

Boeing Canada Technology
Winnipeg Division
99 Murray Park Road
Winnipeg, Manitoba, Canada R3J 3M6

April 25th, 2016

Tracy Braun, M.Sc., Director,
Environmental Approvals Branch
Manitoba Conservation and Water Stewardship
Suite 160, 123 Main Street
Winnipeg, Manitoba R3C 1A5



Dear Director,

RE: Boeing Canada Operation Ltd – 99 Murray Park Road – Notice of Alteration

The Boeing Canada Operations Ltd. facility located at 99 Murray Park Road in Winnipeg Manitoba and is currently operating under Environment Act Licence No.1301R originally issued on August 28th, 1989.

Section 14 of the Manitoba Environment Act requires that Manitoba Conservation be notified and approve of any alterations to a development.

This letter and the enclosed information is intended to provide additional information for the Notice of Alteration that was originally submitted on May 28th, 2013 advising of Boeing Canada Operations Ltd.'s plans to construct an addition to the west side of the existing facility in order to support the production of Boeing's 737 MAX airplane program.

I trust that the enclosed information satisfies the requirements of the Environment Act Proposal under The Environment Act. If however, you have any questions or require any further information; please contact the undersigned.

Sincerely,

A handwritten signature in blue ink that reads "R. Wroblewski".

Rebecca Wroblewski
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[Boeing Canada Winnipeg](#)
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Desk: (204) 833-7196
rebecca.wroblewski@boeing.com

Environment Act Proposal Form



Name of the development: BOEING CANADA OPERATIONS LIMITED	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): CLASS 1 DEVELOPMENT - MANUFACTURING PLANT	
Legal name of the applicant: BOEING CANADA OPERATIONS LIMITED	
Mailing address of the applicant: 99 MURRAY PARK ROAD	
Contact Person: REBECCA WROBLEWSKI	
City: WINNIPEG	Province: MANITOBA Postal Code: R3J 3M6
Phone Number: 204-833-7196	Fax: N/A email: <i>rebecca.wroblewski@boeing.com</i>
Location of the development: 99 MURRAY PARK ROAD, WINNIPEG MANITOBA	
Contact Person: REBECCA WROBLEWSKI	
Street Address: 99 MURRAY PARK ROAD	
Legal Description: AEROSPACE COMPOSITES MANUFACTURING	
City/Town: WINNIPEG	Province: MANITOBA Postal Code: R3J 3M6
Phone Number: 204-833-7196	Fax: N/A email: <i>rebecca.wroblewski@boeing.com</i>
Name of proponent contact person for purposes of the environmental assessment: REBECCA WROBLEWSKI	
Phone: 204-833-7196	Mailing address: 99 MURRAY PARK ROAD
Fax: N/A	WINNIPEG, MB R3J 3M6
Email address: rebecca.wroblewski@boeing.com	
Webpage address: N/A	
Date: 04/22/2016	Signature of proponent, or corporate principal of corporate proponent: <i>R. Wroblewski</i>
	Printed name: Rebecca Wroblewski

**Boeing Winnipeg Murray Park Expansion
Environment Act Proposal**

**Boeing Canada Operations Ltd.
Winnipeg, Manitoba**

April 25, 2016

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Boeing Winnipeg Murray Park Expansion Environment Act Proposal

1. Executive Summary

This Environment Act Proposal is to propose the development of Boeing Canada Operations Limited's Boeing Winnipeg Murray Park Expansion Facility located at 99 Murray Park Road in Winnipeg Manitoba.

The Boeing Canada Operations Ltd. facility located at 99 Murray Park Road is currently operating under Environment Act Licence Number 1301R, issued on August 28, 1989 and later revised on October 15th, 1997.

2. Introduction and Background

Boeing Canada Operations Ltd. (Boeing Winnipeg) is one of the largest aerospace composite manufacturers in Canada, employing over 1,500 people in 800,000 square feet of space in two locations in Winnipeg, Manitoba. Boeing Winnipeg produces nearly 1,000 end item composite parts and assemblies for Boeing Commercial Airplanes. Major products include wing to body fairings, engine strut forward fairings, engine strut aft fairings and landing gear doors. Boeing Winnipeg is also responsible for designing and manufacturing many parts for Boeing's 787 Dreamliner program.

Boeing Winnipeg has maintained current third party certification of their ISO 14001:2004 Environmental Management System since 2008.

In order to support the production of the acoustic inner barrel (AIB) for Boeing's new 737 MAX program, additional manufacturing space is required at Boeing Winnipeg's Murray Park facility.

This new development consists of 160,802 square feet of additional space at the west end of the existing building to support the production of Boeing's 737 MAX program.

The development matches the existing building in terms of construction material, building height, and occupancy. The development houses an open manufacturing space, a controlled contamination room, paint booth, autoclaves, receiving area and docks, and office space. The development building is targeting LEED Silver Certification.

The purpose of this Environment Act Proposal is to ensure that the development is designed, constructed, and operated in an environmentally responsible manner consistent with provincial environmental legislation, policies, and guidance.

3. Description of the Development

3.1 Certificate of Title

See Appendix A.

3.2 Mineral Rights

Not Applicable.

3.3 Existing Land Use

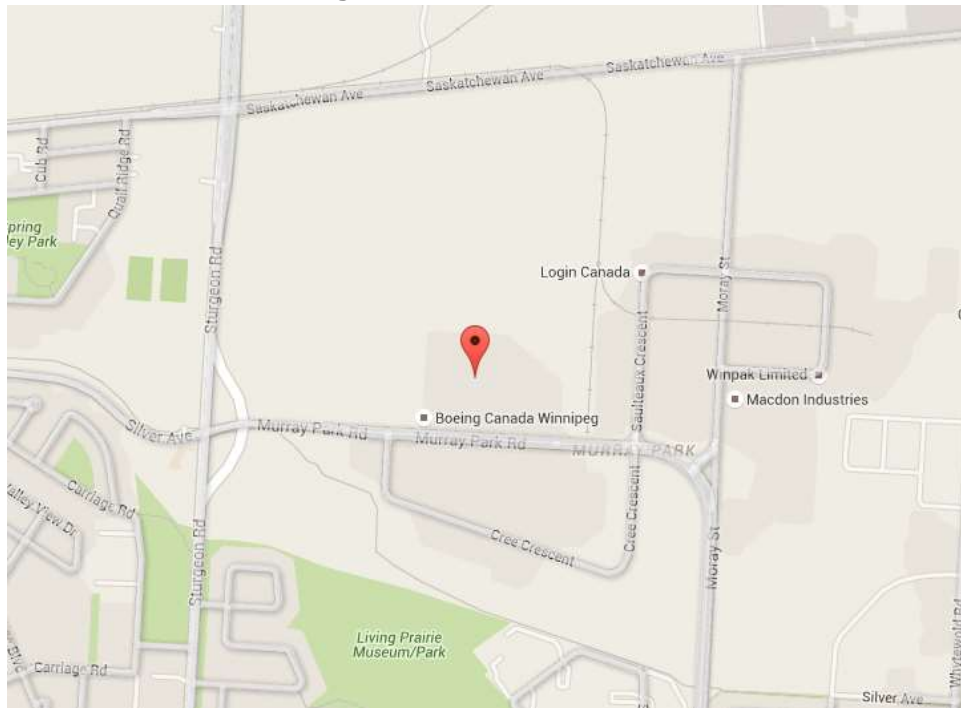


Boeing Canada Operations Ltd. Boeing Winnipeg Murray Park Facility – Aerial Photograph

The subject property located at 99 Murray Park Road in Winnipeg, Manitoba, Canada has a total land area of 128 acres with a developed land area of 39 acres. The commercial space is currently used for the manufacturing of composite aircraft parts.

The property is located in an industrial area in the City of Winnipeg (Murray Industrial Park). The site is bounded by Murray Park Road to the south, Sturgeon Road to the west, Saskatchewan Avenue to the north and Saulteaux Crescent to the east. Commercial properties are located to the north of the site. Commercial and light industrial/manufacturing properties are located to the east and south of the site. Vacant land is located to the west of the site and residential properties are present further to the west.

Figure 1: Site Location¹



¹ City of Winnipeg Citizen's Information Service (Google Maps 2016)

3.4 Land Use Designation & Zoning Designation

The land use designation according to The City of Winnipeg Zoning By-law 200/06 for the property located at 99 Murray Park Road is M-2 (Manufacturing – General) with additional PDO Airport Vicinity zoning.

3.5 Planning

The detailed planning phase for the expansion development at Boeing Winnipeg's Murray Park facility began in October of 2012. The Design Builder was mandated to pursue LEED Silver certification through the Canada Green Building Council. The design process for the development was based on the Integrated Design Approach (IDP).

3.5.1 Predesign Phase

An intensive two day design charrette was conducted to determine project goals and to set the groundwork for decision making. A charter agreement was initiated by setting out objectives together between Boeing Winnipeg and the contracted consultant team. This charter was further refined at subsequent IDP meetings and later served as a touch stone when value engineering options were vetted in order to meet the project and cost threshold. The initial design charrette was followed up by an energy charrette that furthered the design approach to include the exploration of improved energy performance opportunities, goals, and targets. Key targets identified included the pursuit of measurement and verification and enhanced commissioning.

3.5.2 Design Phase

The design team worked through the design of the development; circling inward from massing, orientation to the passive building design (skin, glazing, shading, daylighting, glazing ratios etc.) to more active energy systems. Energy modeling and comparative analysis of systems became a focus for the team to vet the pros and cons of each system. Throughout the process, the architectural design was fully collaborated with that of the other building engineering design disciplines. The building design methodology incorporated sustainable criteria to target LEED Silver minimum requirements. Weekly meetings between the consultant and Boeing Winnipeg served as collaborative opportunities for design discussion and a high level of owner involvement. Design options were developed by the consultant for presentation and consideration by Boeing. Through this approach, a high degree of "informed client consent" was reached.

3.5.3 Construction Phase

Construction of the development building began in October of 2012 with a Full Construction Permit being approved on July 29th, 2013. Construction of the development building was considered substantially complete in October of 2014.

Selective demolition was required to accommodate the building expansion development. Plans were produced to identify components to remain, or be salvaged, as well as what components were to be removed. Salvaged material remained the property of Boeing, removed material was to be disposed of off-site with every effort made to divert the material from the landfill. Boeing's Environment, Health and Safety (EHS) specialists reviewed and approved all material being removed from the site.

The existing building remained functional while the expansion development was under construction. Portions of the existing west wall were penetrated to provide connection(s) to the expansion development. Existing building additions (lean-to-shed) on the west end of the existing building were removed to make way for the expansion development.

3.5.4 Commissioning of Major Equipment Phase

The construction of the first autoclave to be added to the development began in June of 2014 and is predicted to be completed in May of 2016. The construction of the second autoclave to be added to the development is scheduled to begin in May of 2016 and is predicted to be completed in April of 2018.

The construction of the Paint Booth began in January of 2016 and is predicted to be completed in June of 2016.

3.5.5 Proposed Operations and Equipment

Proposed operations and equipment to be included in the manufacturing space of the development are described in the table below:

Table 1: Proposed Operations and Equipment Descriptions

Proposed Operation	Operation and Equipment Description
Cloth Cutting <i>737 AIB</i>	Pre-impregnated carbon fiber composite, composite adhesive, and composite peel ply are all cut using a Conveyor-style Cloth Cutter and 2D NC Machine. This operation will occur within the controlled contamination room located in the expansion development. It is not predicted that this operation will have any negative environmental impacts.
Core Trim <i>737 AIB</i>	Fiberglass core is trimmed using an abrasive cutter rotary style tool (a small, floor mounted tool with a pneumatically driven abrasive cutter that is used to remove excess core) and vacuum cleaned as necessary.
Layup (1st, 2nd, Insitu) <i>737 AIB</i>	Segments/Piles of pre-impregnated carbon fiber composite, composite adhesive, and peel ply are placed and manipulated to match the contour of the part mold (tool). This operation is aided by Overhead Laser Target (OLT) equipment that is used to guide the operator. This operation will occur within the controlled contamination room located in the expansion development. It is not predicted that this operation will have any negative environmental impacts.
Autoclaves and Oven Cure <i>737 AIB</i>	Two identical autoclaves (pressure vessels that are used to process parts and materials that require exposure to elevated pressure and temperature conditions) are used to cure parts. Parts are then cured in a non-pressurized oven (cure oven).
Detool and Solvent Cleaned <i>737 AIB</i>	Tool is disassembled and the surface is solvent cleaned using Frekote (Appendix B) and prepared as necessary. This operation occurs beneath a fume booth (Non-Pressurized Open Front Booth).

Robotic Laser Cleaning 737 AIB	Tool is moved into a Class 1 Laser fully enclosed room (enclosure) and an inverted robot that is suspended over the tool cleans (laser ablation) it to remove release agent (excess resin, Frekote, or any other contaminant) on the surface using a Clean Laser CL500 (Class 4 YAG laser source). The robotic laser cleaning operation utilizes integral exhaust at the source of the cleaning to capture any fumes.
Trim 737 AIB	An enclosed 5-axis Horizontal Machining Center (Computer Numerical Control (CNC) Machine) with the ability to pivot a tool and/or part at various orientations is used to trim, mill, and drill composite parts.
Panel Inspection 737 AIB	Manual General Inspection. This operation will have no environmental impact.
Non-Destructive Inspection (NDI) 737 AIB	A Pneumatic Part Handling Arm is used to manipulate the part into position. Part is ultrasonically inspected using a waster based robotic pulse-echo scanner (NDI Machine).
Sand and Fill 737 AIB	Part is sanded and any voids/gaps/holes are filled with an auto body-style filler. Part is re-sanded after the filler has cured. This operation occurs within an Environmental Booth (recirculating air booth) that is designed to filter airborne contaminants from the sanding operations.
Robotic Perforation Drill 737 AIB	Robotic drilling units operate in synchronized movement with one another to drill perforations in the part. Part is perforated with a robotic drill. A Pneumatic Part Handling Arm is used to manipulate the part into position.
Defuzz 737 AIB	Part is sanded to remove burrs from robotic perforation. This operation is conducted within an Environmental Booth (recirculating air booth) that is designed to filter airborne contaminants from sanding operations.
POA and Hole Quality Inspection 737 AIB	Manual General Inspection. This operation will have no environmental impact.
Edge Seal and T12 737 AIB	Exposed graphite edges are sealed with an epoxy-based sealant (Appendix C), followed by a polythioether rubber based sealant (Appendix D) for exposed areas of core. An automatic sealant mixer is used to provide a thorough and consistent mix of the sealant. A low Temperature Cure Tent used to cure the sealant at a required temperature.
Paint Prep and Robotic Paint 737 AIB	Part is masked and run through a 2-coat paint cycle using aluminized primer (Appendix E). The part is then run through a flash-off room and a cure room. A Fume Booth (open-face, dry filter, side-draft exhaust paint booth) with an exhaust fan will be used for mixing paint and paint cap/pot cleaning. A Robotic Spray applicator will be used to apply aluminized primer. A Flash-Off room will be used to allow flash-off (solvents) of the part. A Cure room will provide regulated temperature to cure the paint.
Final and Impedance Inspection 737 AIB	General Inspection using an Impedance Meter, an instrument used to measure the ratio of voltage to current

	in a given circuit at a given frequency. This operation will have no environmental impact.
Crating <i>737 AIB</i>	Part is placed on a wooden crate using a Pneumatic Part Handling Arm to manipulate the part into position and sealed for shipping. This operation will have no environmental impact.
Assembly <i>777</i>	Assembly of Parts for the 777 Program (777 Engine Strut Forward Fairing (ESFF), 777 Ducts, 777 CIP Engine Strut Aft Fairing (ESAF), and 777 Engine Strut Aft Fairing (ESAF)). This operation involves some drilling, for which integral (point-source) vacuum collection is designed to capture dust.
787 MLGD <i>787</i>	Staging of parts only. This operation will have no environmental impact.
Receiving <i>Support Function</i>	Receiving of products and materials only. This operation will have no environmental impact.
Parts Control Area (PCA) <i>Support Function</i>	Inventory management only. This operation will have no environmental impact.

3.6 Funding

No government funding has been applied for nor received for this development.

3.7 Previous Studies and Authorizations

- Full Construction Permit (#111756, 2013)
- Interim Occupancy Permit (#111756, 2013)
- Full Occupancy Permit (Estimated September 2016)

4. Description of Existing Environment in the Project Area

4.1 Local and Regional Setting

The development is located within a mixed-use industrial area in the City of Winnipeg in the Winnipeg Ecodistrict. The Winnipeg Ecodistrict occupies most of the southeastern portion of the Lake Manitoba Plain Ecoregion. It extends from the Canada-United States border to about 50° 30' N.

4.2 Site Topography and Subsurface Description

The ground surface of the development property and the surrounding areas are relatively level with a large hill rising approximately 10 meters above the surrounding area in the northwest section of the property.

The subsurface soils of the property are characterized as Glaciolacustrine deposits, characterized by silts and highly plastic clays underlain by silt till. Depth to the underlying Dolomitic Limestone bedrock (Gunton Member - Stony Mountain Formation) is approximately 5 to 11 meters.

4.3 Climate

The Winnipeg Ecodistrict is the most humid subdivision of the Grassland Transition Ecoclimatic Region in southern Manitoba. The prevailing climate is characterized by short, warm summers

and long, cold winters. The mean annual temperature is about 2.4 degrees Celsius, the average growing season is 183 days, and average growing degree days number about 1720.

The mean annual precipitation is approximately 515 millimeters of which less than one-quarter falls as snow. Precipitation varies greatly from year to year and is highest from late spring through summer. The average yearly moisture deficit is about 200 millimeters. The Winnipeg Ecodistrict has a cool, subhumid to humid, Boreal to a moderately cold, subhumid, Cryoboreal soil climate. No climate monitoring stations have been identified on, or in the immediate surrounding area of the property.

4.4 Surface and Ground Water

The nearest surface water body is Sturgeon Creek, located approximately 1.3 kilometers south of the property. The nearest significant surface water body is The Assiniboine River located approximately 3.5 kilometers to the southeast of the property. It is not predicted that the development will have any negative environmental impact on these water bodies.

On the development property, groundwater can be reached approximately 1.5 to 5.5 meters below the ground surface. It is anticipated that any groundwater in the vicinity flows in a southern direction, towards Sturgeon Creek and The Assiniboine River. Boeing Canada Operations Ltd.'s Murray Park facility is licensed under The Water Rights Act (License Number 2014-056) to divert water from a fractured limestone aquifer located on the property. The water is diverted from this aquifer through a supply well located onsite and is used solely for geothermal purposes (cooling water) and then returned to the aquifer through two return wells (See Appendix F). The wells are monitored on a monthly basis and water usage is calculated annually and submitted to Manitoba Conservation.

4.5 Terrestrial Environment

Located within the Manitoba Ecodistrict, the predominant terrestrial environment on the property consists of tall prairie grass, meadow prairie grass and meadow grass communities; dependent on the natural drainage conditions of specific locations. There are sparsely wooded areas located to the north and west of the property.

4.6 Protected and At-Risk Species

No protected, rare, threatened, or endangered species or any important sensitive species and/or habitats have been identified on, or in the vicinity of the property.

4.7 Regional Land and Resource Uses

The City of Winnipeg is the largest community in the Winnipeg Ecodistrict, and in all of Manitoba. Approximately two-thirds of Manitoba's population resides in Winnipeg and the surrounding areas. The predominant resource use in the region is the cultivation of soil for agriculture.

4.8 Socioeconomic Environment and Identification of Protected Areas

The former Harcourt Street Landfill site, previously owned and operated by the City of Winnipeg (1952-1964) is situated in an area of land in the northwestern section of the Boeing property. The landfill was capped with clay at the time of closure. The footprint of the former landfill has remained undeveloped since closure. The City of Winnipeg conducted regular environmental

monitoring at the landfill site beginning in 1981. The latest monitoring event occurred in July 2012. In 2013; a Limited Phase I Environmental Site Assessment was conducted by Golder Associates Ltd. who concluded that the historical data and subsequent monitoring of the area did not indicate any significant environmental concerns associated with the site. This area remains undeveloped.

It is noted that in the surrounding land of the property, a prehistoric archaeological site exists. The site is located in the northeast corner of Murray Park and Sturgeon Roads, west of Boeing Canada Operations Ltd. It is identified in "An Inventory of Pre-1880 Historical Resources in the City of Winnipeg" prepared by M.E. Kelly, an excerpt of which is included in Appendix G. This area remains undeveloped.

No significant public safety or human health risks have been identified in the development area. In addition, no protected areas, heritage resources, or First Nations communities have been identified in the immediate vicinity of the development.

5. Description of Potential Environmental and Human Health Effects of the Development and Proposed Mitigation Measures

5.1 Impacts to Air Quality and Air Quality Management

5.1.1 Core Trim (737 AIB)

The proposed Core Trim operation is predicted to have minimum impact to air quality. The proposed Core Trim operation involves an abrasive cutter tool that is used to trim excess core. The tool is designed to have a vacuum attached to provide point-source (integral) dust collection during the cutting. The vacuum will be inspected regularly to ensure that it is operating efficiently. The contents of the vacuum collection bags will be emptied on an as-needed basis and the collection bag and contents will be disposed of as regular non-hazardous waste.

