects Skin sensitiser

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Aldrich - 406821

Further information

Copyright 2014 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Barium sulfate

Product Number : 243353

Brand : Sigma-Aldrich

Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich Canada Co.
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 9058299500

Fax : +1 9058299292

Emergency Phone # (For both supplier and manufacturer) : 1-800-424-9300

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Damage to the lungs.

WHMIS Classification

Not WHMIS controlled.

Not a dangerous substance or mixture according to the Globally Harmonised System (GHS).

HMIS Classification

Health hazard: 0

Chronic Health Hazard: *

Flammability: 0

Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.

Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes May cause eye irritation.

Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Baryte

Formula : BaO₄S

Molecular Weight : 233.39 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Barium sulfate			
7727-43-7	231-784-4	-	-

4. FIRST AID MEASURES

General advice

Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIREFIGHTING MEASURES

Conditions of flammability

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Sulphur oxides, Barium oxide

Explosion data - sensitivity to mechanical impact

no data available

Explosion data - sensitivity to static discharge

no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid dust formation. Avoid breathing vapours, mist or gas.

Environmental precautions

Do not let product enter drains.

Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Barium sulfate	7727-43-7	TWA	10 mg/m ³	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
		TWA	10 mg/m ³	Canada. British Columbia OEL

Remarks	The 8-hour TWA listed in the Table is for the total dust. The substance also has an 8-hour TWA of 3 mg/m ³ for the respirable fraction.			
		TWAE V	5 mg/m ³	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
	The standard corresponds to dust containing no asbestos and the percentage in crystalline silica is less than 1 %.			
		TWAE V	10 mg/m ³	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
	The standard corresponds to dust containing no asbestos and the percentage in crystalline silica is less than 1 %.			

Personal protective equipment

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

General industrial hygiene practice.

Specific engineering controls

Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form powder

Colour white

Safety data

pH 7

Melting point/freezing point Melting point/range: 1,580 °C (2,876 °F)

Boiling point 1,600 °C (2,912 °F) at 1,013 hPa (760 mmHg)

Flash point not applicable

Ignition temperature no data available

Auto-ignition temperature no data available

Lower explosion limit no data available

Upper explosion limit	no data available
Vapour pressure	no data available
Density	4.500 g/cm ³
Water solubility	insoluble
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

Aluminum, Phosphorus

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Sulphur oxides, Barium oxide
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

no data available

Inhalation LC50

no data available

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

Genotoxicity in vivo - mouse - Intraperitoneal
Micronucleus test

Carcinogenicity

Carcinogenicity - rat - Intrapleural
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration: Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

Prolonged inhalation of dust may cause baritosis, a benign pneumoconiosis. If ingested, the presence of soluble barium salts as impurities may cause toxic reactions due to bioaccumulation., Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

no data available

Additional Information

RTECS: CR0600000

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION**WHMIS Classification**

Not WHMIS controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION**Further information**

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SAFETY DATA SHEET

Version 5.1
 Revision Date 05/09/2014
 Print Date 07/08/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Aluminum hydroxide

Product Number : 239186

Brand : Sigma-Aldrich

Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich Canada Co.
 2149 Winston Park Drive
 OAKVILLE ON L6H 6J8
 CANADA

Manufacturer : Sigma-Aldrich Corporation
 3050 Spruce St.
 St. Louis, Missouri 63103
 USA

Telephone : +1 9058299500

Fax : +1 9058299292

Emergency Phone # (For both supplier and manufacturer) : 1-800-424-9300

Preparation Information : Sigma-Aldrich Corporation
 Product Safety - Americas Region
 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

WHMIS Classification

Not WHMIS controlled.

Not a dangerous substance or mixture according to the Globally Harmonised System (GHS).

HMIS Classification

Health hazard: 0

Flammability: 0

Physical hazards: 0

Potential Health Effects

Inhalation : May be harmful if inhaled. May cause respiratory tract irritation.

Skin : May be harmful if absorbed through skin. May cause skin irritation.

Eyes : May cause eye irritation.

Ingestion : May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : H_3AlO_3

Molecular Weight : 78.00 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Aluminium hydroxide			
21645-51-2	244-492-7	-	<=100%

4. FIRST AID MEASURES

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIREFIGHTING MEASURES**Conditions of flammability**

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Aluminum oxide

Explosion data - sensitivity to mechanical impact

no data available

Explosion data - sensitivity to static discharge

no data available

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Avoid dust formation. Avoid breathing vapours, mist or gas.

Environmental precautions

No special environmental precautions required.

Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling**

Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
Aluminium hydroxide	21645-51-2	TWAEV	10 mg/m ³	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
Remarks	The standard corresponds to dust containing no asbestos and the percentage in crystalline silica is less than 1 %.			

Personal protective equipment**Respiratory protection**

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

General industrial hygiene practice.

Specific engineering controls

Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 300 °C (572 °F)
Boiling point	no data available
Flash point	not applicable
Ignition temperature	no data available
Auto-ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	2.42 g/cm ³
Water solubility	0.00009 g/l at 20 °C (68 °F) - OECD Test Guideline 105 - insoluble
Partition coefficient:	no data available

n-octanol/water	
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

Strong acids

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Aluminum oxide

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

LD50 Oral - rat - female - > 2,000 mg/kg

Inhalation LC50

no data available

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

Skin - rabbit - No skin irritation - 4 h - OECD Test Guideline 404

Serious eye damage/eye irritation

Eyes - rabbit - No eye irritation - OECD Test Guideline 405

Respiratory or skin sensitisation

Maximisation Test - guinea pig - Does not cause skin sensitisation. - OECD Test Guideline 406

Germ cell mutagenicity

Genotoxicity in vitro - mouse - lymphocyte - with and without metabolic activation - negative

Genotoxicity in vivo - rat - male - Oral - negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity

Reproductive toxicity - Human - female - Oral

Effects on Newborn: Physical.

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

Nausea, Vomiting, Constipation.

Synergistic effects

no data available

Additional Information

RTECS: BD0940000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	semi-static test NOEC - Salmo trutta - > 0.07 mg/l - 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	static test NOEC - Daphnia magna (Water flea) - > 0.005 mg/l - 48 h Method: OECD Test Guideline 202
Toxicity to algae	static test NOEC - Pseudokirchneriella subcapitata (Selenastrum capricornutum) - > 0.004 mg/l - 72 h Method: OECD Test Guideline 201

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

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IMDG

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IATA

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15. REGULATORY INFORMATION

WHMIS Classification

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