



ATTACHMENT 9 (5 PAGES)  
RESIN

MSDS #: 2561V8

<p>WHMIS (Canada)</p> <p>B-2 D-2A D-2B</p>	<p>NFPA (USA)</p> <p>Fire: 3</p> <p>Health: 2</p> <p>Reactivity: 1</p> <p>Specific hazard</p>	<p>HMIS (USA)</p> <table border="1"> <tr> <td>Health hazards</td> <td>* 2</td> </tr> <tr> <td>Flammability</td> <td>3</td> </tr> <tr> <td>Physical hazards</td> <td>1</td> </tr> <tr> <td>Personal protection</td> <td>X</td> </tr> </table>	Health hazards	* 2	Flammability	3	Physical hazards	1	Personal protection	X	<p>Protective clothing</p>
Health hazards	* 2										
Flammability	3										
Physical hazards	1										
Personal protection	X										

Section 1. Chemical product and company identification	
Trade name	C544-FWA-23
Product type	Polyester Resin Solution
Chemical family	Aromatic.
Material uses	Used in the manufacture of thermoset plastic parts.
Manufacturer	<p>AOC, LLC 950 Highway 57 East Collierville, TN U.S.A. 38017 Website: www.aoc-resins.com Phone Number: (901) 854-2800 8am-5pm (Central Time) Mon-Fri</p>
In case of emergency	<p>CHEMTREC (US): 24 hours/7 days (800) 424-9300 CANUTEC (Canada): 24 hours/7 days (613) 996-6666</p>

Section 2. Hazards identification	
SHA status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	Eye contact, Skin contact, Inhalation, Ingestion
Potential acute health effects	<p><b>Eyes:</b> Severe eye irritant which may result in redness, burning, tearing and blurred vision.</p> <p><b>Skin:</b> Skin irritant which may result in burning sensation. Repeated or prolonged skin contact may cause dermatitis.</p> <p><b>Ingestion:</b> Ingestion may result in mouth, throat and gastrointestinal irritation, nausea, vomiting and diarrhea.</p> <p><b>Inhalation:</b> Inhalation of spray mist or liquid vapors may cause upper respiratory irritation and possible central nervous system effects including headaches, nausea, vomiting, dizziness, drowsiness, loss of coordination, impaired judgement and general weakness.</p>
Potential chronic health effects	<p><b>CARCINOGENIC EFFECTS:</b></p> <p><b>Styrene:</b> Classified A4 (not classifiable for human or animal) by ACGIH. Classified 2B (possible for human) by IARC. Classified as "reasonably anticipated to be a human carcinogen" by NTP. An increased incidence of lung tumors was observed in mice from a recent inhalation study. The relevance of this finding is uncertain since data from other long-term animal studies and from epidemiology studies of workers exposed to styrene do not provide a basis to conclude that styrene is carcinogenic to humans.</p> <p><b>Cobalt 2-Ethylhexanoate:</b> Classified A3 (proven for animal) by ACGIH. Classified 2B (possible for human) by IARC.</p> <p><b>MUTAGENIC or TERATOGENIC EFFECTS:</b> No known effect according to our database.</p>

### Section 3. Composition/information on ingredients

Name	CAS #	% by weight
1) Styrene	100-42-5	48.0
2) Methanol	67-56-1	0.7
3) Cobalt 2-Ethylhexanoate	136-52-7	0.1 - 1

### Section 4. First aid measures

Eye contact	Flush with a continuous flow of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Use of buffered baby shampoo will aid in removal. Seek medical attention.
Skin contact	Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. If irritation persists, seek medical attention.
Inhalation	Move the victim to a safe area as soon as possible. Allow the victim to rest in a well-ventilated area. If breathing is difficult, give oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.
Ingestion	Do not induce vomiting. Seek immediate medical attention.