5.1.2 Autoclave and Oven Cure (737 AIB)

The proposed autoclave operations are predicted to have minimum impact to air quality from the burning of natural gas and resin emissions from parts:

- The combustion system generated NO_x is guaranteed not to exceed 0.07 lbs/MMBtu over a range from 9 MMBtu/h to 3.3 MMBtu/h (HHV) with PUV Natural Gas. This value is based on the emission of 58 ppm_{dv} NO_x corrected to 3% O₂ dry volume basis.
- The combustion system generated CO is guaranteed not to exceed 0.11 lbs/MMBtu over a range from 9MMBtu/h to 3.3 MMBtu/h (HHV) with PUV Natural Gas. This value is based on the emission of 149 ppm_{dv} CO, corrected to 3% O₂ dry volume basis.
- It is proposed that the autoclaves will run two 8-12 hour cure cycles at a temperature of 360^oF.
- Following each cure cycle, the proposed autoclaves will purge to the outdoor environment as described below (See Appendix H):
 - Vacuum Receiver Exhaust (Wall Vent): Purge a nitrogen and compressed air mix at an exhaust temperature of 100^oF.
 - Main Pressurization Medium Exhaust: Purge a nitrogen and compressed air mix at a max flow rate of 20,000 scfm and an exhaust temperature of 100^oF.

The proposed autoclaves have resin traps to trap the resin emissions from airplane parts in

vapor form and condense them to liquid form. A preventative maintenance schedule will ensure that the condensed liquid is collected as hazardous waste and will be hauled off-site by the Hazardous Waste contractor (Miller Environmental Corporation).

5.1.3 Detool and Frekote (737 AIB)

The proposed Detool and Frekote application is predicted to have minimum impact to air quality. The proposed Detool and Frekote applications will include a local exhaust ventilation system (fume booth) to capture any fumes from the application of Frekote. The fume booth will be equipped with a tube axial in-line exhaust fan (14,000 CFM with a 3HP 48-v/60/3 TEFC motor) vented directly to the outdoors. The booth is equipped with a polyester filter offering high arrestance and low resistance to further reduce impact to air quality. Preventative maintenance will be performed on the fume booth. This will ensure that the booth is working at maximum efficiency. The booth will be inspected on a weekly basis to examine the condition of the booth and the filters. The filters will be inspected on a monthly basis. The operation of the exhaust fan will be inspected on a quarterly basis.

5.1.4 Robotic Laser Cleaning (737 AIB)

The proposed Robotic Laser Cleaning operation is predicted to have minimum impact to air quality. Any fumes from the proposed Laser Tool Cleaning operation will be captured using integral exhaust, specifically a TEKA-LFE-301 Fume Extractor designed with a 2 stage filtration system (1st stage particle filter cartridge, 2nd stage carbon cartridge). Any fumes from the proposed robotic laser cleaning operation will be captured by the TEKA-LFE-301 Fume Extractor unit and filtered before being returned to the factory space. Preventative maintenance will be performed regularly on the fume extractor to ensure that it is working at maximum efficiency and the filters will be changed on a regular basis (as determined by regular inspections/ as-needed basis).

5.1.5 Trim (737 AIB)

The proposed Trim operation is predicted to have minimum impact to air quality. The proposed Trim operation is conducted within an enclosed Computer Numerical Control (CNC) milling and drilling machine that has the ability to remotely control the position of the tool and drill and mill it at various orientations. The CNC machine will be equipped with a filter system and dust collectors. The CNC machine will be inspected daily, including the filters and the dust collectors. The dust collectors will be emptied on an as-needed basis and the contents will be disposed of as regular non-hazardous waste.

5.1.6 Sand and Fill, Defuzz (737 AIB)

The proposed Sand and Fill and Defuzz operation is predicted to have minimum impact to air quality. The proposed Sand and Fill and Defuzz operations are conducted within a recirculating air booth (Environmental Booth) that captures and filters particulates before recirculating air back into the factory space. Preventative maintenance will ensure that the booth is working at maximum efficiency. The booth will be inspected on a weekly basis to examine the condition of the booth and the filters will be changed on a monthly basis.

5.1.7 Robotic Perforation Drilling (737 AIB)

The proposed Robotic Perforation Drilling operation is predicted to have minimum impact to air quality. The proposed Robotic Perforation Drilling System is equipped with a point-source (integral) dust collector to capture graphite dust that results from drilling operations. It is estimated that at full-production rates; the operation will generate less than 120 lbs of graphite dust monthly. The dust collector will be inspected regularly to ensure that it is operating efficiently. The dust collector will be emptied on an as-needed basis and the contents will be disposed of as regular non-hazardous waste.

5.1.8 Paint Prep and Robotic Paint (737 AIB)

The proposed Paint Prep and Robotic Paint operation is predicted to have minimum impact to air quality. Paint mixing and paint cap/pot cleaning operations will be conducted under a chemical fume hood in order to capture any emissions. It is estimated that during a normal production day, 6.8 liters of Type 10 Aluminized Epoxy Primer will be mixed beneath the chemical fume hood. It is further estimated that during a normal production day, 0.4 liters of Methyl Ethyl Ketone (Appendix I) will be applied beneath the chemical fume hood during cleaning operations. The chemical fume hood is equipped with an 18" non-sparking exhaust fan rated at 2,000 cfm with ½ horsepower, 208 volt, 3 phase motor. Preventative maintenance will be performed regularly on the fume hood. This will ensure that the hood is working at maximum efficiency. The hood will be inspected on a weekly basis to examine the condition and operating efficiency of the hood and the exhaust fan.

The paint booth will be exhausted to the outdoors (See Appendix H) through a booth mounted exhaust fan, running at 22,200 CFM. The makeup air will be supplied directly to the booth via a roof mounted indirect-fired natural gas unit. The makeup air will be filtered twice; once at the makeup air unit and later at the booth discharge. The emission release from the new paint booth is predicted to be low as it is equipped with a triple-stage filter system (1st stage: CPA roll media, 2nd stage: 20"x20" MEPT panel filters, 3rd stage: 20"x20"x12" bag filters). In addition, the average paint time of 20 minutes per day and estimated paint volume of approximately 6.8 liters per day is considered insignificant. No noticeable particulate emissions are expected as the filter system is designed to minimize these effects. Preventative Maintenance will be performed on the paint booth. This will ensure that the booth is working at maximum efficiency. A bi-weekly inspection will be completed to examine the condition of the booth paint arrestors and filters. Filters are changed bi-weekly or sooner if required. Weekly manometers/magnahelic gauge readings are also done to ensure efficiency of the filter changes.

Both the flash-off and cure rooms are equipped with 2nd stage 20"x20" MEPT panel filters and have their own exhaust ducting. Preventative maintenance will ensure that the filters and exhaust are working at maximum efficiency. The rooms will be inspected on a weekly basis to examine their condition and the filters will be changed on a regular basis.

5.1.9 Assembly (777)

The proposed Assembly operation is predicted to have minimum impact to air quality. The proposed Assembly operation involves some drilling, for which point-source (integral) vacuum collection is designed to capture any dust during the drilling operation.

The vacuum will be inspected regularly to ensure that it is operating efficiently. The contents of the vacuum collection bags will be emptied on an as-needed basis and the collection bag and contents will be disposed of as regular non-hazardous waste.

5.2 Impacts to Water Quality and Water Quality Management

5.2.1 Non-Destructive Inspection (NDI) (737 AIB)

The proposed NDI operation is predicted to have minimum impact to water quality. The proposed NDI operation involves the periodic discharge of water containing low concentrations of biocide into a City of Winnipeg sanitary sewer located on the property. The discharge of this wastewater has been reviewed by the City of Winnipeg's Waste and Water Department (2014) and because the wastewater contains biocide (Appendix J) with dilutions in the range of 1-2.5L/1000 gallons, it has been approved for discharge into the sanitary sewer.

5.2.2 Cooling Towers and Chillers

Boeing Canada Operations Ltd.'s Murray Park facility is currently registered under the City of Winnipeg's Sewer By-law 92/2010 (License Number BOEI-2016) to annually discharge cooling water from the autoclaves and chillers into a land drainage sewer located on the property (Appendix K). The cooling water can be characterized as city water containing small concentrations of biocide, water-based deposit control agent, biodispersant, and corrosion inhibitor (Appendix L). This land drainage sewer discharges to the Assiniboine River at Woodhaven Boulevard (Waste Water Discharge License No. BOEI-2016 under Sewer By-law No.92/2010). Compliance with the conditions of the license and all clauses of the City of Winnipeg Sewer By-law No. 92/2010 are reviewed annually.

5.3 Impacts to Land

It is not predicted that there will be any effects on the wildlife, fisheries, forestry, or heritage resources being that the proposed operations are in an established industrial zone.

5.4 Impacts to Soil Quality

The proposed operations will be conducted in the developed area, i.e., on the factory shop floor. Hence, the soil quality of the surrounding undeveloped areas will not be affected.

5.5 Storage of Hazardous Materials

All chemicals and hazardous materials will be stored in appropriate cabinets and/or containments as per the requirements of the federal and provincial laws and regulations, and Boeing procedures.

5.6 Hazardous Waste Management

The Boeing Canada Operations Ltd. facility at 99 Murray Park Road is currently registered (Provincial ID No. MBG00001) under the Manitoba Regulation 175/87 (Generator Registration and Carrier Licencing Regulation).

Any hazardous waste generated from the proposed operations will be disposed of by an accredited Boeing Canada Operations Ltd. contractor. At present, Miller Environmental Corporation is responsible for transporting and disposing of all hazardous waste streams

generated from the two Boeing Canada Operations Ltd. Facilities, namely: 99 Murray Park Road and 1345 Redwood Avenue.

Currently, there are no plans for the decommissioning of the proposed operations. In all likelihood if this situation did arise, the proposed operations would be decommissioned in an environmental friendly manner.

5.7 Non-Hazardous Waste Management

Any non-hazardous waste generated from the proposed operations will be recycled or disposed of by accredited Boeing Canada Operations contractors. At present, the following contractors are responsible for transporting and disposing of all non-hazardous waste streams generated from the two Boeing Canada Operations Ltd. Facilities, namely; 99 Murray Park Road and 1345 Redwood Avenue: Waste Management (landfill waste, plastics, cardboard, wood), Samborski Environmental (compostables) and Orloff Metal Recycling (metals).

6. Follow up Plans Including Monitoring and Reporting

Boeing Winnipeg is committed to operating and maintaining the proposed development in accordance with all legal requirements (federal, provincial, and municipal).

With respect to health and safety matters and environmental considerations, the entire facility will be inspected on an ongoing and consistent basis by site Environment, Health, and Safety (EHS) professionals. In addition, the facility will be audited and recertified on an ongoing basis to meet its requirements under ISO 14001 standards.

7. Conclusion

Boeing Canada Operations Ltd.'s Murray Park expansion development will ensure that Boeing Winnipeg has the space and technology needed to continue as the largest aerospace composite manufacturing center in Canada.

The proposed expansion development of Boeing Winnipeg's Murray Park facility will not only provide the Boeing Company with the expanded production capabilities that it requires, but it has also been specifically designed and constructed to satisfy applicable environmental, health, and safety requirements.

Appendix A
Certificate of Title

DATE: 2012/04/02
TIME: 11:35

MANITOBA
STATUS OF TITLE

TITLE NO: 1106430/1

PAGE: 1

STATUS OF TITLE..... ACCEPTED
ORIGINATING OFFICE... WINNIPEG
REGISTERING OFFICE... WINNIPEG
REGISTRATION DATE.... 1989/06/05
COMPLETION DATE..... 1989/05/14

PRODUCED FOR... X
ADDRESS.....

CLIENT FILE... NA
PRODUCED BY... A. KASERBAUER

LEGAL DESCRIPTION:

2433265 MANITOBA LTD.

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREOF, IN THE FOLLOWING DESCRIBED LAND:

LOT 1 BLOCK 3 PLAN 10634 WLTO
IN RL 12 PARISH OF ST JAMES

ACTIVE TITLE CHARGE(S):

81-55648/1	ACCEPTED	CAVEAT THE CITY OF WINNIPEG	REG'D: 1981/07/28
	FROM/BY:		
	TO:		
	CONSIDERATION:	NOTES:	
1225932/1	ACCEPTED	MORTGAGE 2433265 MANITOBA LTD. MANITOBA DEVELOPMENT CORPORATION	REG'D: 1989/11/06
	FROM/BY:		
	TO:		
	CONSIDERATION:	\$7,200,000.00	NOTES:
3758062/1	ACCEPTED	BUILDERS LITN ABCO SUPPLY & SERVICE LTD. AGAINST: 2433265 MANITOBA LTD.	REG'D: 2009/04/09
	FROM/BY:		
	TO:		
	CONSIDERATION:	\$433,830.12	NOTES:

ADDRESS(ES) FOR SERVICE:

EFFECT	NAME AND ADDRESS	POSTAL CODE
ACTIVE	2433265 MANITOBA LTD 99 MURRAY PARK RD WINNIPEG MB	R3J 3Y6

ORIGINATING INSTRUMENT(S):

REGISTRATION NUMBER	TYPE	REG. DATE	CONSIDERATION	SWORN VALUE
1162922/1	T	1989/06/05	\$1.00	\$6,100,000.00
	PRESENTED BY:	AIKINS, MACAULEY & THORVALDSON		
	FROM:	BDEING OF CANADA LTD.		
	TO:	2433265 MANITOBA LTD.		

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE SYSTEM ON 2012/04/02 OF TITLE NUMBER 1106430/1

***** STATUS OF TITLE 1106430/1 CONTINUED ON NEXT PAGE *****

DATE: 2012/04/02
TIME: 11:35

MANITOBA
STATUS OF TITLE

TITLE NO: 1106430/1

PAGE: 2

STATUS OF TITLE..... ACCEPTED PRODUCED FOR... X
ORIGINATING OFFICE... WINNIPEG ADDRESS.....
REGISTERING OFFICE... WINNIPEG
REGISTRATION DATE.... 1983/06/05
COMPLETION DATE..... 1989/05/14

CLIENT FILE... NA
PRODUCED BY... A. KASERBAUER

FROM TITLE NUMBER(S):

B57574/1 ALL

LAND INDEX:

LOT BLOCK SURVEY PLAN

1 3 10634

NOTE:

ACCEPTED THIS 5TH DAY OF JUNE, 1989
BY W. KNIGHT FOR THE DISTRICT REGISTRAR OF
THE LAND TITLES DISTRICT OF WINNIPEG.

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA
STORAGE SYSTEM ON 2012/04/02 OF TITLE NUMBER 1106430/1.

***** END OF STATUS OF TITLE 1106430/1 *****

Appendix B
SDS: Frekote

Safety Data Sheet



Revision Number: 006.0

Issue date: 08/01/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: LOCTITE FREKOTE 710NC MOLD RELEASE known as FREKOTE 710-NC 1GA EN
 Product type: Mold Release
 Restriction of Use: None Identified
 Company address: Henkel Corporation, One Henkel Way, Rocky Hill, Connecticut 06067
 IDH number: 549255
 Item number: 38429
 Region: United States
 Contact information: Telephone: (860) 571-5100
 MEDICAL EMERGENCY Phone: Poison Control Center 1-877-671-4608 (toll free) or 1-303-592-1711
 TRANSPORT EMERGENCY Phone: CHEMTREC 1-800-424-9300 (toll free) or 1-703-527-3887
 Internet: www.henkelna.com

Contains one or more components for which a Toxic Substances Control Act (TSCA) Low Volume Exemption (LVE) applies. See Section 15.

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
 DANGER: FLAMMABLE LIQUID AND VAPOR. MAY BE FATAL IF SWALLOWED AND ENTERS AIRWAYS. CAUSES SKIN IRRITATION. CAUSES SERIOUS EYE IRRITATION. MAY CAUSE DROWSINESS OR DIZZINESS.

HAZARD CLASS	HAZARD CATEGORY
FLAMMABLE LIQUID	3
SKIN IRRITATION	2
EYE IRRITATION	2A
SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE	3
ASPIRATION HAZARD	1



Precautionary Statements

Prevention: Keep away from heat, sparks, open flames, hot surfaces - no smoking. Keep container tightly closed. No release into water. Use explosion-proof equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Avoid breathing vapors, mist, or spray. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves, eye protection, and face protection.

Response: IF SWALLOWED: Immediately call a physician or poison control center. If on skin (or hair): Take off immediately all contaminated clothing. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to remove. Continue rinsing. Call a poison control center or physician if you feel unwell. Do NOT induce vomiting. If skin irritation occurs: Get medical attention. If eye irritation persists: Get medical attention. Take off contaminated clothing. In case of fire: Use

IDH number: 549255

Product name: LOCTITE FREKOTE 710NC MOLD RELEASE known as FREKOTE 710-NC 1GA EN
 Page 1 of 6

Storage: foam, dry chemical or carbon dioxide to extinguish.
Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place.
Keep cool. Store locked up.

Disposal: Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
Dibutyl ether	142-96-1	10 - 30
Naphtha, hydrotreated heavy; (petroleum)	64742-48-9	60 - 100
Alkanes, C7-10-iso-	90622-86-3	1 - 5
Octane	111-65-9	1 - 5

* Exact percentage is a trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

Inhalation:	Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Skin contact:	Remove contaminated clothing and footwear. Immediately flush skin with plenty of water (using soap, if available). If symptoms develop and persist, get medical attention. Wash clothing before reuse.
Eye contact:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get immediate medical attention.
Ingestion:	Keep individual calm. Do not induce vomiting; contains petroleum distillates and/or aromatic solvents. Never give anything by mouth to an unconscious person. Get immediate medical attention. If vomiting occurs, prevent aspiration by keeping the patient's head below the knees.
Symptoms:	See Section 11.
Notes to physician:	This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity when deciding whether to induce vomiting.

5. FIRE FIGHTING MEASURES

Extinguishing media:	Water spray (fog), foam, dry chemical or carbon dioxide. Do not use high volume water jet.
Special firefighting procedures:	Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear. In case of fire, keep containers cool with water spray. Keep personnel upwind of fire.
Unusual fire or explosion hazards:	Vapors may form explosive mixtures with air. Do not handle or store near an open flame, heat or other sources of ignition. Hydrocarbon solvents are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering or pumping at high flow rates. If this charge reaches a significantly high level, sparks can form that may ignite vapors of flammable liquids.

Hazardous combustion products: Oxides of carbon. Irritating organic vapours. Acid smoke and fumes. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not allow product to enter sewer or waterways. Prevent further leakage or spillage if safe to do so. Advise authorities if product has entered or may enter sewers, water sources or extensive land areas. This product is insoluble in water and will float on surface.

Clean-up methods: Remove all sources of ignition. Ventilate area. Wear suitable protective clothing, gloves and eye/face protection. Keep upwind of the spilled material and isolate exposure. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Store in a partly filled, closed container until disposal.

7. HANDLING AND STORAGE

Handling: During use and until all vapors are gone: Keep area ventilated - do not smoke; extinguish all flames, pilot lights, and heaters; turn off stoves, electrical tools and appliances, and any other sources of ignition. Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Make sure containers are properly grounded before use or transfer of material. For operations where eye or face contact could occur, provide safety shower and eyewash fountain.

Storage: For safe storage, store at or below 48.8 °C (119.8 °F). Keep in a cool, well ventilated area away from heat, sparks and open flame. Keep container tightly closed until ready for use.

For information on product shelf life contact Henkel Customer Service at (800) 243-4874.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Dibutyl ether	None	None	None	None
Naphtha, hydrotreated heavy; (petroleum)	None	None	None	195 ppm TWA
Alkanes, C7-10-iso-	None	None	None	None
Octane	300 ppm TWA	500 ppm (2,350 mg/m ³) PEL	None	None

Engineering controls: Use explosion-proof mechanical ventilation and local exhaust to control contaminants to within their occupational exposure limits during the use of this product.

Respiratory protection: Use a NIOSH approved air-purifying respirator if the potential to exceed established exposure limits exists.

Eye/face protection: Safety goggles or safety glasses with side shields. Full face protection should be used if the potential for splashing or spraying of product exists. Safety showers and eye wash stations should be available.

Skin protection: Use chemical resistant, impermeable clothing including gloves and either an apron or body suit to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Color:	Colorless
Odor:	Mild, Solvent
Odor threshold:	Not available.
pH:	Not available.
Vapor pressure:	Not available.
Boiling point/range:	> 112 °C (> 233.6 °F) (1,013 hPa)
Melting point/ range:	Not determined
Specific gravity:	0.754
Vapor density:	Heavier than air.
Flash point:	31 °C (87.8 °F) Taglabue closed cup
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Autoignition temperature:	> 200 °C (> 392°F) (value for solvent)
Evaporation rate:	Slower than ether.
Solubility in water:	Slight
Partition coefficient (n-octanol/water):	Not available.
VOC content:	754 g/l of coating
Viscosity:	Not available.
Decomposition temperature:	Not available.

10. STABILITY AND REACTIVITY

Stability:	Risk of ignition. Stable under normal conditions of storage and use.
Hazardous reactions:	Will not occur.
Hazardous decomposition products:	Oxides of carbon. Traces of Ammonia. Hydrocarbons.
Incompatible materials:	Strong oxidizing agents. Humid air. Water.
Reactivity:	Not available.
Conditions to avoid:	Avoid static discharge. Vapors may form explosive mixtures with air. Spray mist may be flammable at temperatures below the flash point. Keep away from open flames, hot surfaces and sources of ignition. Fire or intense heat may cause violent rupture of packages. Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure:	Skin, Inhalation, Eyes, Ingestion
------------------------------	-----------------------------------

Potential Health Effects/Symptoms

Inhalation:	Vapors and mists will irritate nose and throat and possibly eyes. High vapor concentrations (greater than approximately 1000 ppm) may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.
Skin contact:	Causes skin irritation. Solvent action can dry and defat the skin, causing the skin to crack, leading to dermatitis.
Eye contact:	Causes serious eye irritation.
Ingestion:	This product may be fatal if it is swallowed. Aspiration may occur during swallowing or vomiting, resulting in lung damage. Central nervous system depression, including dizziness, drowsiness, fatigue, nausea, headache, unconsciousness.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects
Dibutyl ether	None	Irritant, Central nervous system, Cardiac, Kidney, Gastrointestinal, Mutagen
Naphtha, hydrotreated heavy; (petroleum)	None	Irritant
Alkanes, C7-10-iso-	None	Central nervous system, Irritant, Lung, Cardiac
Octane	Inhalation LC50 (RAT, 4 h) = 118 mg/l	Central nervous system, Irritant, Lung

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Dibutyl ether	No	No	No
Naphtha, hydrotreated heavy; (petroleum)	No	No	No
Alkanes, C7-10-iso-	No	No	No
Octane	No	No	No

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Dispose of according to Federal, State and local governmental regulations.

Hazardous waste number: D001: Ignitable.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Resin solution
 Hazard class or division: 3
 Identification number: UN 1866
 Packing group: III

International Air Transportation (ICAO/IATA)

Proper shipping name: Resin solution
 Hazard class or division: 3
 Identification number: UN 1866
 Packing group: III

Appendix C
SDS: Edge Seal

3M Canada Company
 1840 Oxford Street East, Post Office Box 5757
 London, Ontario N6A 4T1
 Medical Emergency Telephone: (519) 451-2500, Ext. 2222
 Transportation Emergency Telephone (CANUTEC): (613) 996-6666

Material Safety Data Sheet

Document id : 10-9143-8 Issue date : 2015/06/05
 Version : 23.00 Supersedes date : 2012/08/24

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Prepared by: Corporate Regulatory Services, 3M Canada Company
 Telephone: (800) 364-3577, Fax: (800) 603-7758, Web Site: www.3M.ca

1 Chemical Product and Company Identification

Tradename:
 3M(TM)SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY (PART A)
 Product ID:
 62-2217-8540-5
 Intended Use of Product:
 Part A of 2-Part Adhesive
 Division:
 Aerospace Aircraft Maint Division

2 Hazards Identification

Critical Hazards:

Corrosive (Eye Burns): Signs/symptoms can include cloudy appearance of the cornea, chemical burns, severe pain, tearing, ulcerations, significantly impaired vision or complete loss of vision.
 Severe Skin Irritation: signs/symptoms can include localized redness, swelling, itching, dryness, cracking, blistering, and pain.
 Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.
 May be absorbed following inhalation and cause target organ effects.
 May be absorbed following ingestion and cause target organ effects.
 KAOLIN (1332-58-7) has been shown to cause fibrosis of the lungs.
 TOLUENE (108-88-3): can cause birth defects or other reproductive harm.

3M(TM) SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216,
GRAY (PART A)

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See Sections 7 and 11 for further information.

3 Composition/Information on Ingredients

Ingredient Name	CAS Number	Percentage
ALIPHATIC POLYMER DIAMINE	68911-25-1	40 - 70
KAOLIN	1332-58-7	30 - 60
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL	4246-51-9	7 - 13
TOLUENE	108-88-3	0.1 - 1.0

NOTE:

Each percentage is expressed as the ratio of the weight of the ingredient to the weight of the controlled product.

4 First Aid Measures

Instructions for Eye Contact:

Immediately flush with large amounts of water for at least 15 minutes. Remove contact lenses if easy to do. Continue rinsing. Immediately get medical attention.

Instructions for Skin Contact:

Immediately wash with soap and water. Remove contaminated clothing and wash before reuse. If signs/symptoms develop, get medical attention.

Instructions for Inhalation:

Remove person to fresh air. If you feel unwell, get medical attention.

Instructions for Ingestion:

Rinse mouth. If you feel unwell, get medical attention.

5 Fire Fighting Measures

Flash point:	>= 151.7 °C
Lower Explosive Limit (%):	Not applicable
Upper Explosive Limit (%):	Not applicable
Autoignition temperature:	Not available

Suitable Extinguishing Media:

In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam to extinguish.

Exposure Hazards during Fire:

Material will not burn.

Combustion Products from Fire:

Amine Compounds - During Combustion;
Carbon monoxide - During Combustion;

3M(TM) SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216,

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GRAY (PART A)

Carbon dioxide - During Combustion;
 Oxides of Nitrogen - During Combustion;
 Toxic Vapour, Gas, Particulate - During Combustion;
 Unusual Fire and Explosion Hazards
 None inherent in this product.

Fire Fighting Procedures:

No unusual fire or explosion hazards are anticipated.

NFPA: Health	3
NFPA: Fire	1
NFPA: Reactivity	1
NFPA: Unusual Reaction Hazard	none

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

6 Accidental Release Measures

Personal Precautions:

Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Warning! A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

Environmental Procedures

Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

Methods for cleaning up

Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Seal the container. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and MSDS. Dispose of collected material as soon as possible.

7 Handling and Storage

Storage Requirements:

No data available.

Incompatible Materials:

Heat is generated during cure. Do not cure a mass larger than 50 grams in a confined space to prevent a premature reaction (exotherm) with production of intense heat and smoke.

Store away from oxidizing agents.

Ventilation:

No data available.

Explosion Prevention:

Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.)

Use Instructions:

Avoid skin contact with hot material. Avoid breathing of dust created by cutting, sanding, grinding or machining. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Use personal protective equipment (gloves, respirators, etc.) as required.

8 Exposure Controls/Personal Protection

Personal Protection

Eye Protection:

Select and use eye/face protection based on results of an exposure assessment. The following should be worn alone or in combination, as appropriate, to prevent eye contact:

Safety glasses with side shields
Indirect vented goggles;

Hand Protection:

Wear heat insulating gloves when handling this material to prevent thermal burns. The following glove material(s) are recommended:

nitrile rubber;
polyethylene/ethylene vinyl alcohol;

Skin Protection:

Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials. The following

3M(TM) SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216,
GRAY (PART A)

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protective clothing material(s) are recommended:
Boot Covers - Disposable
Apron - Polyethylene/ethylene vinyl alcohol

Apron - Nitrile

Respiratory Protection:

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:

Half facepiece or fullface air-purifying respirator with organic vapor cartridges and P95 particulate prefilters

Ingestion (Prevention):

Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water.

Recommended Ventilation:

Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

Ingredient Exposure Data

ALIPHATIC POLYMER DIAMINE (68911-25-1)

Specific Ingredient Data

No data available.

LD50 (rat, oral) No data available.

LC50 (rat, inhalation/4 hours) No data available.

Exposure Limits

No data available.

KAOLIN (1332-58-7)

Specific Ingredient Data

No data available.

LD50 (rat, oral) No data available.

LC50 (rat, inhalation/4 hours) No data available.

Exposure Limits

ACGIH: TWA 2 mg/m3 (respirable fraction)

BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL (4246-51-9)

LD50 (rat, oral) 4290 mg/kg

LD50 (dermal, rabbit) □ 2500 mg/kg

LC50 (rat, inhalation/4 hours) No data available.

Exposure Limits

No data available.

TOLUENE (108-88-3)

LD50 (rat, oral) 636 mg/kg

LD50 (dermal, rabbit) 14100 uL/kg

LC50 (rat, inhalation/4 hours) LC50 (female rat, inhalation/4 hours vapour):

3M(TM) SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216,
GRAY (PART A)

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19.0 mg/l

Exposure Limits

ACGIH: TWA 20 ppm

CMRG: STEL 75 ppm (skin contact contributes to exposure)

9 Physical and Chemical Properties

Physical form,Color,Odour:	Liquid; grey; pungent odour
Odour Threshold:	No data available.
pH:	Not available
Boiling point/boiling range:	>= 152.22 C
Melting point/melting range:	Not available
Vapour pressure:	<= 27 psia at 55 C
Water Solubility:	Nil
Partition coefficient (K o/w):	Not Available
Specific gravity:	□ 1.26 Water=1
Vapour density:	Not applicable
Volatile organic compounds:	Approximately 43 gms/liter EPA24A
Evaporation rate:	Not applicable
Viscosity:	40000 - 80000 centipoise
Percent Volatile:	No data available.

10 Stability and Reactivity

Conditions to Avoid:

Heat is generated during cure. Do not cure a mass larger than 50 grams in a confined space to prevent a premature reaction (exotherm) with production of intense heat and smoke.

Materials to Avoid:

Strong oxidizing agents;

Hazardous Decomposition:

Amine Compounds - During Combustion;
Carbon monoxide - During Combustion;
Carbon dioxide - During Combustion;
Oxides of Nitrogen - During Combustion;
Toxic Vapour, Gas, Particulate - During Combustion;

Stability and Reactivity:

Stable. Hazardous polymerization will not occur. This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

3M(TM) SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216,
GRAY (PART A)

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11 Toxicological Information

Effects from Eye Contact:

Corrosive (Eye Burns): Signs/symptoms can include cloudy appearance of the cornea, chemical burns, severe pain, tearing, ulcerations, significantly impaired vision or complete loss of vision.

Effects from Skin Contact:

Severe Skin Irritation: signs/symptoms can include localized redness, swelling, itching, dryness, cracking, blistering, and pain.

Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Effects from Inhalation:

May be absorbed following inhalation and cause target organ effects.
Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Vapours from heated material may cause irritation of the respiratory system. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Effects from Ingestion:

Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

May be absorbed following ingestion and cause target organ effects.

Sensitization Information:

Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Persons previously sensitized to amines may develop a cross-sensitization reaction to certain other amines.

Carcinogenicity:

No data available.

Mutagenicity:

No data available.

Reproductive Effects:

TOLUENE (108-88-3): can cause birth defects or other reproductive harm.

Component Based Information:

KAOLIN (1332-58-7) has been shown to cause fibrosis of the lungs.

Prolonged or repeated exposure may cause:

Pneumoconiosis: Sign/symptoms can include persistent cough, breathlessness, chest pain, increased amounts of sputum, and changes in lung function tests.

Product Based Information:

No data available.

3M(TM) SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216,
GRAY (PART A)

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12 Ecological Information

Environmental Data:

Ecotoxicity Data:

Not determined.

Ecofate Data:

Not determined.

13 Disposal Considerations

Product as Sold:

No data available.

Product Packaging:

No data available.

Special Instructions:

Since regulations vary, consult applicable regulations or authorities before disposal.

 14 Transport Information

 Transportation of Dangerous Goods

TDG Classification: Non-Regulated Material
 Special Information:: Contact 3M for more information.
 These transportation classifications are provided as a customer service. As the shipper YOU remain responsible for complying with all applicable laws and regulations, including proper transportation classification and packaging. 3M's transportation classifications are based on product formulation, packaging, 3M policies and 3M's understanding of applicable current regulations. 3M does not guarantee the accuracy of this classification information. This information applies only to transportation classification and not the packaging, labeling, or marking requirements. The original 3M package is certified for Canadian ground shipment only. If you are shipping by air or ocean, the package may not meet applicable regulatory requirements.

3M(TM) SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216,
GRAY (PART A)

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 15 Regulatory Information

WHMIS Classification: D2A, D2B, E

NOTE:

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

Product Certifications:

The product on this MSDS, or all its components, is included on the following countries' chemical inventories, as noted:

- TSCA - Toxic Substances Control Act (USA)
- EINECS - European Inventory of Existing Commercial Chemical Substances
- AICS - Australian Inventory of Chemical Substances
- MITI - Ministry of International Trade and Industry (JAPAN)
- CICS - Chinese Inventory of Chemical Substances
- PICCS - Philippines Inventory of Commercial Chemical Substances
- DSL - Domestic Substances List (Canada)
- KECI - Korean Existing Chemicals Inventory

 16 Other Information

Reason for Reissue:

The following Sections and topics have been updated or revised:

- Section 4 - First Aid Measures
- Section 5 - Fire Fighting Measures
- Section 6 - Accidental Release Measures
- Section 7 - Handling and Storage

Section 8 - Exposure Controls/Personal Protection
Section 9 - Physical and Chemical Properties;
Section 10 - Stability and Reactivity;
Section 11 - Toxicological Information;
WHMIS Classification change

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3M(TM) SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216,
GRAY (PART A)

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particular purpose and suitable for user's method of use or application.

---End---

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Transportation Emergency Telephone (CANUTEC): (613) 996-6666

Material Safety Data Sheet

Document id : 10-9142-0 Issue date : 2015/06/05
Version : 11.00 Supersedes date : 2012/08/24

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Prepared by: Corporate Regulatory Services, 3M Canada Company
Telephone: (800) 364-3577, Fax: (800) 603-7758, Web Site: www.3M.ca

1 Chemical Product and Company Identification

Tradename:
SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY (PART B)
Product ID:
62-2216-8540-7
Intended Use of Product:
Part B of 2 Part Adhesive
Division:
Aerospace Aircraft Maint Division

2 Hazards Identification

Critical Hazards:
Moderate Eye Irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.
Moderate Skin Irritation: Signs/symptoms can include localized redness, swelling, itching, and dryness.
Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.
WARNING: Contains a chemical which can cause cancer. Titanium Dioxide (CAS 13463-67-7) (IARC human carcinogen 2B).
KAOLIN (1332-58-7) has been shown to cause fibrosis of the lungs.
See Sections 7 and 11 for further information.

SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
(PART B)

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3 Composition/Information on Ingredients

Ingredient Name	CAS Number	Percentage
EPOXY RESIN	25068-38-6	70 - 80
KAOLIN	1332-58-7	20 - 30
TITANIUM DIOXIDE	13463-67-7	0.1 - 0.6

NOTE:

Each percentage is expressed as the ratio of the weight of the ingredient to the weight of the controlled product.

4 First Aid Measures

Instructions for Eye Contact:

Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

Instructions for Skin Contact:

Immediately wash with soap and water. Remove contaminated clothing and wash before reuse. If signs/symptoms develop, get medical attention.

Instructions for Inhalation:

Remove person to fresh air. If you feel unwell, get medical attention.

Instructions for Ingestion:

Rinse mouth. If you feel unwell, get medical attention.

5 Fire Fighting Measures

Flash point: >= 248.9 °C
Lower Explosive Limit (%): Not applicable
Upper Explosive Limit (%): Not applicable
Autoignition temperature: Not available

Suitable Extinguishing Media:

In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam to extinguish.

Exposure Hazards during Fire:

None inherent in this product.

Combustion Products from Fire:

Aldehydes - During Combustion;
Hydrocarbons - During Combustion;
Carbon monoxide - During Combustion;
Carbon dioxide - During Combustion;
Ketones - During Combustion;
Toxic Vapour, Gas, Particulate - During Combustion;

SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
(PART B)

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Unusual Fire and Explosion Hazards

None inherent in this product.

Fire Fighting Procedures:

No unusual fire or explosion hazards are anticipated.

NFPA: Health	2
NFPA: Fire	1
NFPA: Reactivity	1
NFPA: Unusual Reaction Hazard	

none

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

6 Accidental Release Measures

Personal Precautions:

Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

Environmental Procedures

Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

Methods for cleaning up

Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and MSDS. Seal the container. Dispose of collected material as soon as possible.

SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
(PART B)

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7 Handling and Storage

Storage Requirements:

No data available.

Incompatible Materials:

Heat is generated during cure. Do not cure a mass larger than 50 grams in a confined space to prevent a premature reaction (exotherm) with production of intense heat and smoke.

Store away from acids;

Store away from oxidizing agents.

Ventilation:

No data available.

Explosion Prevention:

Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.)

Use Instructions:

Avoid skin contact with hot material. Avoid breathing of dust created by cutting, sanding, grinding or machining. Avoid breathing dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Avoid release to the environment. Wash contaminated clothing before reuse.

8 Exposure Controls/Personal Protection

Personal Protection

Eye Protection:

Select and use eye/face protection based on results of an exposure assessment. The following should be worn alone or in combination, as appropriate, to prevent eye contact:

Full faceshield

Indirect vented goggles;

Hand Protection:

Wear heat insulating gloves when handling this material to prevent thermal burns. The following glove material(s) are recommended: polyethylene/ethylene vinyl alcohol;

Skin Protection:

Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials. The following protective clothing material(s) are recommended:

Apron - Polyethylene/ethylene vinyl alcohol

Respiratory Protection:

SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
(PART B)

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An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:

Half facepiece or fullface air-purifying respirator with organic vapor cartridges and P95 particulate prefilters

Ingestion (Prevention):

Do not eat, drink or smoke when using this product.

Recommended Ventilation:

Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment. Provide appropriate local exhaust when product is heated. Provide appropriate local exhaust ventilation for cutting, grinding, sanding or machining.

Ingredient Exposure Data

EPOXY RESIN (25068-38-6)	
LD50 (rat, oral)	11400 mg/kg
LD50 (dermal, rabbit)	23.4 g/kg
LC50 (rat, inhalation/4 hours)	> 791 mg/m3
Exposure Limits	
No data available.	
KAOLIN (1332-58-7)	
Specific Ingredient Data	
No data available.	
LD50 (rat, oral)	No data available.
LC50 (rat, inhalation/4 hours)	No data available.
Exposure Limits	
ACGIH: TWA 2 mg/m3 (respirable fraction)	
TITANIUM DIOXIDE (13463-67-7)	
LD50 (rat, oral)	> 24000 mg/kg
LC50 (rat, inhalation/4 hours)	> 6820 mg/m3
Exposure Limits	
ACGIH: TWA 10 mg/m3	
CMRG: TWA 5 mg/m3 (as respirable dust)	

SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
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9 Physical and Chemical Properties

Physical form,Color,Odour:	Liquid; off-white; very slight epoxy odour;
Odour Threshold:	No data available.
pH:	Not applicable
Boiling point/boiling range:	>= 260.0 C
Melting point/melting range:	Not available
Vapour pressure:	<= 27 psia at 55 C
Water Solubility:	Nil
Partition coefficient (K o/w):	Not Available
Specific gravity:	□ 1.33 Water=1
Vapour density:	Not applicable
Volatile organic compounds:	□ 0.8 gms/liter EPA24A
Evaporation rate:	Not applicable
Viscosity:	75000 - 150000 centipoise
Percent Volatile:	□ 0.06 % by weight ASTM

10 Stability and Reactivity

Conditions to Avoid:

Heat is generated during cure. Do not cure a mass larger than 50 grams in a confined space to prevent a premature reaction (exotherm) with production of intense heat and smoke.

Materials to Avoid:

Strong acids;
Strong oxidizing agents;

Hazardous Decomposition:

Aldehydes - During Combustion;
Hydrocarbons - During Combustion;
Carbon monoxide - During Combustion;
Carbon dioxide - During Combustion;
Ketones - During Combustion;
Toxic Vapour, Gas, Particulate - During Combustion;

Stability and Reactivity:

Stable. Hazardous polymerization will not occur. This material is considered to be non reactive under normal use conditions.

SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
(PART B)

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11 Toxicological Information

Effects from Eye Contact:

Moderate Eye Irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Effects from Skin Contact:

Moderate Skin Irritation: Signs/symptoms can include localized redness, swelling, itching, and dryness.

Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Effects from Inhalation:

Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Vapours from heated material may cause irritation of the respiratory system. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Effects from Ingestion:

Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Sensitization Information:

Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Carcinogenicity:

WARNING: Contains a chemical which can cause cancer. Titanium Dioxide (CAS 13463-67-7) (IARC human carcinogen 2B).

Mutagenicity:

No data available.

Reproductive Effects:

No data available.

Component Based Information:

KAOLIN (1332-58-7) has been shown to cause fibrosis of the lungs.
Prolonged or repeated exposure may cause:

Pneumoconiosis: Sign/symptoms can include persistent cough,
breathlessness, chest pain, increased amounts of sputum, and
changes in lung function tests.

Product Based Information:

No data available.

SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
(PART B)

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12 Ecological Information

Environmental Data:

Ecotoxicity Data:

Not determined.

Ecofate Data:

Not determined.

13 Disposal Considerations

Product as Sold:

No data available.

Product Packaging:

No data available.

Special Instructions:

Since regulations vary, consult applicable regulations or
authorities before disposal.

14 Transport Information

Transportation of Dangerous Goods

TDG Classification:

Non-Regulated Material

Special Instructions:

Not regulated per U.S. DOT,
IATA or IMO.

Special Information:: Contact 3M for more information.

These transportation classifications are provided as a customer
service. As the shipper YOU remain responsible for complying with
all applicable laws and regulations, including proper
transportation classification and packaging. 3M's transportation
classifications are based on product formulation, packaging, 3M
policies and 3M's understanding of applicable current regulations.
3M does not guarantee the accuracy of this classification
information. This information applies only to transportation
classification and not the packaging, labeling, or marking
requirements. The original 3M package is certified for Canadian
ground shipment only. If you are shipping by air or ocean, the
package may not meet applicable regulatory requirements.

SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
(PART B)

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15 Regulatory Information

WHMIS Classification: D2A D2B

NOTE:

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

Product Certifications:

The product on this MSDS, or all its components, is included on the following countries' chemical inventories, as noted:

- AICS - Australian Inventory of Chemical Substances
- PICCS - Philippines Inventory of Commercial Chemical Substances
- KECI - Korean Existing Chemicals Inventory
- CICS - Chinese Inventory of Chemical Substances
- DSL - Domestic Substances List (Canada)
- MITI - Ministry of International Trade and Industry (JAPAN)
- TSCA - Toxic Substances Control Act (USA)
- EINECS - European Inventory of Existing Commercial Chemical Substances

16 Other Information

Reason for Reissue:

The following Sections and topics have been updated or revised:

- Section 2 - Hazards Identification - Critical Hazards
- Section 3 - Composition/Information on Ingredients
- Section 4 - First Aid Measures
- Section 5 - Fire Fighting Measures
- Section 6 - Accidental Release Measures
- Section 7 - Handling and Storage
- Section 8 - Exposure Controls/Personal Protection
- Section 9 - Physical and Chemical Properties;
- Section 11 - Toxicological Information;

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SCOTCH-WELD(TM) EPOXY ADHESIVE EC-2216, GRAY
(PART B)

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particular purpose and suitable for user's method of use or
application.