### Section 5. Fire-fighting measures

The product is:	Flammable liquid, Class IC.
Auto-ignition temperature	914°F(490°C) Styrene
Flash point	87.6°F (31°C) Styrene
Flammable limits	Lower: 0.9% Upper: 6.8% (Styrene)
Products of combustion	May produce carbon monoxide, carbon dioxide, and irritating or toxic vapors, gases or particulate.
Fire hazard	Flammable in the presence of open flames, sparks, or heat.
Explosion hazard	Can react with oxidizing materials. Explosive in the form of vapor when exposed to heat or flame. Material may polymerize when container is exposed to heat (fire) and polymerization will increase pressure in a closed container which may cause the container to rupture violently.
Fire-fighting media and instructions	SMALL FIRE: Use carbon dioxide, foam, dry chemical or water fog to extinguish. LARGE FIRE: Evacuate surrounding areas. Use carbon dioxide, foam, dry chemical or water fog to extinguish. Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. Prevent run off to sewers or other water ways.

### Section 6. Accidental release measures

Small spill	Absorb with an inert material and place in an appropriate waste disposal container.
Large spill	Stop leak if without risk. Eliminate all ignition sources. Contain with an inert material, recover as much as possible and place the remainder in an appropriate waste disposal container. Warn unauthorized personnel to move away. Prevent entry into sewers or confined areas.

## Section 7. Handling and storage

### Handling

WARNING! Use only in well-ventilated areas. Store away from direct sunlight. Avoid inhalation and contact with eyes, skin, and clothing. Wear appropriate personal protective equipment for your task. Ground and bond all containers when transferring the material. Empty containers may retain product and product vapor. Do not expose to heat, flame, sparks or other ignition sources such as cutting, welding, drilling, grinding or static electricity. Do not pressurize. Provide adequate safety showers and eyewashes in the area of use.

### Storage

Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Containers should be grounded.

## Section 8. Exposure controls/personal protection

### Exposure limits

Styrene

**ACGIH TLV (United States, 3/2012). Absorbed through skin.**

TWA: 20 ppm 8 hours.

TWA: 85 mg/m<sup>3</sup> 8 hours.

STEL: 40 ppm 15 minutes.

STEL: 170 mg/m<sup>3</sup> 15 minutes.

**OSHA PEL Z2 (United States, 11/2006).**

TWA: 100 ppm 8 hours.

AMP: 600 ppm 5 minutes.

CEIL: 200 ppm

**NIOSH REL (United States, 6/2009).**

TWA: 50 ppm 10 hours. Form:

TWA: 215 mg/m<sup>3</sup> 10 hours.

STEL: 100 ppm 15 minutes.

STEL: 425 mg/m<sup>3</sup> 15 minutes.

Methanol

**ACGIH TLV (United States, 3/2012). Absorbed through skin.**

TWA: 200 ppm 8 hours.

TWA: 262 mg/m<sup>3</sup> 8 hours.

STEL: 250 ppm 15 minutes.

STEL: 328 mg/m<sup>3</sup> 15 minutes.

**NIOSH REL (United States, 6/2009). Absorbed through skin.**

TWA: 200 ppm 10 hours.

TWA: 260 mg/m<sup>3</sup> 10 hours.

STEL: 250 ppm 15 minutes.

STEL: 325 mg/m<sup>3</sup> 15 minutes.

**OSHA PEL (United States, 6/2010).**

TWA: 200 ppm 8 hours.

TWA: 260 mg/m<sup>3</sup> 8 hours.

Cobalt 2-Ethylhexanoate

**OSHA PEL (United States).**

TWA: 0.1 mg/m<sup>3</sup>

### Engineering controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Provide adequate safety showers and eyewashes in the area of use.

### Personal protection

Personal protective equipment may vary depending on the job being performed.

**Eye/face:** Wear eye protection such as safety glasses with side shields, splash goggles or face shield with safety glasses.

**Skin:** Avoid skin contact. Impervious gloves should be worn. Other items may include long sleeves, lab coats, or impervious jackets.

**Respiratory:** Determine if airborne concentrations are below the recommended exposure limits in accordance your company's PPE program and regulatory requirements. If they are not, select a NIOSH-approved respirator that provides adequate protection from the concentration levels encountered. Air-purifying respirators are generally adequate for organic vapors. Use positive pressure, supplied-air respirators if there is potential for an uncontrolled release, if exposure levels are unknown, or under circumstances where air-purifying respirators may not provide adequate protection.