---End---

Appendix D
SDS: T12 Sealant

Material Safety Data Sheet



Date of issue 23 June 2013
Version 5

1. Product and company identification

Product name : PR 1826 B 1/2 Part A
Code : PR 1826 B 1/2 Part A
Supplier : PPG Aerospace PRC-DeSoto
12780 San Fernando Road
Sylmar, CA 91342
Phone: 818 362 6711
Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)

2. Hazards identification

Emergency overview : WARNING!
CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION.
MAY BE HARMFUL IF INHALED OR SWALLOWED. SANDING AND GRINDING
DUSTS MAY BE HARMFUL IF INHALED. CONTAINS MATERIAL THAT CAN CAUSE
TARGET ORGAN DAMAGE.
Do not swallow. Do not get on skin or clothing. Avoid contact with eyes. Use only
with adequate ventilation. Keep container tightly closed and sealed until ready for use.
Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled.
Ingestion : May be harmful if swallowed.
Skin : Irritating to skin. May cause an allergic skin reaction.
Eyes : Irritating to eyes.

Over-exposure signs/symptoms

Trimethoxysilanes are capable of forming methanol if hydrolyzed or ingested. If swallowed, methanol may be harmful or fatal or cause blindness.

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

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).

See toxicological information (Section 11)

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Reaction product: bisphenol-A-(epichlorhydrin); epoxy resin	25068-38-6	30 - 60
Phenol, polymer with formaldehyde, glycidyl ether (MW<=700)	28064-14-4	10 - 30
calcium carbonate	471-34-1	10 - 30
carbon black respirable	1333-86-4	3 - 7
[3-(2,3-epoxypropoxy)propyl]trimethoxysilane	2530-83-8	1 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

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. Never give anything by mouth to an unconscious or convulsing person.

Eye contact	: Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.
Skin contact	: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
Inhalation	: Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.
Ingestion	: If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do NOT induce vomiting.
Notes to physician	: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product	: In a fire or if heated, a pressure increase will occur and the container may burst.
Extinguishing media	
Suitable	: Use an extinguishing agent suitable for the surrounding fire.
Not suitable	: None known.
Special exposure hazards	: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Hazardous combustion products	: Decomposition products may include the following materials: carbon oxides halogenated compounds metal oxide/oxides
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
Environmental precautions	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.
Large spill	: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.
Small spill	: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not swallow. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Avoid release to the environment. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	IPEL
calcium carbonate	TWA	10 MG/M3 TD 3 MG/M3 R	5 mg/m ³ R 15 mg/m ³ TD 5 mg/m ³ R 15 mg/m ³	Not established	Not established	Not established
carbon black respirable	TWA	3 mg/m ³	3.5 mg/m ³	3.5 mg/m ³	3.5 mg/m ³	Not established
	STEL	Not established	Not established	Not established	7 mg/m ³	Not established

Key to abbreviations

A = Acceptable Maximum Peak	S = Potential skin absorption
ACGIH = American Conference of Governmental Industrial Hygienists.	SR = Respiratory sensitization
C = Ceiling Limit	SS = Skin sensitization
F = Fume	STEL = Short term Exposure limit values
IPEL = Internal Permissible Exposure Limit	TD = Total dust
OSHA = Occupational Safety and Health Administration.	TLV = Threshold Limit Value
R = Respirable	TWA = Time Weighted Average
Z = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances	

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
- Engineering measures** : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

8 . Exposure controls/personal protection

Eyes	: Safety glasses with side shields.
Hands	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Gloves	: butyl rubber
Respiratory	: If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Skin	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Liquid.
Flash point	: Closed cup: Not applicable.
Material supports combustion.	: Yes.
Color	: Black.
Odor	: Not available.
pH	: Not available.
Boiling/condensation point	: >37.78°C (>100°F)
Melting/freezing point	: Not available.
Specific gravity	: 1.36
Density (lbs / gal)	: 11.35
Vapor pressure	: Not available.
Vapor density	: Not available.
Evaporation rate	: Not available.
VOC	: $\overline{0}$ g/l
Partition coefficient: n-octanol/water	: Not available.
% Solid. (w/w)	: $\overline{0}$ 9.9

10 . Stability and reactivity

Stability	: Stable under recommended storage and handling conditions (see Section 7).
Conditions to avoid	: No specific data.
Materials to avoid	: Reactive or incompatible with the following materials: acids, oxidizing materials, strong alkalis
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Product code PR 1826 B 1/2 Part A	Date of issue 23 June 2013	Version 5
Product name PR 1826 B 1/2 Part A		

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Reaction product: bisphenol-A-(epichlorhydrin); epoxy resin	LD50 Oral	Rat	>2 g/kg	-
	LD50 Dermal	Rabbit	>2 g/kg	-
calcium carbonate	LD50 Oral	Rat	6450 mg/kg	-
	LD50 Oral	Rat	>15400 mg/kg	-
carbon black respirable	LD50 Dermal	Rabbit	>3 g/kg	-
	LD50 Oral	Rat	7.01 g/kg	-
[3-(2,3-epoxypropoxy)propyl]trimethoxysilane	LD50 Oral	Rat	7.01 g/kg	-
	LD50 Dermal	Rabbit	4.3 g/kg	-
	LC50 Inhalation Dusts and mists	Rat	>5300 mg/m ³	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Target organs

: Contains material which causes damage to the following organs: skin, eyes.
Contains material which may cause damage to the following organs: lungs, upper respiratory tract.

Carcinogenicity

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	NTP	OSHA
Carbon black respirable	A3	2B	-	-

Carcinogen Classification code:
 ACGIH: A1, A2, A3, A4, A5
 IARC: 1, 2A, 2B, 3, 4
 NTP: Proven, Possible
 OSHA: +
 Not listed or regulated as a carcinogen: -

12. Ecological information

Environmental effects : Water polluting material. May be harmful to the environment if released in large quantities.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (reaction product: bisphenol-A-(epichlorhydrin); epoxy resin, Phenol, polymer with formaldehyde, glycidyl ether (MW<=700))	9	III	-
IMDG	3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (reaction product: bisphenol-A-(epichlorhydrin); epoxy resin, Phenol, polymer with formaldehyde, glycidyl ether (MW<=700)). Marine pollutant (reaction product: bisphenol-A-(epichlorhydrin); epoxy resin, Phenol, polymer with formaldehyde, glycidyl ether (MW<=700))	9	III	-
DOT	3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (reaction product: bisphenol-A-(epichlorhydrin); epoxy resin, Phenol, polymer with formaldehyde, glycidyl ether (MW<=700))	9	III	Reportable quantity 8522.5 lbs / 3869.2 kg [90.215 gal / 341.5 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

PG* : Packing group
 Reportable quantity RQ : CERCLA: Hazardous substances.: No products were found.

15 . Regulatory information

- United States inventory (TSCA 8b) : All components are listed or exempted.
- Australia inventory (AICS) : All components are listed or exempted.
- Canada inventory (DSL) : All components are listed or exempted.
- China inventory (IECSC) : All components are listed or exempted.
- Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
- Japan inventory (ENCS) : All components are listed or exempted.
- Korea inventory (KECI) : All components are listed or exempted.
- New Zealand (NZIoC) : All components are listed or exempted.
- Philippines inventory (PICCS) : Not determined.

United States
 SARA 302/304: No products were found.
 CERCLA: Hazardous substances.: No products were found.

SARA 311/312 SDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
Reaction product: bisphenol-A-(epichlorhydrin); epoxy resin	25068-38-6	Y	N	N	N	N
Phenol, polymer with formaldehyde, glycidyl ether (MW<=700)	28064-14-4	Y	N	N	N	N
calcium carbonate	471-34-1	N	N	N	N	N
carbon black respirable	1333-86-4	N	Y	N	N	N
[3-(2,3-epoxypropoxy)propyl]trimethoxysilane	2530-83-8	Y	N	N	Y	N

Product code PR 1826 B 1/2 Part A Date of issue 23 June 2013 Version 5
Product name PR 1826 B 1/2 Part A

15 . Regulatory information

Product as-supplied : Y Y N N N

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 0 Health : 2 Reactivity : 0

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 2 * Flammability : 0 Physical hazards : 0

(*) - 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 under 29 CFR 1910.1200, 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 (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 2 Flammability : 0 Instability : 0

Date of previous issue : 3/10/2013.

Organization that prepared : EHS

the MSDS

Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

Material Safety Data Sheet



Date of issue 23 June 2013

Version 7

1. Product and company identification

Product name : PR 1826 B 1/2 Part B
Code : PR 1826 B 1/2 Part B
Supplier : PPG Aerospace PRC-DeSoto
12780 San Fernando Road
Sylmar, CA 91342
Phone: 818 362 6711

Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)

2. Hazards identification

Emergency overview : WARNING!
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF INHALED OR SWALLOWED. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.
Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Irritating to respiratory system. Can irritate eyes, nose, mouth and throat.
Ingestion : May be harmful if swallowed.
Skin : Irritating to skin.
Eyes : Irritating to eyes.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
Ingestion : No specific data.
Skin : Adverse symptoms may include the following:
irritation
redness
dryness
cracking
Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

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).

See toxicological information (Section 11)

Product code PR 1826 B 1/2 Part B	Date of issue 23 June 2013	Version 7
Product name PR 1826 B 1/2 Part B		

3. Composition/information on ingredients

Name	CAS number	%
1,3-Propanediol, 2-ethyl-2-(hydroxymethyl)-, polymer with 2-(5-hexenylthio)ethanol, 2-mercaptoethanol-propylene oxide reaction products, 2,2'-thiobis(ethanol) and 2,2'-thiobis(ethanethiol)	119147-78-3	15 - 40
proprietary polythioether	Not available.	10 - 30
calcium carbonate	471-34-1	10 - 30
aluminium hydroxide	21645-51-2	7 - 13
titanium dioxide	13463-67-7	1 - 5
butanone	78-93-3	1 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

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. Never give anything by mouth to an unconscious or convulsing person.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.
- Skin contact** : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
- Inhalation** : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.
- Ingestion** : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do NOT induce vomiting.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

- Flammability of the product** : No specific fire or explosion hazard.
- Extinguishing media**
 - Suitable** : Use an extinguishing agent suitable for the surrounding fire.
 - Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Hazardous combustion products** : Decomposition products may include the following materials:
 - carbon oxides
 - sulfur oxides
 - metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

6. Accidental release measures

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Do not swallow. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	IPEL
calcium carbonate	TWA	10 MG/M3 TD 3 MG/M3 R	5 mg/m ³ R 15 mg/m ³ TD 5 mg/m ³ R 15 mg/m ³	Not established	Not established	Not established
aluminium hydroxide	TWA	1 mg/m ³	Not established	Not established	2 mg/m ³	Not established
titanium dioxide	TWA	10 mg/m ³	15 mg/m ³ TD	10 mg/m ³ TD	10 mg/m ³ (as Ti)	Not established
	STEL	Not established	Not established	Not established	20 mg/m ³ (as Ti)	Not established
butanone	TWA	200 ppm	200 ppm	200 ppm	200 ppm	Not established
	STEL	300 ppm	Not established	300 ppm	300 ppm	Not established

Key to abbreviations

- A = Acceptable Maximum Peak
- ACGIH = American Conference of Governmental Industrial Hygienists.
- C = Ceiling Limit
- F = Fume
- IPEL = Internal Permissible Exposure Limit
- OSHA = Occupational Safety and Health Administration.
- R = Respirable
- Z = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances
- S = Potential skin absorption
- SR = Respiratory sensitization
- SS = Skin sensitization
- STEL = Short term Exposure limit values
- TD = Total dust
- TLV = Threshold Limit Value
- TWA = Time Weighted Average

Consult local authorities for acceptable exposure limits.

8 . Exposure controls/personal protection

Recommended monitoring procedures	: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
Engineering measures	: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
Hygiene measures	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Personal protection	
Eyes	: Safety glasses with side shields.
Hands	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Respiratory	: If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Skin	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Solid.
Flash point	: Closed cup: 65.56°C (150°F)
Explosion limits	: Lower: 1.8%
Material supports combustion.	: Yes.
Color	: White.
Odor	: Not available.
pH	: Not available.
Boiling/condensation point	: Not available.
Melting/freezing point	: Not available.
Specific gravity	: 1.45
Density (lbs / gal)	: 12.1
Vapor pressure	: Not available.
Vapor density	: Not available.
Evaporation rate	: Not available.
VOC	: 22 g/l
Partition coefficient: n-octanol/water	: Not available.

Product code PR 1826 B 1/2 Part B	Date of issue 23 June 2013	Version 7
Product name PR 1826 B 1/2 Part B		

9. Physical and chemical properties

% Solid, (w/w) : 88.5

10. Stability and reactivity

Stability	: Stable under recommended storage and handling conditions (see Section 7).
Conditions to avoid	: No specific data.
Materials to avoid	: Reactive or incompatible with the following materials: acids, oxidizing materials, strong alkalis
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
1,3-Propanediol, 2-ethyl-2-(hydroxymethyl)-, polymer with 2-(5-hexenylthio)ethanol, 2-mercaptoethanol-propylene oxide reaction products, 2,2'-thiobis(ethanol) and 2,2'-thiobis(ethanethiol)	LD50 Oral	Rat	5000 mg/kg	-
calcium carbonate	LD50 Oral	Rat	6450 mg/kg	-
titanium dioxide	LD50 Oral	Rat	>10 g/kg	-
butanone	LD50 Oral	Rat	2737 mg/kg	-
	LD50 Dermal	Rabbit	6480 mg/kg	-
	LC50 Inhalation Vapor	Rat	11243 ppm	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Defatting irritant

: Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Target organs

: Contains material which causes damage to the following organs: lungs, brain, central nervous system (CNS).
Contains material which may cause damage to the following organs: kidneys, peripheral nervous system, upper respiratory tract, skin, eyes.

Carcinogenicity

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	NTP	OSHA
aluminum hydroxide	A4	-	-	-
titanium dioxide	A4	2B	-	-

Carcinogen Classification code: ACGIH: A1, A2, A3, A4, A5
IARC: 1, 2A, 2B, 3, 4
NTP: Proven, Possible
OSHA: +
Not listed or regulated as a carcinogen: -

Product code PR 1826 B 1/2 Part B	Date of issue 23 June 2013	Version 7
Product name PR 1826 B 1/2 Part B		

12. Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
butanone	Acute LC50 3220000 to 3320000 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	Acute LC50 >400 ppm Marine water	Fish - Sheepshead minnow - Cyprinodon variegatus	96 hours
	Acute LC50 >520000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 400 ppm Marine water	Fish - Sheepshead minnow - Cyprinodon variegatus	96 hours
	Chronic NOEC <70000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14. Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	None.	Not regulated.	None.	-	-
IMDG	None.	Not regulated.	None.	-	-
DOT	None.	Not regulated.	None.	-	-

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: butanone: 5000 lbs. (2270 kg);

15. Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.

Australia inventory (AICS) : All components are listed or exempted.

Canada inventory (DSL) : All components are listed or exempted.

China inventory (IECSC) : All components are listed or exempted.

Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.

Product code PR 1826 B 1/2 Part B Date of issue 23 June 2013 Version 7
 Product name PR 1826 B 1/2 Part B

15. Regulatory information

Japan inventory (ENCS) : All components are listed or exempted.
 Korea inventory (KECI) : All components are listed or exempted.
 New Zealand (NZIoC) : All components are listed or exempted.
 Philippines inventory (PICCS) : Not determined.

United States

SARA 302/304: No products were found.
 CERCLA: Hazardous substances.: butanone: 5000 lbs. (2270 kg);

SARA 311/312 SDS Distribution - Chemical Inventory - Hazard Identification:

<u>Chemical name</u>	<u>CAS #</u>	<u>Acute</u>	<u>Chronic</u>	<u>Fire</u>	<u>Reactive</u>	<u>Pressure</u>
1,3-Propanediol, 2-ethyl-2-(hydroxymethyl)-, polymer with 2-(5-hexenylthio)ethanol, 2-mercaptoethanol-propylene oxide reaction products, 2,2'-thiobis (ethanol) and 2,2'-thiobis (ethanethiol)	119147-78-3	Y	N	N	N	N
proprietary polythioether	Not available.	Y	N	N	N	N
calcium carbonate	471-34-1	N	N	N	N	N
aluminium hydroxide	21645-51-2	N	N	N	N	N
titanium dioxide	13463-67-7	N	Y	N	N	N
butanone	78-93-3	Y	N	Y	N	N
Product as-supplied :		Y	Y	N	N	N

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification
 Flammability : 2 Health : 2 Reactivity : 0

16. Other information

Hazardous Material Information System (U.S.A.)

Health : 2 * Flammability : 2 Physical hazards : 0
 (*) - 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 under 29 CFR 1910.1200, 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 (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 2 Flammability : 2 Instability : 0

Date of previous issue : 1/7/2013.

Organization that prepared the MSDS : EHS

✓ Indicates information that has changed from previously issued version.

Disclaimer

Product code PR 1826 B 1/2 Part B

Date of issue 23 June 2013

Version 7

Product name PR 1826 B 1/2 Part B

16 . Other information

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

Appendix E
SDS: Type 10 Aluminized Epoxy Primer and Curing Solution

International Paint LLC
Automotive and Aerospace Coatings



Material Safety Data Sheet

463-6-4_Aluminized Epoxy Primer

Code: 463-6-4

Akzo Nobel Coatings Inc. encourages and expects you to read and understand this entire MSDS, as there is important information throughout the document. Further, Akzo Nobel Coatings Inc. expects you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

To promote safe handling, each customer or recipient should: 1) Notify its employees, agents, contractors, and others whom it knows or believes will use this material of the information contained in this MSDS and any other information regarding hazards and safety; 2) Furnish this same information to each of its customers for the product; 3) Request its customers to notify their employees, customers, and other users of the product of this information; and 4) Notify its employees, agents, contractors, and others that the precautions identified for this product and any other products with which mixtures may be created are transferable and cumulative to the mixture.

Section 1. Chemical product and company identification

Manufacturer

Akzo Nobel Coatings, Inc.
1 East Water Street
Waukegan, IL 60085
USA
+1(847) 625-4200

Product code : 463-6-4
Product name : 463-6-4_Aluminized Epoxy Primer
Product use : Coatings or Coatings Component
Date of issue : 3 February 2015
Version : 10
Date of printing : 3 February 2015.

IN CASE OF EMERGENCY (HEALTH OR SPILLS):
CHEMTREC +1 (800) 424-9300 (Inside the US)
CHEMTREC International +1 (703) 527-3887 (Outside the US, collect calls accepted)

For the most recent update to this Material Safety Data Sheet, visit our website at <http://www.akzonobel.com/aerospace>
For additional information call (847) 625-4200.

Section 2. Hazards identification

Emergency overview : WARNING!
FLAMMABLE LIQUID AND VAPOR. HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA.

Routes of entry : Not available.

Potential acute health effects

Inhalation : Irritating to respiratory system.

Ingestion : Toxic if swallowed.

Skin : Toxic in contact with skin. Severely irritating to the skin.

Akzo Nobel Coatings, Inc.
Automotive and Aerospace Coatings

463-6-4_Aluminized Epoxy Primer

Code: 463-6-4

Page: 2/15

Section 2. Hazards identification

Eyes : Severely irritating to eyes. Risk of serious damage to eyes.

Potential chronic health effects

Chronic effects : Contains material that may cause target organ damage, based on animal data.

Carcinogenicity : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : Contains material which may cause birth defects, based on animal data.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Target organs : Contains material which may cause damage to the following organs: blood, kidneys, lungs, the nervous system, the reproductive system, liver, peripheral nervous system, gastrointestinal tract, cardiovascular system, upper respiratory tract, skin, bones, central nervous system (CNS), ears, eye, lens or cornea, nose/sinuses.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
reduced fetal weight
increase in fetal deaths
skeletal malformations

Ingestion : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

Skin : Adverse symptoms may include the following:
irritation
redness
reduced fetal weight
increase in fetal deaths
skeletal malformations

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness
reduced fetal weight
increase in fetal deaths
skeletal malformations

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

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Section 3. Composition/information on ingredients

United States

<u>Name</u>	<u>CAS number</u>	<u>% by weight</u>
butanone	78-93-3	10 - 25
xylene	1330-20-7	10 - 25
Aluminium powder (stabilized)	7429-90-5	5 - 10
cyclohexanone	108-94-1	5 - 10
4-methylpentan-2-one	108-10-1	5 - 10
toluene	108-88-3	1 - 5
Mica-group minerals	12001-26-2	1 - 5
ethylbenzene	100-41-4	1 - 5
pentazinc chromate octahydroxide	49863-84-5	1 - 5
Naphtha (petroleum), hydrodesulfurized heavy	64742-82-1	1 - 5
Solvent naphtha (petroleum), light arom.	64742-95-6	1 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Section 4. First aid measures

Eye contact	: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
Inhalation	: Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
Ingestion	: Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
Notes to physician	: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

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Section 5. Fire-fighting measures

- Flammability of the product** : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.
- Extinguishing media**
- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Not available.
- Special remarks on explosion hazards** : Not available.

Section 6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

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Section 6. Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Product name

United States

butanone

Exposure limits

ACGIH TLV (United States, 6/2013).

STEL: 885 mg/m³ 15 minutes.

STEL: 300 ppm 15 minutes.

TWA: 590 mg/m³ 8 hours.

TWA: 200 ppm 8 hours.

NIOSH REL (United States, 10/2013).

STEL: 885 mg/m³ 15 minutes.

STEL: 300 ppm 15 minutes.

TWA: 590 mg/m³ 10 hours.

TWA: 200 ppm 10 hours.

OSHA PEL (United States, 2/2013).

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Section 8. Exposure controls/personal protection

xylene	<p>TWA: 590 mg/m³ 8 hours. TWA: 200 ppm 8 hours. ACGIH TLV (United States, 3/2012). STEL: 651 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 434 mg/m³ 8 hours. TWA: 100 ppm 8 hours. OSHA PEL (United States, 6/2010). TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours.</p>
Aluminium powder (stabilized)	<p>NIOSH REL (United States, 10/2013). TWA: 5 mg/m³ 10 hours. Form: Respirable fraction TWA: 10 mg/m³ 10 hours. Form: Total ACGIH TLV (United States, 6/2013). TWA: 1 mg/m³ 8 hours. Form: Respirable fraction OSHA PEL (United States, 2/2013). TWA: 5 mg/m³, (as Al) 8 hours. Form: Respirable fraction TWA: 15 mg/m³, (as Al) 8 hours. Form: Total dust</p>
cyclohexanone	<p>ACGIH TLV (United States, 6/2013). Absorbed through skin. STEL: 50 ppm 15 minutes. TWA: 20 ppm 8 hours. NIOSH REL (United States, 10/2013). Absorbed through skin. TWA: 100 mg/m³ 10 hours. TWA: 25 ppm 10 hours. OSHA PEL (United States, 2/2013). TWA: 200 mg/m³ 8 hours. TWA: 50 ppm 8 hours.</p>
4-methylpentan-2-one	<p>ACGIH TLV (United States, 6/2013). STEL: 75 ppm 15 minutes. TWA: 20 ppm 8 hours. NIOSH REL (United States, 10/2013). STEL: 300 mg/m³ 15 minutes. STEL: 75 ppm 15 minutes. TWA: 205 mg/m³ 10 hours. TWA: 50 ppm 10 hours. OSHA PEL (United States, 2/2013). TWA: 410 mg/m³ 8 hours. TWA: 100 ppm 8 hours.</p>
toluene	<p>NIOSH REL (United States, 6/2009). STEL: 560 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 375 mg/m³ 10 hours. TWA: 100 ppm 10 hours. OSHA PEL Z2 (United States, 11/2006). AMP: 500 ppm 10 minutes. CEIL: 300 ppm TWA: 200 ppm 8 hours. ACGIH TLV (United States, 3/2012). TWA: 20 ppm 8 hours.</p>

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Section 8. Exposure controls/personal protection

Mica-group minerals	<p>ACGIH TLV (United States, 6/2013). TWA: 3 mg/m³ 8 hours. Form: Respirable fraction NIOSH REL (United States, 10/2013). TWA: 3 mg/m³ 10 hours. Form: Respirable fraction OSHA PEL Z3 (United States, 2/2013). TWA: 20 mppcf 8 hours.</p>
ethylbenzene	<p>ACGIH TLV (United States, 3/2012). TWA: 20 ppm 8 hours. NIOSH REL (United States, 6/2009). STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours. OSHA PEL (United States, 6/2010). TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours.</p>
pentazinc chromate octahydroxide	<p>NIOSH REL (United States, 10/2013). TWA: 0.0002 mg/m³, (as Cr) 8 hours. Form: OSHA PEL Z2 (United States, 2/2013). CEIL: 1 mg/10m³ OSHA PEL (United States, 2/2013). TWA: 0.005 mg/m³, (as Cr) 8 hours. Form: ACGIH TLV (United States, 6/2013). TWA: 0.01 mg/m³, (measured as Cr) 8 hours.</p>
Solvent naphtha (petroleum), light arom.	<p>NIOSH REL (United States, 6/2009). TWA: 5 mg/m³ 10 hours. Form: Mist STEL: 10 mg/m³ 15 minutes. Form: Mist</p>

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures	: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
Engineering measures	: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
Hygiene measures	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

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Section 8. Exposure controls/personal protection

Dry sanding, flame cutting and/or welding of the dry paint film will give rise to dust and/or hazardous fumes. Wet sanding/flattening should be used wherever possible. If exposure cannot be avoided by the provision of local exhaust ventilation, suitable respiratory protective equipment should be used.

Personal protection

- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Other protection : Not available.

Section 9. Physical and chemical properties

- Physical state** : Liquid.
- Flash point** : Closed cup: -4°C (24.8°F)
- Auto-ignition temperature** : Not available.
- Upper/lower flammability or explosive limits**
- Upper:** : Not determined.
- Lower:** : Not determined.
- Appearance** : Silver-white.

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Section 9. Physical and chemical properties

Odor	: Solvent.
Odor threshold	: Not available.
Specific gravity	: 1.022
pH	: Not available.
Boiling/condensation point	: 80°C (176°F)
Melting/freezing point	: Not available.
Vapor pressure	: Not available.
Vapor density	: Heavier than air
Density	: 8.53 lbs per gal 1.022 g/cm ³
Weight Volatiles	: 64.67% (w/w)
Volume Volatiles	: 78.26 % (v/v)
Weight Solids	: 35.33 % (w/w)
Volume Solids	: 21.74 % (v/v)
Regulatory VOC	: 5.52 lbs/gal (881 g/l) minus water and exempt solvents
Dispersibility properties	: Not dispersible in the following materials: cold water.
Evaporation rate	: Not determined.
Coefficient of water/oil distribution	: Not determined.

Section 10. Stability and reactivity

Stability	: The product is stable.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Materials to avoid	: Reactive or incompatible with the following materials: oxidizing materials
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced. Not available. Not available.

Section 11. Toxicological information

United States

Acute toxicity

Product/ingredient name	Result	Species	Dose
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Section 11. Toxicological information

butanone	LD50 Dermal	Rabbit	6480 mg/kg
	LD50 Intraperitoneal	Rat	607 mg/kg
	LD50 Oral	Rat	2737 mg/kg
xylene	TDLo Intraperitoneal	Rat	361 mg/kg
	LD50 Intraperitoneal	Rat	2459 mg/kg
	LD50 Oral	Rat	4300 mg/kg
	LD50 Subcutaneous	Rat	1700 mg/kg
cyclohexanone	TDLo Dermal	Rabbit	4300 mg/kg
	LD50 Dermal	Rabbit	1 mL/kg
	LD50 Intraperitoneal	Rat	1130 mg/kg
	LD50 Oral	Rat	1800 mg/kg
4-methylpentan-2-one	LD50 Oral	Rat	1620 uL/kg
	LD50 Subcutaneous	Rat	2170 mg/kg
	LDLo Intravenous	Rat	568 mg/kg
	LD Dermal	Rabbit	>3 g/kg
toluene	LD50 Intraperitoneal	Rat	400 mg/kg
	LD50 Oral	Rat	4600 mg/kg
	LD50 Oral	Rat	2080 mg/kg
	TDLo Oral	Rat	500 mg/kg
ethylbenzene	LD50 Dermal	Rabbit	14100 uL/kg
	LD50 Intraperitoneal	Rat	1332 mg/kg
	LD50 Intravenous	Rat	1960 mg/kg
	LD50 Oral	Rat	636 mg/kg
	LD50 Unreported	Rat	6900 mg/kg
	LDLo Intraperitoneal	Rat	2.5 mL/kg
	TDLo Dermal	Rat	26.4 mg/kg
	TDLo Intraperitoneal	Rat	1 g/kg
	TDLo Intraperitoneal	Rat	900 mg/kg
	TDLo Intraperitoneal	Rat	750 mg/kg
	TDLo Intraperitoneal	Rat	600 mg/kg
	TDLo Intraperitoneal	Rat	250 mg/kg
	TDLo Oral	Rat	1200 mg/kg
	TDLo Oral	Rat	1000 mg/kg
TDLo Oral	Rat	800 mg/kg	
Solvent naphtha (petroleum), light arom.	TDLo Oral	Rat	650 mg/kg
	TDLo Oral	Rat	400 mg/kg
	LD50 Dermal	Rabbit	>5000 mg/kg
	LD50 Dermal	Rabbit	17800 uL/kg
Solvent naphtha (petroleum), light arom.	LD50 Oral	Rat	3500 mg/kg
	TDLo Dermal	Rat	0.08 mL/kg
Solvent naphtha (petroleum), light arom.	TDLo Intraperitoneal	Rat	1062 mg/kg
	LD50 Oral	Rat	8400 mg/kg

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
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Section 11. Toxicological information

butanone	Skin - Mild irritant	Rabbit	-	24 hours 14 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
xylene	Eyes - Mild irritant	Rabbit	-	87 milligrams	-
	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams	-
	Skin - Mild irritant	Rat	-	8 hours 80 microliters	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
cyclohexanone	Skin - Moderate irritant	Rabbit	-	100 Percent	-
	Eyes - Severe irritant	Rabbit	-	24 hours 250 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	20 milligrams	-
	Skin - Mild irritant	Human	-	48 hours 50 Percent	-
4-methylpentan-2-one	Skin - Mild irritant	Rabbit	-	500 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 100 microliters	-
	Eyes - Severe irritant	Rabbit	-	40 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
toluene	Eyes - Mild irritant	Rabbit	-	0.5 minutes 100 milligrams	-
	Eyes - Mild irritant	Rabbit	-	870 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
	Skin - Mild irritant	Pig	-	24 hours 250 microliters	-
	Skin - Mild irritant	Rabbit	-	435 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Moderate irritant	Rabbit	-	500 milligrams	-
	Eyes - Severe	Rabbit	-	500	-
ethylbenzene	Eyes - Severe	Rabbit	-	500	-

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Section 11. Toxicological information

	irritant			milligrams	
	Skin - Mild	Rabbit	-	24 hours	-
	irritant			15	
Solvent naphtha (petroleum), light arom.	Eyes - Mild	Rabbit	-	milligrams	-
	irritant			24 hours	-
				100	
				microliters	

Conclusion/Summary : Not available.
Skin : Not available.
Eyes : Not available.
Respiratory : Not available.

Sensitizer

Conclusion/Summary : Not available.
Skin : Not available.
Respiratory : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
butanone	-	-	-	None.	-	-
xylene	A4	3	-	None.	-	-
Aluminium powder (stabilized)	A4	-	-	-	-	-
cyclohexanone	A3	-	-	None.	-	-
4-methylpentan-2-one	A3	-	-	None.	-	-
toluene	A4	-	-	None.	-	-
ethylbenzene	A3	2B	-	None.	-	-
pentazinc chromate octahydroxide	A1	1	-	+	Known to be a human carcinogen.	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Section 12. Ecological information

Environmental effects : No known significant effects or critical hazards.
Aquatic ecotoxicity : Not available.
Biodegradability : Not available.
Partition coefficient: n-octanol/water : Not available.
Toxicity of the products of biodegradation : Not available.

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Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Ecotoxicological data for one or more components are known and will be made available on request.


Section 13. Disposal considerations

Waste disposal: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/ PERSONAL PROTECTION for additional handling information and protection of employees.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label
DOT Classification	UN1263	PAINT	3	II	

Additional information

The above classification is based on a one gallon container (s) packaged and marked to comply with the requirements of 49 CFR Parts 171 through 173, as applicable. It is each shipper's responsibility to ensure each package is compatible with a selected mode of transportation and packaged in compliance with the domestic and, if applicable, international requirements for the selected mode of transport.

Section 15. Regulatory information

United States

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

United States inventory (TSCA 8b) : All components are listed or exempted.

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Section 15. Regulatory information

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	xylene	1330-20-7	10 - 25
	Aluminium powder (stabilized)	7429-90-5	5 - 10
	4-methylpentan-2-one	108-10-1	5 - 10
	toluene	108-88-3	1 - 5
	ethylbenzene	100-41-4	1 - 5

California Prop. 65 : WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Canada

WHMIS (Canada)

- : Class B-2: Flammable liquid
- : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
- : Class D-2A: Material causing other toxic effects (Very toxic).
- : Class D-2B: Material causing other toxic effects (Toxic).



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.

Canada inventory

- : All components are listed or exempted.

EU regulations

Hazard symbol or symbols



Risk phrases

- R11- Highly flammable.
- R45- May cause cancer.
- R20/21- Also harmful by inhalation and in contact with skin.
- R36/38- Irritating to eyes and skin.
- R43- May cause sensitization by skin contact.
- R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases

- : S53- Avoid exposure - obtain special instructions before use.
- : S23- Do not breathe vapor or spray.
- : S36/37- Wear suitable protective clothing and gloves.
- : S61- Avoid release to the environment. Refer to special instructions/ safety data sheet.

International regulations

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Section 15. Regulatory information

International lists

- : **Australia inventory (AICS):** At least one component is not listed.
- China inventory (IECSC):** All components are listed or exempted.
- Japan inventory:** At least one component is not listed.
- Korea inventory:** All components are listed or exempted.
- Malaysia Inventory (EHS Register):** At least one component is not listed.
- New Zealand Inventory of Chemicals (NZIoC):** All components are listed or exempted.
- Philippines inventory (PICCS):** All components are listed or exempted.
- Taiwan inventory (CSNN):** At least one component is not listed.

Section 16. Other information

HMIS® III

Health	*	2
Flammability		3
Physical hazards		0

Notice to reader

To the best of our 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 hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

International Paint LLC
Automotive and Aerospace Coatings



Material Safety Data Sheet

X-306_Epoxy Primer Curing Solution

Code: X-306

Akzo Nobel Coatings Inc. encourages and expects you to read and understand this entire MSDS, as there is important information throughout the document. Further, Akzo Nobel Coatings Inc. expects you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

To promote safe handling, each customer or recipient should: 1) Notify its employees, agents, contractors, and others whom it knows or believes will use this material of the information contained in this MSDS and any other information regarding hazards and safety; 2) Furnish this same information to each of its customers for the product; 3) Request its customers to notify their employees, customers, and other users of the product of this information; and 4) Notify its employees, agents, contractors, and others that the precautions identified for this product and any other products with which mixtures may be created are transferable and cumulative to the mixture.

Section 1. Chemical product and company identification

Manufacturer

Akzo Nobel Coatings, Inc.
1 East Water Street
Waukegan, IL 60085
USA
+1(847) 625-4200

Product code : X-306
Product name : X-306_Epoxy Primer Curing Solution
Product use : Coatings or Coatings Component
Date of issue : 26 October 2015
Version : 5
Date of printing : 26 October 2015.

IN CASE OF EMERGENCY (HEALTH OR SPILLS):

CHEMTREC +1 (800) 424-9300 (Inside the US)
CHEMTREC International +1 (703) 527-3887 (Outside the US, collect calls accepted)

For the most recent update to this Material Safety Data Sheet, visit our website at <http://www.akzonobel.com/aerospace>
For additional information call (847) 625-4200.

Section 2. Hazards identification

Emergency overview : DANGER!
FLAMMABLE LIQUID AND VAPOR. MAY BE FATAL IF SWALLOWED. CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC RESPIRATORY REACTION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE CANCER HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER, BASED ON ANIMAL DATA.

Potential acute health effects

Inhalation : Corrosive to the respiratory system. May cause sensitization by inhalation. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

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Section 2. Hazards identification

- Ingestion** : Very toxic if swallowed. May cause burns to mouth, throat and stomach.
- Skin** : Corrosive to the skin. Causes burns. Toxic in contact with skin.
- Eyes** : Corrosive to eyes. Causes burns.

Potential chronic health effects

- Chronic effects** : Contains material that may cause target organ damage, based on animal data. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
- Carcinogenicity** : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : Contains material which may cause damage to the following organs: blood, kidneys, the nervous system, liver, spleen, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), ears, eye, lens or cornea.

Over-exposure signs/symptoms

- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma
- Ingestion** : Adverse symptoms may include the following:
stomach pains
- Skin** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
- Eyes** : Adverse symptoms may include the following:
pain
watering
redness
- Medical conditions aggravated by over-exposure** : Pre-existing respiratory disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

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Section 3. Composition/information on ingredients

United States

<u>Name</u>	<u>CAS number</u>	<u>% by weight</u>
Isopropyl alcohol	67-83-0	35 - 45
xylene	1330-20-7	35 - 45
ethylbenzene	100-41-4	5 - 10
Silane	-	5 - 10
Diethylglyceryl triethylphenol	90-72-2	1 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Section 4. First aid measures

Eye contact	: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
Inhalation	: Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
Ingestion	: Call medical doctor or poison control center immediately. Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
Notes to physician	: In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Section 5. Fire-fighting measures

Flammability of the product : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Suitable	: Use dry chemical, CO ₂ , water spray (fog) or foam.
Not suitable	: Do not use water jet.

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Section 5. Fire-fighting measures

- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Not available.
- Special remarks on explosion hazards** : Not available.

Section 6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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Section 7. Handling and storage

- Handling :** Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage :** Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Product name

Exposure limits

United States

Isopropyl alcohol

ACGIH TLV (United States, 6/2013).

STEL: 400 ppm 15 minutes.

TWA: 200 ppm 8 hours.

NIOSH REL (United States, 10/2013).

STEL: 1225 mg/m³ 15 minutes.

STEL: 500 ppm 15 minutes.

TWA: 980 mg/m³ 10 hours.

TWA: 400 ppm 10 hours.

OSHA PEL (United States, 2/2013).

TWA: 980 mg/m³ 8 hours.

TWA: 400 ppm 8 hours.

xylene

ACGIH TLV (United States, 6/2013).

STEL: 651 mg/m³ 15 minutes.

STEL: 150 ppm 15 minutes.

TWA: 434 mg/m³ 8 hours.

TWA: 100 ppm 8 hours.

OSHA PEL (United States, 2/2013).

TWA: 435 mg/m³ 8 hours.

TWA: 100 ppm 8 hours.

ethylbenzene

ACGIH TLV (United States, 6/2013).

TWA: 20 ppm 8 hours.

NIOSH REL (United States, 10/2013).

STEL: 545 mg/m³ 15 minutes.

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Section 8. Exposure controls/personal protection

STEL: 125 ppm 15 minutes.
TWA: 435 mg/m³ 10 hours.
TWA: 100 ppm 10 hours.
OSHA PEL (United States, 2/2013).
TWA: 435 mg/m³ 8 hours.
TWA: 100 ppm 8 hours.

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Dry sanding, flame cutting and/or welding of the dry paint film will give rise to dust and/or hazardous fumes. Wet sanding/flattening should be used wherever possible. If exposure cannot be avoided by the provision of local exhaust ventilation, suitable respiratory protective equipment should be used.
- Personal protection**
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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Section 8. Exposure controls/personal protection

Eyes	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
Skin	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Section 9. Physical and chemical properties

Physical state	: Liquid.
Flash point	: Closed cup: 12°C (53.6°F)
Auto-ignition temperature	: Not available.
Upper/lower flammability or explosive limits	
	Upper: : Not determined.
	Lower: : Not determined.
Appearance	: Colorless.
Odor	: Solvent.
Odor threshold	: Not available.
Specific gravity	: 0.84
pH	: Not available.
Boiling/condensation point	: 83°C (181.4°F)
Melting/freezing point	: Not available.
Vapor pressure	: Not available.
Vapor density	: Heavier than air
Density	: 7.01 lbs per gal 0.84 g/cm ³
Weight Volatiles	: 89.04% (w/w)
Volume Volatiles	: 90.8 % (v/v)
Weight Solids	: 10.96 % (w/w)
Volume Solids	: 9.20 % (v/v)
Regulatory VOC	: 6.25 lbs/gal (749 g/l) minus water and exempt solvents
Dispersibility properties	: Not dispersible in the following materials: cold water.
Evaporation rate	: Not determined.

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Section 9. Physical and chemical properties

Coefficient of water/oil distribution : Not determined.