Reference OSHA 29 CFR 1910.134.

### Personal protection in case of a large spill

Chemical resistant gloves, full protective suit, and boots. Respiratory protection in accordance with OSHA regulation 29 CFR 1910.134. A self-contained breathing apparatus should be used to avoid inhalation of the product vapors.

## Section 9. Physical and chemical properties

Physical state	Liquid.
Color	Purple.
Odor	Aromatic.
Molecular weight (g/mol)	1000 to 15000
Boiling point	293°F(145°C) Styrene
Melting point	Not available.
pH (1% soln/water)	Not applicable.
Vapor pressure	4.5 mm Hg@ 68°F (20°C) Styrene
Vapor density	3.59 Styrene (Air = 1)
Specific gravity	1.1 (Water = 1)
Partition coefficient: n-octanol/water	Not available.
Evaporation rate	Not available.
Odor threshold	0.14 ppm Styrene
Solubility in water	Slight.
Dispersibility properties	Not dispersed in water.

## Section 10. Stability and reactivity

Stability	This product is normally stable, but can become unstable at elevated temperatures.
Instability temperature	>170°F (77°C)
Conditions of instability	Heat.
Incompatibility with various substances	Polymerizes in the presence of organic peroxides, oxidizing materials, or heat.
Corrosivity	Our database contains no additional remark on the corrosivity of this product

## Section 11. Toxicological information

Toxicity to animals	Name	Result	Species	Dose	Exposure
	Styrene	LC50 Inhalation Gas.	Rat	2770 ppm	4 hours
		LC50 Inhalation	Rat	11800 mg/m <sup>3</sup>	4 hours
		Vapor			
	Cobalt 2-Ethylhexanoate	LD50 Oral	Rat	2650 mg/kg	-
		LD50 Dermal	Rabbit	>5 g/kg	-
		LD50 Oral	Rat	1.22 g/kg	-
	Methanol	LD50 Oral	Rat	6171 mg/kg	-
		LC50 Inhalation Gas.	Rat	145000 ppm	1 hours
		LC50 Inhalation Gas.	Rat	64000 ppm	4 hours
		LD50 Dermal	Rabbit	15800 mg/kg	-
		LD50 Oral	Mouse	7300 mg/kg	-
		LD50 Oral	Rat	5600 mg/kg	-
Special remarks on toxicity to animals	Lung effects that have been observed in mouse studies have been shown in some studies to be the result of mouse specific enzymes (not in humans) that enable the mechanism for producing cancer in mice.				
Special remarks on chronic effects on humans	A study of long term effects of workers exposed to styrene levels in the range of 25-35 ppm, 8 hour TWA, indicated a possible mild hearing loss.				
Effective Date: 08/06/2013	Supersedes Date: 01/22/2013			Page: 4/5	

**Section 11. Toxicological information**

Special remarks on other toxic effects on humans      No additional remark.


**Section 12. Ecological information**

Ecotoxicity      Toxic to aquatic organisms. Should not be released to sewage system or other bodies of water at concentrations above limits established in regulations or permits.

**Section 13. Disposal considerations**

Waste disposal      Recycle to process, if possible. Consult your local or regional authorities. Ignitable characteristic.

**Section 14. Transport information**

DOT	UN1866; Resin Solution; 3; III.	<b>Labels</b> 
TDG	UN1866; Resin Solution; 3; III.	
IATA/IMDG	UN1866; Resin Solution; 3; III	
Additional information	US regulations require the reporting of spills when the amount exceeds the Reportable Quantity (RQ) for specific components of this material. See CERCLA in Section 15, Regulatory Information, for the Reportable Quantities.	

**Section 15. Regulatory information**

Other regulations      This section does not reference all applicable regulatory compliance lists.

TSCA: All ingredients are listed or compliant with TSCA.

DSL: All ingredients are listed or compliant with the NSNR.