Section 10. Stability and reactivity

- Stability** : The product is stable.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
- Materials to avoid** : Reactive or incompatible with the following materials:
oxidizing materials
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

United States

Acute toxicity

Product/ingredient name	Result	Species	Dose
Isopropyl alcohol	LD50 Dermal	Rabbit	12800 mg/kg
	LD50 Intraperitoneal	Rat	2735 mg/kg
	LD50 Intravenous	Rat	1088 mg/kg
	LD50 Oral	Rat	5045 mg/kg
	LD50 Oral	Rat	5000 mg/kg
	TDLo Intraperitoneal	Rat	800 mg/kg
xylene	LD50 Intraperitoneal	Rat	2459 mg/kg
	LD50 Oral	Rat	4300 mg/kg
	LD50 Subcutaneous	Rat	1700 mg/kg
	TDLo Dermal	Rabbit	4300 mg/kg
ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg
	LD50 Dermal	Rabbit	17800 uL/kg
	LD50 Oral	Rat	3500 mg/kg
	TDLo Dermal	Rat	0.08 mL/kg
Silane	TDLo Intraperitoneal	Rat	1062 mg/kg
	LD50 Oral	Rat	2413 mg/kg
	LD50 Oral	Rat	7460 uL/kg
	LDLo Dermal	Rabbit	16 mL/kg
2,4,6-tris(dimethylaminomethyl) phenol	LD50 Dermal	Rat	1280 mg/kg
	LD50 Oral	Rat	2169 mg/kg
	LD50 Oral	Rat	1673 mg/kg
	LD50 Oral	Rat	1200 mg/kg

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
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Section 11. Toxicological information

Isopropyl alcohol	Eyes - Moderate irritant	Rabbit	-	24 hours	-
				100 milligrams	
	Eyes - Moderate irritant	Rabbit	-	10 milligrams	-
	Eyes - Severe irritant	Rabbit	-	100 milligrams	-
	Skin - Mild irritant	Rabbit	-	500 milligrams	-
xylene	Eyes - Mild irritant	Rabbit	-	87 milligrams	-
	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams	-
	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	100 Percent	-
ethylbenzene	Eyes - Severe irritant	Rabbit	-	500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
Silane	Eyes - Severe irritant	Rabbit	-	15 milligrams	-
	Skin - Mild irritant	Rabbit	-	500 milligrams	-
2,4,6-tris(dimethylaminomethyl) phenol	Eyes - Severe irritant	Rabbit	-	24 hours 50 Micrograms	-
	Skin - Mild irritant	Rat	-	0.025 Milliliters	-
	Skin - Severe irritant	Rat	-	0.25 Milliliters	-
	Skin - Severe irritant	Rabbit	-	24 hours 2 milligrams	-

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Isopropyl alcohol	A4	-	-	None.	-	-
xylene	A4	-	-	None.	-	-
ethylbenzene	A3	2B	-	None.	-	-

Mutagenicity

Conclusion/Summary : Not available.

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Section 11. Toxicological information

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Section 12. Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity : Not available.

Biodegradability : Not available.

Other adverse effects : No known significant effects or critical hazards.

Ecotoxicological data for one or more components are known and will be made available on request.



Section 13. Disposal considerations

Waste disposal: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/ PERSONAL PROTECTION for additional handling information and protection of employees.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label
DOT Classification	UN1263	PAINT RELATED MATERIAL	3	II	 

Additional information

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Section 14. Transport information

The marine pollutant mark is not required when transported on inland waterways in sizes of ≤5 L or ≤5 kg or by road, rail, or inland air in non-bulk sizes.

Reportable quantity

281.36 lbs / 127.74 kg [40.172 gal / 152.07 L]

Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

The above classification is based on a one gallon container (s) packaged and marked to comply with the requirements of 49 CFR Parts 171 through 173, as applicable. It is each shipper's responsibility to ensure each package is compatible with a selected mode of transportation and packaged in compliance with the domestic and, if applicable, international requirements for the selected mode of transport.

Section 15. Regulatory information

United States

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

United States inventory (TSCA 8b) : All components are listed or exempted.

SARA 313

Form R - Reporting requirements	Product name	CAS number	Concentration
	xylene	1330-20-7	25 - 40
	ethylbenzene	100-41-4	5 - 10

California Prop. 65 : WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Canada

WHMIS (Canada) : Class B-2: Flammable liquid
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class E: Corrosive material



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.

Canada inventory : All components are listed or exempted.

EU regulations

Hazard symbol or symbols :



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Section 15. Regulatory information

Risk phrases

- R11- Highly flammable.
- R20/21- Harmful by inhalation and in contact with skin.
- R41- Risk of serious damage to eyes.
- R38- Irritating to skin.
- R43- May cause sensitization by skin contact.
- R52/53- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases

- S23- Do not breathe vapor or spray.
- S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.
- S38- In case of insufficient ventilation, wear suitable respiratory equipment.

International regulations

International lists

- Australia inventory (AICS):** All components are listed or exempted.
- China inventory (IECSC):** All components are listed or exempted.
- Japan inventory:** All components are listed or exempted.
- Korea inventory:** All components are listed or exempted.
- Malaysia Inventory (EHS Register):** At least one component is not listed.
- New Zealand Inventory of Chemicals (NZIoC):** All components are listed or exempted.
- Philippines inventory (PICCS):** All components are listed or exempted.
- Taiwan inventory (CSNN):** At least one component is not listed.

Section 16. Other information

HMIS[®] III

Health	*	2
Flammability		3
Physical hazards		0

Notice to reader

To the best of our 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 hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Appendix F
SDS: Groundwater Well Locations



**Locations of Supply and Return
Wells for
Boeing Canada Winnipeg**

**Lot 1, Block 3 Plan 10634 WLTO
(99 Murray Park Road)
Winnipeg, Manitoba**

**EXHIBIT "A"
THIS IS AN INTEGRAL PART OF
LICENCE NO. 2014-056
ISSUED UNDER THE WATER RIGHTS ACT**

Appendix G

**An Inventory of Pre-1880 Historical Resources in the City of Winnipeg
prepared by M.E. Kelly (Excerpt)**

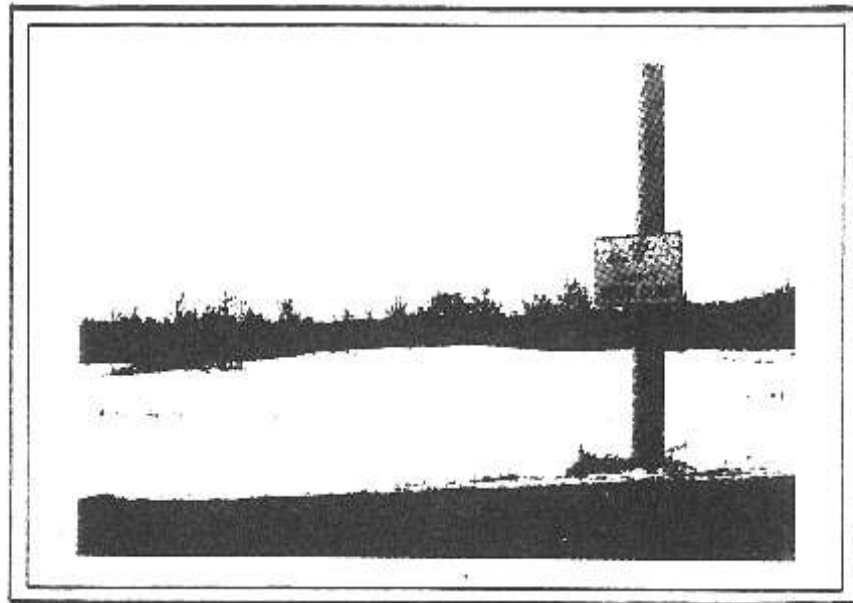
HISTORICAL RESOURCES

An Inventory of
Pre -1880 Historical Resources
in the City of Winnipeg



Prepared by M.E.Kelly,
Paleo-Sciences Intigrated Ltd.
for the Winnipeg
Development Plan Review
Jan , 1980

CITY OF WINNIPEG
PRE 1880 HISTORICAL RESOURCES INVENTORY



City Inventory Number: WPG-1

Site Name/Number(s): St. James Burial Mound, DFLH-1, WS-3, CCAS-3

Site Location/Address: Northeast corner of Murray Park and Sturgeon Roads

Site Type: Paleoenvironmental	<input type="checkbox"/>	▲	
Paleontological	<input type="checkbox"/>	■	Map
Prehistoric Archaeological	<input checked="" type="checkbox"/>	●	Symbol
Historic Archaeological	<input type="checkbox"/>	▼	
Standing Structure	<input type="checkbox"/>	◆	

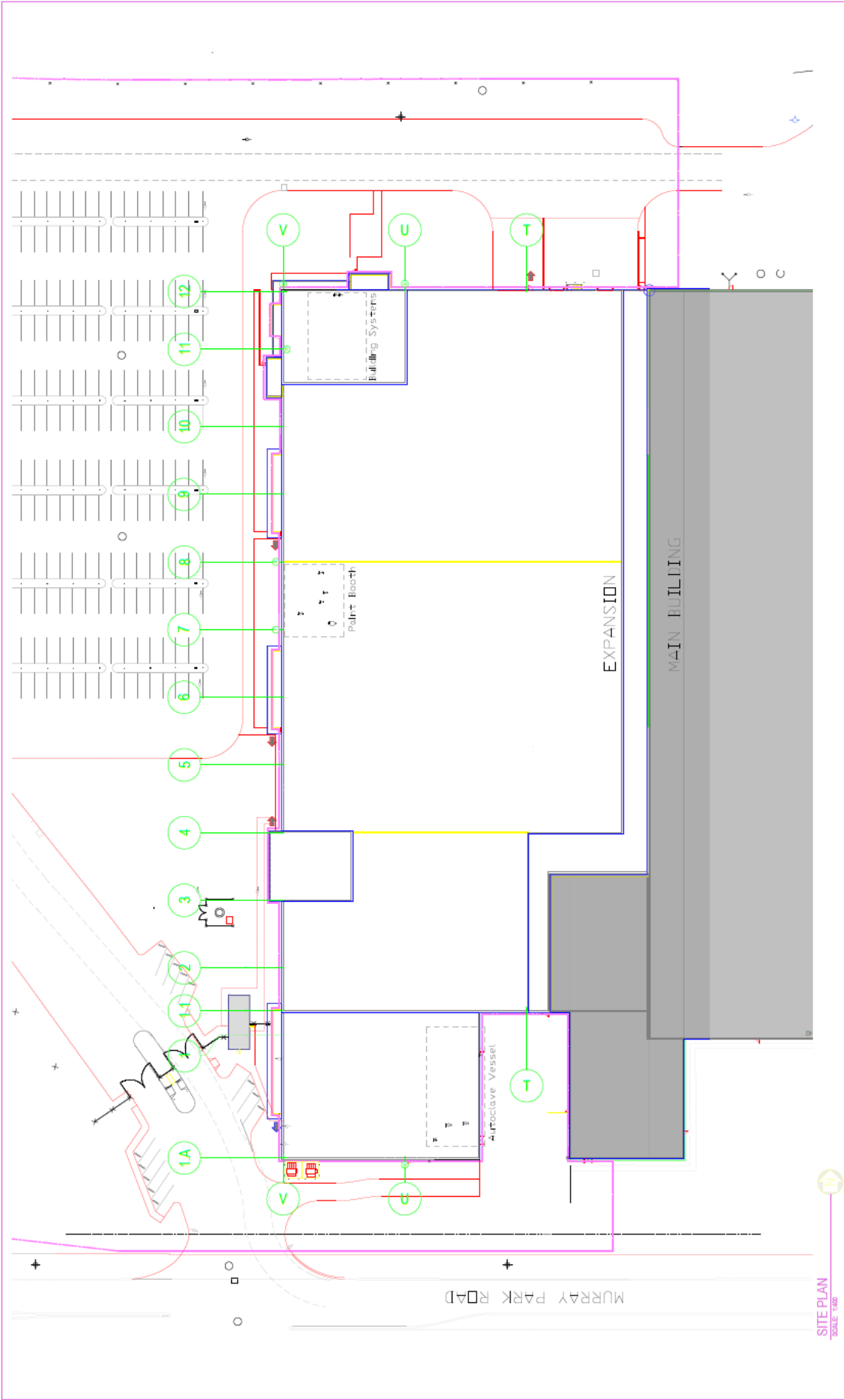
Site Condition/Concerns:

A late Prehistoric human burial mound which has been excavated several times: last by the 1969 University of Winnipeg, Department of Anthropology's Archaeology Field School (see Nass 1974 for report of findings). Chemical contamination is primary on-going disturbance to the site.

Appendix H
Roof Penetrations

Boeing Canada Winnipeg Expansion Building Duct Penetrations Legend

Name	Description	Duct Size Diameter	Duct Height Above Roof	Duct Column Location	Roof Vent Height Above Ground	Detailed Description
Paint Booth						
PB-1	Paint Booth Exhaust	42"	14'	V7		Paint Booth Exhaust Air
PB-2	Flash Booth Exhaust	10"	14'	V7		Flash-off Booth Exhaust Air
PB-3	Cure Booth Exhaust	10"	14'	V7		Cure Booth Exhaust Air
PB-4	Paint Booth Heater Exhaust	14"	6'	V7		Titan Indirect fired Natural Gas Air Makeup Unit / 2,400,000 btu/hr output
PB-5	Cure Booth Heater Exhaust	10"	6'	V8		Titan Indirect fired Natural Gas Air Makeup Unit / 1,210,000 btu/hr output
Autoclave Vessel						
AC-1	Vacuum Receiver Exhaust (Wall Vent)	2"		U1	10'	Qty: 2 /Exhaust temp: 100°F / Nominal flow rate: 0 scfm/ Composition: Nitrogen compressed air mix
AC-2	Main Pressurization Medium Exhaust	24"	12'	U1A		Exhaust temp: 100°F / Max Flow rate: 20,000 scfm / Composition: Nitrogen compressed air mix
AC-3	Combustion Exhaust	30"	4'	U1A		
AC-4	Natural Gas Vents	0.75"	1'	U1A		
Building Systems						
PH-1	Facility Gas Boiler Exhaust	8"	6'	V12		Crest Condensing Natural Gas Boiler / 2,760,000 btu/hr Output
PH-2	Facility Gas Boiler Exhaust	8"	6'	V12		Crest Condensing Natural Gas Boiler / 2,760,000 btu/hr Output



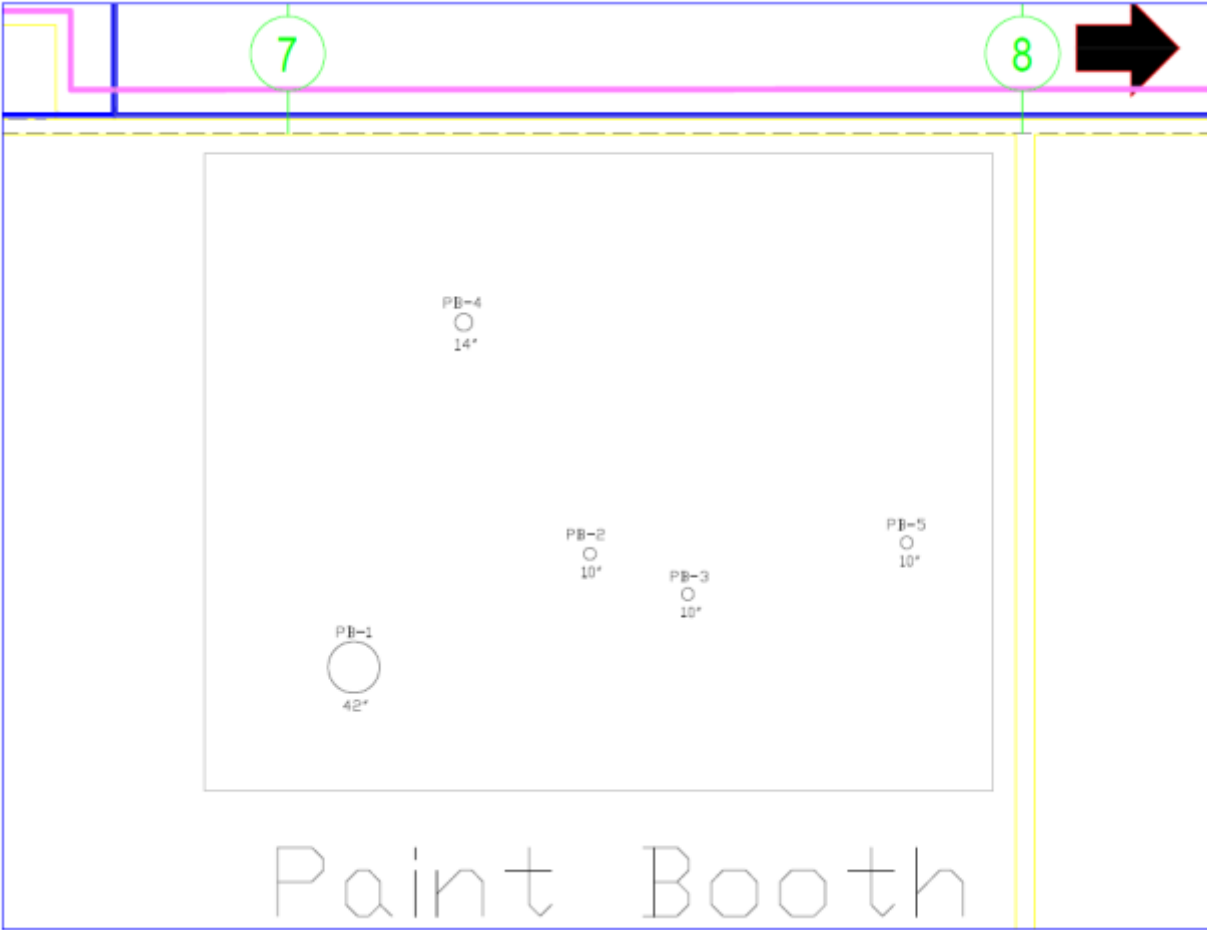
SITE PLAN
SCALE: 1/8" = 1'-0"

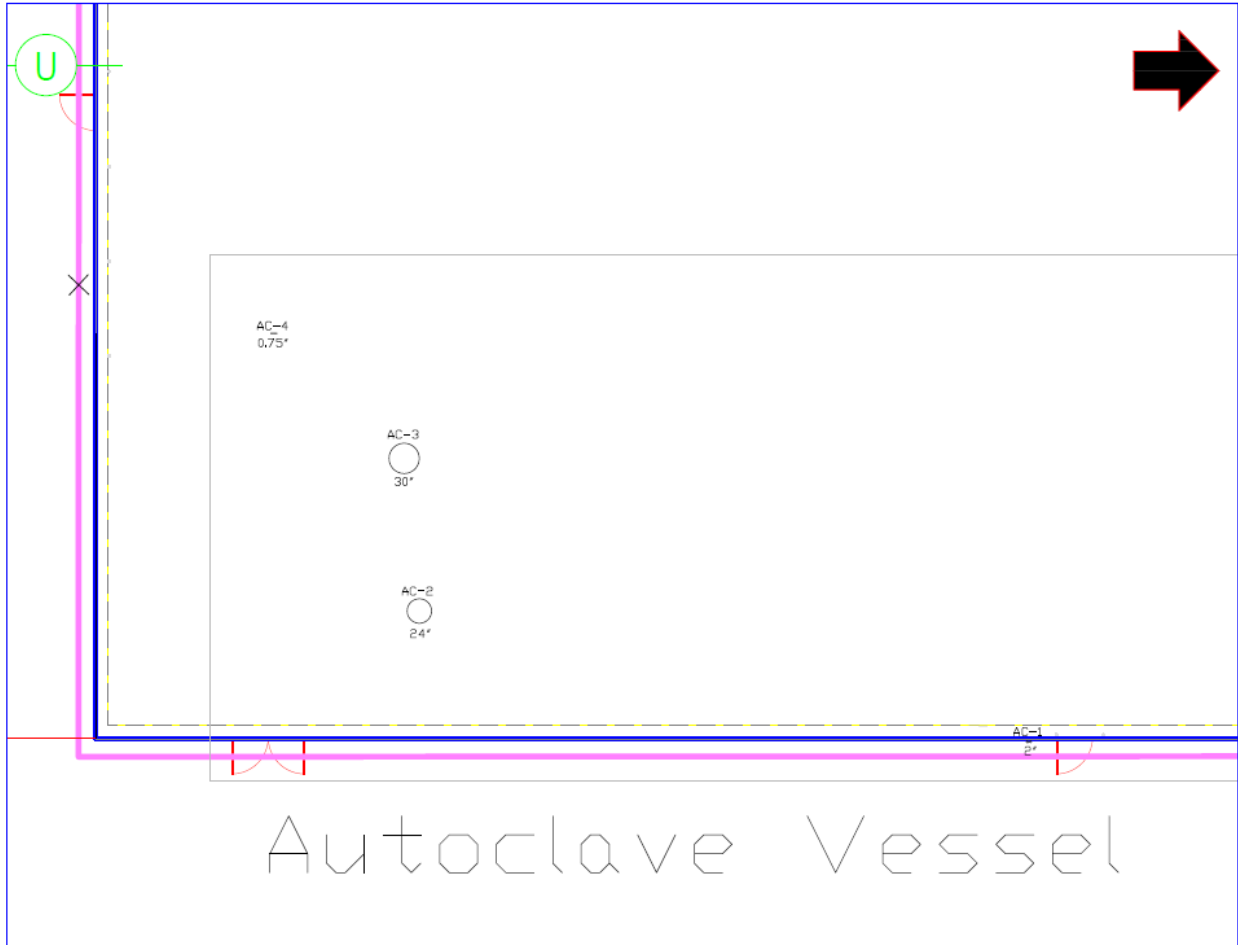
NO.	DATE	BY	CHKD.	DATE	REVISION
1	04/27/18				

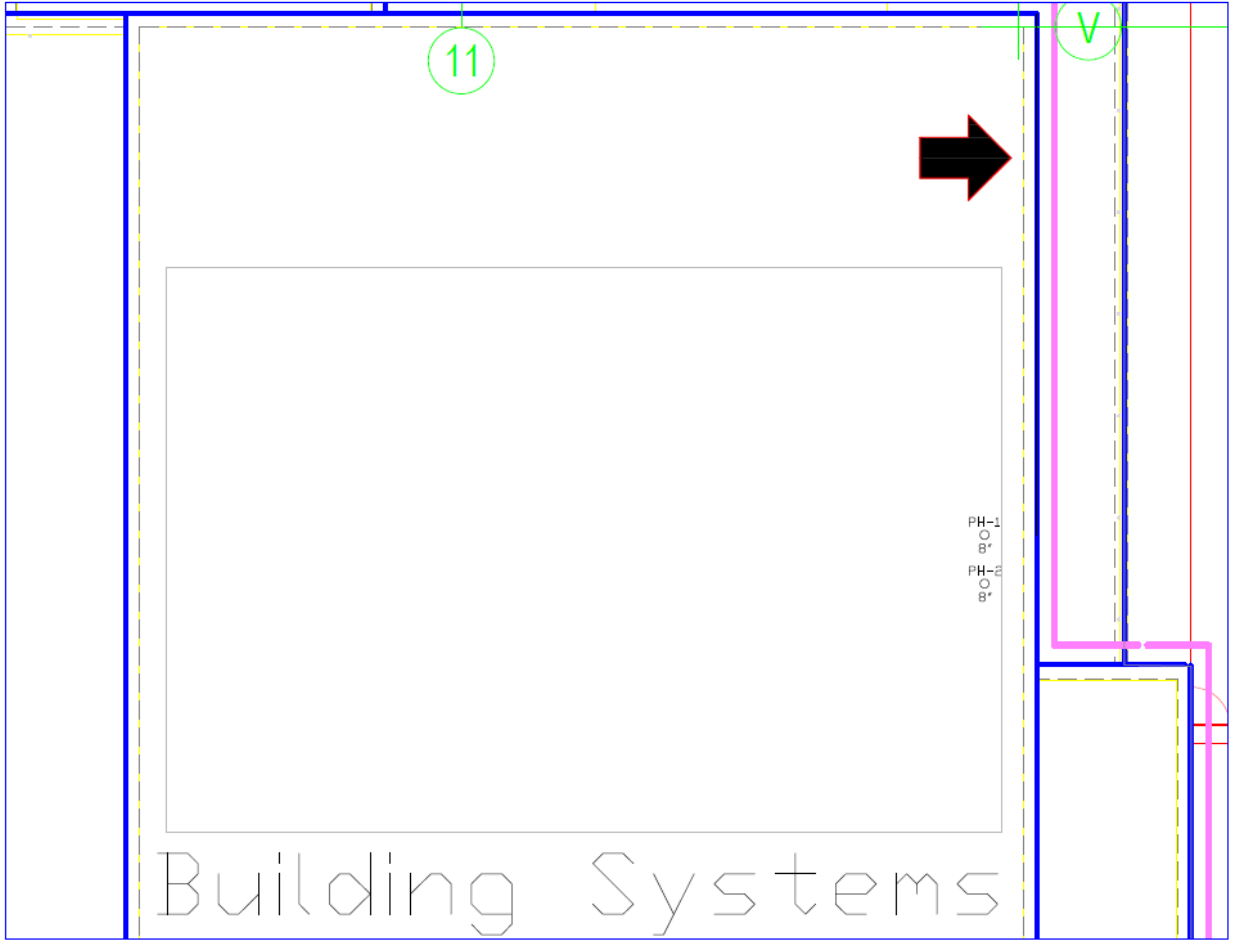
PROJECT NO.	000000A	DATE	04/27/18
PROJECT NAME	MURRAY PARK BUILDING EXPANSION	SCALE	1/8" = 1'-0"
DRAWN BY	A1	CHECKED BY	
DATE		DATE	

NO.	DATE	BY	CHKD.	DATE	REVISION
1					

NO.	DATE	BY	CHKD.	DATE	REVISION
1					







Appendix I
SDS: Methyl Ethyl Ketone

UNIVAR CANADA LTD.
ISSUE DATE:2013-05-03



Material Safety Data Sheet

LA2161

Methyl Ethyl Ketone

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Id: LA2161

Product Name: Methyl Ethyl Ketone

Synonyms: 2-Butanone, 3-Butanone, Butanone, Ethyl Methyl Ketone, MEK, Methyl acetone, Methyl-2-propanone.

Chemical Family: Ketone

Application: Solvent, diluent, chemical feedstock, or fuel.

Distributed By:

Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC
V6X 1W5

Prepared By: The Environment, Health and Safety Department of Univar Canada Ltd.

Preparation date of MSDS: 03/May/2013

Telephone number of preparer: 1-866-686-4827

24-Hour Emergency Telephone Number (CANUTEC): (613) 996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Percentage (W/W)	LD50s and LC50s Route & Species:
Methyl Ethyl Ketone 78-93-3	100	Oral LD50 (Rat) 2600 mg/kg Inhalation LC50 (Mouse) 32 g/m ³

		Inhalation LC50 (Rat, male) 11300 ppm (4-hour exposure) Dermal LD50 (Rabbit) 6400 mg/kg
--	--	---

Note: No additional remark.

3. HAZARDS IDENTIFICATION

Potential Acute Health Effects:

Eye Contact: Causes eye irritation. Symptoms of exposure may include: a burning sensation, redness, swelling and blurred vision.

Skin Contact: May cause moderate skin irritation. Burning sensation may result. Repeated or prolonged contact may cause defatting and drying of skin which may result in skin irritation and dermatitis.

Inhalation: Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing and difficulty breathing. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath and fever. High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.

3. HAZARDS IDENTIFICATION

Ingestion: May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression. Aspiration hazard! Small amounts aspirated into the lungs during ingestion or vomiting may cause lung injury, possibly leading to death. Symptoms of aspiration into the lungs include coughing, gasping, choking, shortness of breath, bluish discolored skin, rapid breathing and heart rate. Chemical pneumonitis from aspiration may result in fever. Pulmonary edema or bleeding, drowsiness, confusion, coma and seizures may occur in more serious cases. Symptoms may develop immediately or as late as 24 hours after the exposure, depending on how much chemical entered the lungs.

4. FIRST AID MEASURES

Eye Contact: Flush eyes with gently flowing water for at least 15 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse the contaminated water into the unaffected eye or face. Seek immediate medical attention.

Skin Contact: Remove contaminated clothing, including shoes, after flushing has begun. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention.

Inhalation: If symptoms are experienced, remove source of contamination or move victim to fresh air. If symptoms persist, get medical attention. If the affected person is not breathing, apply artificial respiration. If breathing is difficult, give oxygen. In situations where administering oxygen is appropriate, first aiders must be trained in the safe use and handling of oxygen. It is preferable to administer oxygen under a doctor's supervision or advice. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation (CPR) immediately. Immediate medical assistance is required.

Ingestion: Seek immediate medical attention. Do NOT induce vomiting. Never give anything by mouth to an unconscious or convulsing person. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Administer artificial respiration if

breathing has stopped. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation (CPR) immediately.

Notes to Physician: Treatment based on sound judgment of physician and individual reactions of patient.

5. FIRE FIGHTING MEASURES

Flash Point: -9 - (-4) °C / 16 - (25)

°F Flash Point Method: Closed

cup.

Autoignition Temperature: 404-515°C /759-959°F

Flammable Limits in Air (%): Lower: 1.8% Upper: 11.5%

Extinguishing Media: Use DRY chemicals, CO₂, alcohol foam or water spray.

Special Exposure Hazards: Flammable Liquid. Isolate and restrict area access. Stop leak only if safe to do so. Move containers from fire area if you can do it without risk. Fight fire from a safe distance and from a protected location. Use fine water spray or fog to control fire spread and cool adjacent structures or containers. This material may produce a floating fire hazard in extreme fire conditions. Vapors are heavier than air and may accumulate in low areas. Vapors may travel along the ground to be ignited at distant locations. Do not allow runoff to enter waterways or sewer.

Hazardous Decomposition/Combustion Materials (under fire conditions): A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

Special Protective Equipment: Wear protective clothing and self-contained breathing apparatus. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA is optional.

NFPA RATINGS FOR THIS PRODUCT ARE: HEALTH 1,

FLAMMABILITY 3, INSTABILITY 0 **HMIS RATINGS FOR THIS**

PRODUCT ARE: HEALTH 2, FLAMMABILITY 3, REACTIVITY 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures: Wear appropriate protective equipment.

Environmental Precautionary Measures: Prevent entry into sewers or streams, dike if needed. Consult local authorities.

Procedure for Clean Up: Flammable liquid. Isolate hazard area and restrict access. Stop leak only if safe to do so. Remove ignition sources and work with non-sparking tools. Small spills: soak up with absorbent material and scoop into containers. Large spills : prevent contamination of waterways. Dike and pump into suitable containers. Clean up residual with absorbent material, place in appropriate container and flush with water.

7. HANDLING AND STORAGE

Handling: Flammable. For industrial use only. Handle and open containers with care. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid inhalation of chemical. DO NOT handle or store near an open flame, heat, or other sources of ignition. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. DO NOT pressurize, cut, heat, or weld containers. Empty containers may contain hazardous product residues. Keep the containers closed when not in use. Protect against physical damage. Use appropriate personnel protective equipment. Electrostatic charges may be generated during

pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 10 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Extinguish any naked flames. **Storage:** Store in a cool, dry, well ventilated area, away from heat and ignition sources. Keep containers tightly closed. Store out of direct sunlight and on an impermeable floor.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

Local exhaust ventilation as necessary to maintain exposures to within applicable limits. Use explosion proof equipment. **Respiratory Protection:** If exposure exceeds occupational exposure limits, use an appropriate NIOSH approved respirator. In case of spill or leak resulting in unknown concentration, use a NIOSH approved supplied air respirator. **Gloves:**

Impervious gloves. Butyl rubber gloves. Silver Shield (R). 4H(R).

Skin Protection: Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential.

Consideration must be given both to durability as well as permeation resistance.

Eyes: Chemical goggles; also wear a face shield if splashing hazard exists.

Other Personal Protection Data: Ensure that eyewash stations and safety showers are proximal to the work-station location.

Ingredients	Exposure Limit - ACGIH	Exposure Limit - OSHA	Immediately Dangerous to Life or Health - IDLH
Methyl Ethyl Ketone	= 200 ppm TWA = 300 ppm STEL	200 ppm TWA 590 mg/m ³ TWA 300 ppm STEL 885 mg/m ³ STEL	3000 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid.

Color: Clear

Odor: Sweet

Ketone pH Not

Available.

Specific Gravity: 0.804-0.806

Boiling Point: 79-80.5°C / 174-176.9°F

Freezing/Melting Point: -86°C / -123°F

Vapor Pressure: 10.33 kPa (77.5 mmHg) @ 20°C

Vapor Density: 2.41

% Volatile by Volume: 100

Evaporation Rate: 2.7 (ether =1)

Solubility: Completely miscible.

VOCs: 100%

Viscosity: 0.52 cS

Molecular Weight:

72.11 **Other:** Not Available.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.

Hazardous Polymerization: Will not occur.

Conditions to Avoid: Avoid excessive heat, open flames and all ignition sources.

10. STABILITY AND REACTIVITY

Materials to Avoid: Oxidizing agents. Strong alkalis. Strong bases. Reducing agents. Amines. Ammonia. Aldehydes. Halogens. Hydrogen peroxide.

Hazardous Decomposition

Products: Peroxides. **Additional**

Information: No additional remark.

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure

Ingestion: May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression. Aspiration hazard! Small amounts aspirated into the lungs during ingestion or vomiting may cause lung injury, possibly leading to death. Symptoms of aspiration into the lungs include coughing, gasping, choking, shortness of breath, bluish discolored skin, rapid breathing and heart rate. Chemical pneumonitis from aspiration may result in fever. Pulmonary edema or bleeding, drowsiness, confusion, coma and seizures may occur in more serious cases. Symptoms may develop immediately or as late as 24 hours after the exposure, depending on how much chemical entered the lungs. **Skin Contact:** May cause moderate skin irritation. Burning sensation may result. Repeated or prolonged contact may cause defatting and drying of skin which may result in skin irritation and dermatitis.

Inhalation: Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing and difficulty breathing. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath and fever. High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.

Eye Contact: Causes eye irritation. Symptoms of exposure may include: a burning sensation, redness, swelling and blurred vision.

Additional Information: Methyl Ethyl Ketone (MEK) is expected to cause no or mild skin irritation. Repeated or prolonged contact can produce dermatitis (red, dry, itchy skin) and whitening of the skin. Animal evidence suggests that MEK is a moderate to severe eye irritant. Brief exposures to MEK vapors produced slight nose and throat irritation. Higher exposures are expected to cause central nervous system depression with symptoms such as headache, nausea, dizziness, drowsiness, and confusion. Extremely high concentrations may cause loss of consciousness and possibly death. Ingestion of MEK is expected to cause central nervous system depression with symptoms such as headache, nausea, dizziness, drowsiness, and confusion. Animal evidence suggests that MEK can be aspirated (inhaled) into the lungs during ingestion or vomiting. Aspiration of even a small amount of liquid could result in a life threatening accumulation of fluid in the lungs. Severe lung damage (edema), respiratory failure, cardiac

arrest and death may result. Animal studies have confirmed synergism between MEK and ethyl n-butyl ketone, methyl n-butyl ketone, n-hexane, carbon tetrachloride, 2,5-hexanedione and chloroform. Principal target organs involved in toxicological interactions are the nervous system and liver, although the lung has also been implicated.

Acute Test of Product:

Acute Oral LD50: Not Available.

Acute Dermal LD50: Not Available.

Acute Inhalation LC50: Not Available.

Carcinogenicity:

Ingredients	IARC - Carcinogens	ACGIH - Carcinogens
Methyl Ethyl Ketone	Not listed.	Not listed.

Carcinogenicity Comment: No additional information available.

Reproductive Toxicity/ Teratogenicity/ Embryotoxicity/ Mutagenicity: Methyl ethyl ketone - three animal studies have shown fetotoxicity (skeletal anomalies) at doses which did not produce any or only very slight maternal toxicity.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Methyl Ethyl Ketone	3130 - 3320 mg/L LC50 (Pimephales promelas) 96 h flow-through	Not Available.	Not Available.

Other Information:

Environmental Fate: Biodegradation: Extensive data demonstrate that Methyl Ethyl Ketone (MEK) is readily biodegradable. Determinations in freshwater and seawater demonstrated that the BOD was a high percentage of the theoretical oxygen demand. Studies on activated sludge showed that MEK is easily degraded and is not toxic to sludge microorganisms in concentrations up to 800 ug/liter. **Photo degradation -** Although MEK is less reactive in smog than many other organic chemicals, it does undergo significant photodecomposition probably because of a combination of direct photolysis and OH radical reactions. In the presence of 5 ppm NO, and with 35-40% relative humidity and 10 ppm MEK, a photodecomposition half-life of 9.8 hours was found. The half-life of MEK calculated in urban conditions is likely to be about 5.5 hours. **Bioaccumulation:** No direct information is available on the ability of MEK to accumulate in biological material. Its high water solubility, rapid degradation by aquatic bacteria, and low octanol-water partition coefficient of 0.26 suggest that it is unlikely to concentrate in aquatic species. Metabolic studies in man demonstrate that concentrations likely to be present in the environment will not lead to accumulation in human tissues.

13. DISPOSAL CONSIDERATIONS

Disposal of Waste Method: Disposal of all wastes must be done in accordance with municipal, provincial and federal regulations.

Contaminated Packaging: Empty containers should be recycled or disposed of through an approved waste management facility.

14. TRANSPORT INFORMATION

DOT (U.S.):

DOT Shipping Name: METHYL ETHYL KETONE

DOT Hazardous Class 3

DOT UN Number: UN1193

DOT Packing Group: II

DOT Reportable Quantity

(lbs): 5000 **Note:** No additional remark. **Marine Pollutant:** No.

TDG (Canada):

TDG Shipping Name: METHYL ETHYL KETONE

Hazard Class: 3

UN Number: UN1193

Packing Group: II

Note: No additional remark. **Marine**

Pollutant: No.

15. REGULATORY INFORMATION

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

Note: Not available.

U.S. Regulatory Rules

Ingredients	CERCLA/SARA - Section 302:	SARA (311, 312) Hazard Class:	CERCLA/SARA - Section 313:
Methyl Ethyl Ketone	Not Listed.	Listed	Not Listed.

California Proposition 65: Not Listed.

MA Right to Know List: Listed.

New Jersey Right-to-Know List: Listed.

Pennsylvania Right to Know List: Listed.

WHMIS Hazardous Class:

B2 FLAMMABLE LIQUIDS



D2B TOXIC MATERIALS

16. OTHER INFORMATION

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

Disclaimer:

NOTICE TO READER:

Univar, expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.

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

Appendix J
SDS: GCO-10

Material Safety Data Sheet



GCO-10

1. Product and company identification

Product name	: GCO-10
Supplier/Manufacturer	: DuBois Chemicals, Inc. 3630 E. Kemper Rd. Cincinnati, OH 45241 USA Phone: 1-800-438-2647 DuBois Chemicals Canada, Inc. 1155 North Service Road West Unit 6 Oakville, Ontario, L6M 3E3 Canada Phone: 1-866-861-3603
Recommended use	: Industrial applications: Cooling water treatment
MSDS #	: DUB00690
Product code	: 02320076, 02320474, 3357267, 3412422
Validation date	: 1/22/2015.
Version	: 2
Responsible name	: Regulatory Department 1-800-438-2647
<u>In case of emergency</u>	: 1-866-923-4919 (US and Canada) 01-651-523-0314 (Int'l and Mexico)

Hazardous Material Information System (U.S.A.)

Health	2
Flammability	0
Physical hazards	0

2. Hazards identification

Physical state : Liquid.

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview : WARNING!
HARMFUL IF INHALED. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE EYE IRRITATION.
Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation.

Potential acute health effects

Inhalation : No known significant effects or critical hazards. **Ingestion** : Harmful if swallowed.

Skin : No known significant effects or critical hazards.

Eyes : Moderately irritating to eyes.

Potential chronic health effects

Carcinogenicity : No known significant effects or critical hazards. **Medical conditions** : None known.

aggravated by overexposure

2. Hazards identification

See toxicological information (Section 11)

3. Composition/information on ingredients

Name	CAS number	% by weight
Poly[oxy-1,2-ethanediyl(dimethyliminio)-1,2-ethanediyl(dimethyliminio)-1,2-ethanediyl chloride (1:2)]	31512-74-0	1 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact	: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
Inhalation	: Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
Ingestion	: Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
Notes to physician	: In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5. Fire-fighting measures

Flammability of the product	: In a fire or if heated, a pressure increase will occur and the container may burst.
Extinguishing media	
Suitable	: Use an extinguishing agent suitable for the surrounding fire.
Not suitable	: None known.
Special exposure hazards	: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Hazardous thermal decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides phosphorus oxides halogenated compounds metal oxide/oxides
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
Environmental precautions	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Methods for cleaning up	
Small spill	: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and storage

Handling	: Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
Storage	: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

8. Exposure controls/personal protection

Occupational exposure

limits No exposure limit value known.

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory

: If a risk assessment indicates this is necessary, use a properly fitted, air-purifying or airfed respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands

: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes

Recommended: Chemical-resistant gloves
: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin

Recommended: splash goggles
: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls

: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Personal protective equipment (Pictograms)



9. Physical and chemical properties

Physical state	: Liquid.
Flash point	: [Product does not sustain combustion.]
Color	: Clear
Odor	: Not available. :
pH	7.5
Dilution pH	: Not available.
Boiling/condensation point	: Not available.
Melting/freezing point	: Not available. :
Specific gravity	1.04
Density	: 8.6788 lbs/gal :
Vapor pressure	Not available.
Vapor density	: Not available.
Odor threshold	: Not available. :
Evaporation rate	Not available.
Solubility	: Easily soluble in the following materials: cold water and hot water.
Partition coefficient: noctanol/water	: Not available.

10. Stability and reactivity

Chemical stability : The product is stable.

Conditions to avoid : No specific data. **Materials to avoid** : No specific data.

Hazardous decomposition : Under normal conditions of storage and use, hazardous decomposition products should **products** not be produced.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Poly[oxy-1,2-ethanediyl (dimethyliminio)-1, 2-ethanediyl (dimethyliminio)-1, 2-ethanediyl chloride (1:2)]	LC50 Inhalation Dusts and mists	Rat	2.9 mg/l	4 hours
	LD50 Oral	Rat	1850 mg/kg	-

Carcinogenicity

None known.

Acute toxicity estimates Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Toxic to aquatic organisms.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection

and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

IATA/IMDG/DOT/TDG: Please refer to the Bill of Lading/receiving documents for up to date shipping information.

15. Regulatory information

United States

U.S. Federal regulations

TSCA 12(b) one-time export

TSCA 12(b) annual export notification United States : TSCA 12(b) one-time export: No products were found.

inventory (TSCA 8b) : TSCA 12(b) annual export notification: No products were found.

EPA Registration Number: : All components are listed or exempted.

: 3635-273

SARA 311/312 Hazards identification: Immediate (acute) health hazard **SARA 302/304:** No products were found.

SARA 313

None identified.

State regulations

Massachusetts : None of the components are listed.

Rhode Island : None of the components are listed.

New Jersey : None of the components are listed.

Pennsylvania : None of the components are listed.

California Prop. 65

None of the components are listed.

Canada

WHMIS (Canada) : Not controlled under WHMIS (Canada).

Canadian lists

Canadian NPRI : None of the components are listed.

Canada inventory : All components are listed or exempted. **Canadian PCP/DIN Number** : 18800

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.

International regulations

International lists : **Australia inventory (AICS):** Not determined.

China inventory (IECSC): All components are listed or exempted.

Japan inventory: Not determined.

Korea inventory: Not determined.

Malaysia Inventory (EHS Register): Not determined.

New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.

Philippines inventory (PICCS): Not determined. Taiwan inventory (CSNN): Not

15. Regulatory information

determined.

Europe inventory : Not determined.

16. Other information

Hazardous Material Information System (U.S.A.) :

Health	2
Flammability	0
Physical hazards	0

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 under 29 CFR 1910.1200, 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 (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

Date of issue : 1/22/2015.

Date of previous issue : 2/6/2012.

Version : 2

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our 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 hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Water Transportation (IMC/MDG)	
Proper shipping name:	RESIN SOLUTION (Octane)
Hazard class or division:	3
Identification number:	UN 1866
Packing group:	III
Marine pollutant:	Octane

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 6 (b) Inventory Status:	All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12 (b) Export Notification:	None above reporting de minimis
CERCLA/SARA Section 302 EHS:	None above reporting de minimis
CERCLA/SARA Section 311/312:	Fire, Immediate Health, Delayed Health
CERCLA/SARA Section 313:	None above reporting de minimis
CERCLA Reportable quantity:	Dibutyl ether (CAS# 142-96-1) 100 lbs. (45.4 kg) Octane (CAS# 111-65-9) 100 lbs. (45.4 kg)
California Proposition 65:	No California Proposition 65 listed chemicals are known to be present.

Canada Regulatory Information

CEPA DSL/NDL Status:	One or more components are not listed on, and are not exempt from listing on either the Domestic Substances List or the Non-Domestic Substances List.
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16. OTHER INFORMATION

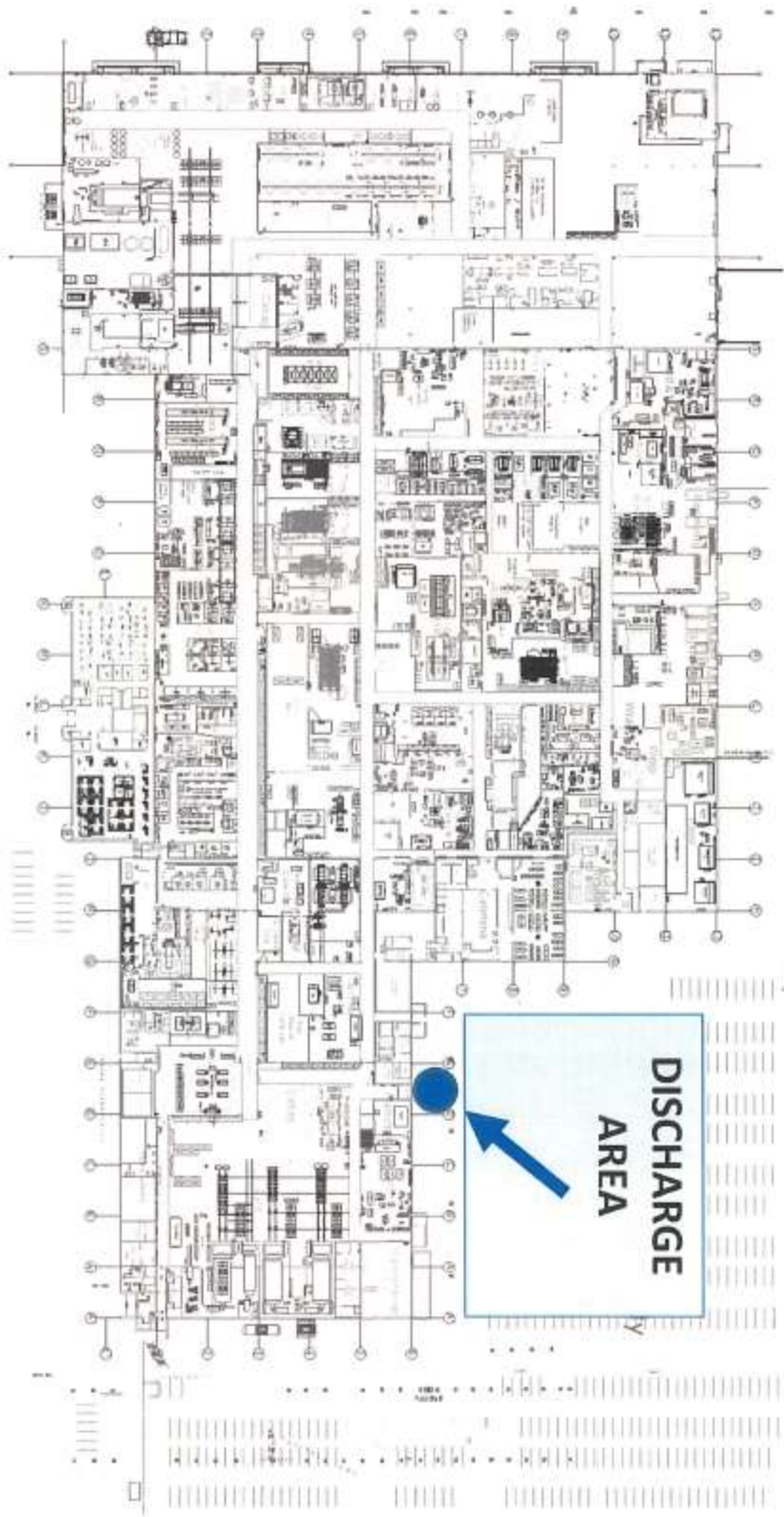
This safety data sheet contains changes from the previous version in sections: New Safety Data Sheet format.

Prepared by: Catherine Bimler, Regulatory Affairs Specialist
Issue date: 08/01/2014

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Appendix K
Cooling Tower: Land Drainage Sewer Location

Murray Park Rd



Appendix L
Cooling Tower SDS:
Biocide
Water Based Deposit Control Agent
Biodispersant
Corrosion Inhibitor



Material Safety Data Sheet

Issue Date: 20-MAY-2010
Supersedes: 25-MAY-2007

SPECTRUS OX1205C

1 Identification

Identification of substance or preparation

SPECTRUS OX1205C

Product Application Area

Biocide.

Company/Undertaking Identification

GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 20-MAY-2010

2 Hazard(s) identification

EMERGENCY OVERVIEW

Corrosive to skin. Corrosive to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

Odor: Chlorine; Appearance: Colorless To Green, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:

Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:

Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:

May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:

Prolonged or repeated exposures may cause primary irritant dermatitis and/or tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

Causes severe irritation, burns or tissue ulceration with subsequent scarring.

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
7681-52-9	SODIUM HYPOCHLORITE Corrosive ORAL LD50-RAT: 6,200 MG/KG DERMAL LD50-RABBIT: >3,000 MG/KG INHL. LC50: NO DATA.	10-20

4 First-aid measures

SKIN CONTACT:

URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:

URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:

Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Rinse mouth with plenty of water. Dilute contents of stomach using 4-10 fluid ounces (120-300 mL) of milk or water.

NOTES TO PHYSICIANS:

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

hydrogen chloride

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Product or rinsates that cannot be used should be diluted with water before disposal in a sanitary sewer.

7 Handling and storage

HANDLING:

Contains an oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids. Do not allow to dry.

STORAGE:

Shelf life = 20 days. Keep containers closed when not in use. Reasonable and safe chemical storage. Store away from acids.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME

SODIUM HYPOCHLORITE

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:

adequate ventilation

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use a respirator with acid gas cartridges and dust/mist prefilters.

SKIN PROTECTION:

gauntlet-type neoprene gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9 Physical and chemical properties

Spec. Grav.(70F,21C)	1.170	Vapor Pressure (mmHG)	22.0
Freeze Point (F)	-14	Vapor Density (air=1)	1.10
Freeze Point (C)	-26		
Viscosity(cps 70F,21C)	13	% Solubility (water)	100.0

Odor	Chlorine
Appearance	Colorless To Green
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	12.5
Evaporation Rate (Water=1)	0.94
Percent VOC:	0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with strong acids may cause a violent reaction releasing heat.

INCOMPATIBILITIES:

Solution of this product will emit sulfur dioxide when heated or acidified. Releases ammonia when made alkaline.

DECOMPOSITION PRODUCTS:

hydrogen chloride

11 Toxicological information

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 Ecological information

AQUATIC TOXICOLOGY

Bluegill Sunfish 96 Hour Static Acute Bioassay
LC50= 5.3; No Effect Level= 2.8 mg/L
Daphnia magna 48 Hour Static Acute Bioassay
LC50= 1.6; No Effect Level= .51 mg/L
Rainbow Trout 96 Hour Static Acute Bioassay
LC50= 1.9; No Effect Level= 1.38 mg/L

BIODEGRADATION

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:
HYPOCHLORITE SOLUTION
8, UN 1791, PG III
DOT EMERGENCY RESPONSE GUIDE #: 154

15 Regulatory information

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

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

Not applicable

FOOD AND DRUG ADMINISTRATION:

21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

PEST CONTROL PRODUCTS ACT:

Registry # 17469

16 Other information

HMIS vII

CODE TRANSLATION

Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles, Face Shield, Gloves, Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	02-JAN-1998 20-MAR-1998	-----	** NEW ** 02-JAN-1998

07-MAY-1998 ;EDIT:9
29-JUL-1998 12
25-AUG-1998 ;EDIT:9
08-FEB-1999 15
11-MAY-2000 15
20-MAR-2001 15
05-JUL-2001 15
29-SEP-2003 16
30-AUG-2006 16
25-MAY-2007 5, 10
20-MAY-2010 4, 7, 10

20-MAR-1998
07-MAY-1998
29-JUL-1998
25-AUG-1998
08-FEB-1999
11-MAY-2000
20-MAR-2001
05-JUL-2001
29-SEP-2003
30-AUG-2006
25-MAY-2007



Material Safety Data Sheet

Issue Date: 27-MAY-2011
Supersedes: 24-JUN-2009

SPECTRUS BD1500

1 Identification

Identification of substance or preparation
SPECTRUS BD1500

Product Application Area
Water-based deposit control agent.

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 27-MAY-2011

2 Hazard(s) identification

EMERGENCY OVERVIEW

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

Odor: Slight; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:

May cause slight gastrointestinal irritation.

TARGET ORGANS:

No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin.

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Product contains no hazardous ingredients reportable under WHMIS regulation

No component is considered to be a carcinogen by the U.S. National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH), or under WHMIS.

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon

FLASH POINT:

> 200F > 93C SETA(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Alkaline. Do not mix with acidic material.

STORAGE:

Keep containers closed when not in use. Reasonable and safe chemical storage. Store away from acids.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

Product contains no hazardous ingredients reportable under WHMIS regulation

ENGINEERING CONTROLS:

adequate ventilation

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, butyl or viton gloves — Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F, 21C)	1.020	Vapor Pressure (mmHG)	< 18.0
Freeze Point (F)	31	Vapor Density (air-1)	< 1.00
Freeze Point (C)	-1		
Viscosity(cps 70F, 21C)	30	% Solubility (water)	100.0

Odor	Slight
Appearance	Colorless
Physical State	Liquid
Flash Point	SETA(CC) > 200F > 93C
pH As Is (approx.)	12.5
Evaporation Rate (Ether-1)	< 1.00
Percent VOC:	0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with strong acids may cause a violent reaction releasing heat. Contact with water reactive compounds may cause fire or explosion.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon

11 Toxicological information

Oral LD50 RAT: >5000 mg/kg
 NOTE - Calculated value according to GHS additivity formula
 Dermal LD50 RABBIT: >5000 mg/kg
 NOTE - Calculated value according to GHS additivity formula

12 Ecological information

AQUATIC TOXICOLOGY

Ceriodaphnia 48 Hour Static Renewal Bioassay
 LC50 Greater Than- 3000 mg/L
 Ceriodaphnia 7 Day Static Renewal Bioassay
 IC25 = 652 mg/L
 Daphnia magna 48 Hour Static Acute Bioassay
 0% Mortality= 2000 mg/L
 Fathead Minnow 7 Day Static Renewal Bioassay
 IC25 = 3000; LC50 Greater Than- 3000 mg/L
 Fathead Minnow 96 Hour Static Bioassay with 48-Hour Renewal
 0% Mortality= 2000 mg/L
 Menidia beryllina (Silversides) 96 Hour Static Acute Bioassay
 0% Mortality= 5000 mg/L
 Mysid Shrimp 96 Hour Static Acute Bioassay
 25% Mortality= 5000; No Effect Level= 2500 mg/L
 Rainbow Trout 96 Hour Static Renewal Bioassay
 No Effect Level= 3000 mg/L
 No Data Available.

BIODEGRADATION

BOD-20 (mg/g): 5
 BOD-5 (mg/g): 4
 COD (mg/g): 341
 TOC (mg/g): 80

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:
 Not Regulated

DOT EMERGENCY RESPONSE GUIDE #: Not applicable

15 Regulatory information

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

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

Not applicable

FOOD AND DRUG ADMINISTRATION:

21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

PEST CONTROL PRODUCTS ACT:

Registry # 5185-319

16 Other information

HMIS VII		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	ALK	pH above 12.0
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status: 16-JUL-1997		** NEW **

09-SEP-1998
15-SEP-1998
12-NOV-1998
25-JUN-1999 11
02-APR-2001 12
05-OCT-2001 4, 16
10-JAN-2002 15
18-JAN-2002 15
29-APR-2003 8, 16
07-FEB-2006 12
10-JUL-2008 4, 8, 11
31-OCT-2008 11
09-FEB-2009 11
24-JUN-2009 10
27-MAY-2011 7, 10

16-JUL-1997
09-SEP-1998
15-SEP-1998
12-NOV-1998
25-JUN-1999
02-APR-2001
05-OCT-2001
10-JAN-2002
18-JAN-2002
29-APR-2003
07-FEB-2006
10-JUL-2008
31-OCT-2008
09-FEB-2009
24-JUN-2009



Material Safety Data Sheet

Issue Date: 20-MAY-2010
Supercedes: 14-AUG-2008

SPECTRUS BD1557

1 Identification

Identification of substance or preparation
SPECTRUS BD1557

Product Application Area
Biodispersant

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 20-MAY-2010

2 Hazard(s) identification

EMERGENCY OVERVIEW

WARNING

May cause moderate irritation to the skin. Severe irritant to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard: Environmentally hazardous substance: Marine Pollutant
Odor: Slight Ammonia; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; May cause moderate irritation to the skin.

ACUTE EYE EFFECTS:

Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:

Primary route of exposure;Mists/aerosols may cause irritation to

upper respiratory tract.

INGESTION EFFECTS:

May cause gastrointestinal irritation with possible nausea, vomiting, constipation or diarrhea, shock and respiratory changes. Symptoms may be delayed for several hours.

TARGET ORGANS:

No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin.

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
25997-06-8	1,2-ETHANEDIAMINE, POLYMER WITH AZIRIDINE Eye irritant	15-40

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon and nitrogen, ammonia and volatile amines

FLASH POINT:

> 213F > 101C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container.

Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Normal chemical handling.

STORAGE:

Keep containers closed when not in use. Protect from freezing. Atmospheric exposure should be minimized. Avoid high temperature storage. Avoid exposure to direct sunlight. Store away from oxidizers. Shelf life 360 days. If frozen, thaw completely and mix thoroughly prior to use.

8 Exposure controls / personal protection

EXPOSURE LIMITS**CHEMICAL NAME**

1,2-ETHANEDIAMINE, POLYMER WITH AZIRIDINE

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:

adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z89.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, butyl, viton or neoprene gloves — Wash off after each use. Replace as necessary.

EYE PROTECTION:

airtight chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F, 21C)	1.022	Vapor Pressure (mmHG)	- 18.0
Freeze Point (F)	32	Vapor Density (air=1)	< 1.00
Freeze Point (C)	0		
Viscosity(cps 70F, 21C)	ND	% Solubility (water)	100.0

Odor		Slight Ammonia
Appearance		Colorless To Light Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 213F > 100C
pH As Is (approx.)		11.1
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

No known hazardous reactions.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon and nitrogen, ammonia and volatile amines

11 Toxicological information

No Data Available.

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Acute Toxicity (Estimated)

EC50= 1.6; Predicted NOEL= .75 mg/L

Fathead Minnow 96 Hour Acute Toxicity (Estimated)

LC50= .45; Predicted NOEL= .19 mg/L

BIODEGRADATION

No Data Available.

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation Hazard: Environmentally hazardous substance: Marine Pollutant
DOT: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.(CONTAINS POLYETHYLENEIMINE)
9, UN 3082, PG III, MARINE POLLUTANT
DOT EMERGENCY RESPONSE GUIDE #: 171
Note: Some containers may be DOT exempt, please check BOL for exact container classification
IATA: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.(CONTAINS POLYETHYLENEIMINE)
9, UN 3082, PG III; MARINE POLLUTANT
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.(CONTAINS POLYETHYLENEIMINE)
9, UN 3082, PG III; MARINE POLLUTANT

15 Regulatory information

TSCA:
All components of this product are included on or are in compliance with the U.S. TSCA regulations.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
396 gallons due to AZIRIDINE (ETHYLENIMINE);
NSF Registered and/or meets USDA (according to 1998 Guidelines):
Registration number: Not Registered
SARA SECTION 312 HAZARD CLASS:
Immediate (acute)
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds
CALIFORNIA REGULATORY INFORMATION
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):
This product contains one or more ingredients known to the state of California to cause cancer.
MICHIGAN REGULATORY INFORMATION
No regulated constituent present at OSHA thresholds

16 Other information

HMIS VII		CODE TRANSLATION
Health	2	Moderate Hazard

Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	<u>EFFECTIVE DATE</u>	<u>REVISIONS TO SECTION:</u>	<u>SUPERCEDES</u>
MSDS status:	14-AUG-2008		** NEW **
	20-MAY-2010	7, 10, 14	14-AUG-2008



Material Safety Data Sheet

Issue Date: 19-MAR-2013
Supercedes: 10-FEB-2012

GENGARD GN8144

1 Identification

Identification of substance or preparation
GENGARD GN8144

Product Application Area
Corrosion inhibitor

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 19-MAR-2013

2 Hazard(s) identification

EMERGENCY OVERVIEW

Corrosive to skin. Corrosive to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

Odor: Slight Ammonia; Appearance: Dark Brown, liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and

gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:

Prolonged or repeated exposures may cause primary irritant dermatitis and/or toxicity to the lung.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin.

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
1310-73-2	SODIUM HYDROXIDE Corrosive; toxic (by ingestion) ORAL LD50-RAT: 140 MG/KG DERMAL LD50-RABBIT: 1350 MG/KG INHL. : NO DATA	3-7
202420-04-0	CHLOROTOLYLTRIAZOLE SODIUM SALT May cause mild irritation to skin and eye ORAL LD50: NO DATA. DERMAL LD50: NO DATA. INHL. LC50: NO DATA.	1-5

4 First-aid measures

SKIN CONTACT:

URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:

URGENT! Immediately flush eyes with water for 30 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Rinse mouth with plenty of water. Dilute contents of stomach using 4-10 fluid ounces (120-300 mL) of milk or water.

NOTES TO PHYSICIANS:

Material is corrosive. It may not be advisable to induce vomiting.
Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon and nitrogen, hydrogen chloride

FLASH POINT:

> 213F > 101C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Alkaline. Corrosive(Eyes). Do not mix with acidic material. Take precautions to minimize foaming.

STORAGE:

Store below 100F (38C). Keep containers closed when not in use. Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Store away from acids. Do not store in aluminum containers.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME**SODIUM HYDROXIDE**

PEL (OSHA): 2 MG/M3

TLV (ACGIH): TWA (Ceiling) - 2 MG/M3

CHLOROTOLYLTRIAZOLE SODIUM SALT

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

gauntlet-type rubber, butyl or neoprene gloves, chemical resistant apron — Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9 Physical and chemical properties

Spec. Grav. (70F,21C)	1.184	Vapor Pressure (mmHG)	- 18.0
Freeze Point (F)	18	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-8		
Viscosity(cps 70F,21C)	45	% Solubility (water)	100.0

Odor		Slight Ammonia
Appearance		Dark Brown
Physical State		Liquid
Flash Point	P-M(CC)	> 213F > 101C
pH As Is (approx.)		> 13.0
Evaporation Rate (Ether-1)		< 1.00
Percent VOC:		0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with strong acids may cause a violent reaction releasing heat. Contact with water reactive compounds may cause fire or explosion.

INCOMPATIBILITIES:

May react with acids or strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon and nitrogen, hydrogen chloride

11 Toxicological information

Oral LD50 RAT:	4000 mg/kg
NOTE - Calculated according to GHS additivity formula	
Dermal LD50 RABBIT:	>5000 mg/kg
NOTE - Calculated according to GHS additivity formula	

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Acute Bioassay (Estimated/pH adjusted)
 LC50= 720; No Effect Level= 487 mg/L
 Fathead Minnow 96 Hour Static Acute Bioassay (Estimated/pH adjusted)
 LC50= 185; No Effect Level= 88 mg/L

BIODEGRADATION

BOD-28 (mg/g): 29
 BOD-5 (mg/g): 13
 COD (mg/g): 270
 TOC (mg/g): 83

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (ACRYLATE TERPOLYMER;
 SODIUM HYDROXIDE)
 8, UN 3267, PG III
 DOT EMERGENCY RESPONSE GUIDE #: 153

15 Regulatory information

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

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

D2H E

16 Other information

HMIS VII		CODE TRANSLATION
Health	3	Serious Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles, Face Shield, Gloves, Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
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MSDS status:	04-NOV-2010		** NEW **
	31-JAN-2011	12	04-NOV-2010
	01-FEB-2011	8	31-JAN-2011
	05-APR-2011	11	01-FEB-2011
	17-JUN-2011	3, 7, 8, 10	05-APR-2011
	10-FEB-2012	2, 4, 5, 8, 14, 16	17-JUN-2011
	19-MAR-2013	16	10-FEB-2012