**Proposition 65 Warning:** This product contains a chemical(s) known to the State of California to cause cancer, birth defects and/or reproductive harm.

**SARA 302 component(s):** None.

**SARA 313 component(s):** Styrene, Methanol, Cobalt 2-Ethylhexanoate.

**CERCLA(RQ):** Styrene - 1000 lbs. (453.6 kg)  
Methanol - 5000 lbs. (2268 kg)

**Section 16. Other information**

Prepared by      AOC, LLC - Corporate Regulatory Affairs.      ON

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## MATERIAL SAFETY DATA SHEET

NOROX<sup>®</sup> MEKP-925H

Syrgis Performance  
Initiators, Inc.  
Helena, AR

## SECTION 1 - IDENTIFICATION OF THE PRODUCT AND THE COMPANY

PRODUCT NAME	NOROX <sup>®</sup> MEKP-925H	TELEPHONE	870-572-2935
MANUFACTURER	Syrgis Performance Initiators, Inc.	CHEMTREC (24hr) (USA)	800-424-9300
ADDRESS	334 Phillips 311 Rd., Helena, AR 72342	(Maritime/International)	703-527-3887
CHEMICAL NAME	Methyl Ethyl Ketone Peroxide (MEKP)	CAS NO.	See Section 2
CHEMICAL FAMILY	Organic Peroxide - Ketone Peroxide	CHEMICAL FORMULA	Mixture

## SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENTS	CAS NO.	%
Methyl Ethyl Ketone Peroxide	1338-23-4	32 - 35
Dimethyl Phthalate	131-11-3	35 - 60
Phlegmatizer	Proprietary	6 - 26
Hydrogen Peroxide	7722-84-1	1
Methyl Ethyl Ketone	78-93-3	0 - 2
Water	7732-18-5	1

## SECTION 3 - HAZARD IDENTIFICATION OF THE PREPARATION

PHYSICAL HAZARDS	Organic Peroxide. Decomposition.
HEALTH HAZARDS	Severe Irritant.
EXPOSURE LIMITS	The ACGIH Ceiling STEL is 1.5 mg/m <sup>3</sup> (0.2 ppm) for Methyl Ethyl Ketone Peroxide.
ROUTES OF EXPOSURE	
Skin Contact	Severe skin irritant, causes redness, blistering, and edema.
Eye Contact	Eye contact causes severe corrosion and may cause blindness.
Ingestion	Human systemic effects by ingestion: changes in structure or function of esophagus, nausea, or vomiting, and other gastrointestinal effects.
Inhalation	Moderately toxic by inhalation.
EFFECTS OF OVER-EXPOSURE	Prolonged inhalation of vapors may cause mucous membrane irritation and vertigo. There are no known medical conditions, which are recognized as being aggravated by exposure.

## SECTION 4 - FIRST-AID MEASURES

Skin	Immediately remove any contaminated clothing. Wash contaminated area thoroughly with soap and copious amounts of water for at least 15 minutes. If irritation or adverse symptoms develop, seek medical attention.
Eyes	Remove any contact lenses at once. Flush eyes with water for at least 15 minutes. Ensure adequate flushing by separating the eyelids with fingers. If irritation or adverse symptoms develop, seek medical attention.
Ingestion	Do Not induce vomiting. Drink plenty of water. Immediately call a physician. For aid to physician, suggest local Poison Control Center.
Inhalation	Remove to fresh air, if coughing, breathing becomes labored, irritation develops or other symptoms develop, seek medical attention at once, even if symptoms develop several hours after the exposure.

## SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT	>200°F (93°C) C.O.C.
FLAMMABLE LIMITS	Not established.
AUTOIGNITION POINT	Not established.
EXTINGUISHING MEDIA	Water from a safe distance - preferably with a fog nozzle. In case of very small fires, other means such as carbon dioxide, foam or dry chemical extinguishers may be effective. Dry chemical combined with MEKP formulations may re-ignite. Light water additives may be particularly effective at extinguishing MEKP fires.
SPECIAL FIRE FIGHTING PROCEDURES	Firefighters should be equipped with protective clothing and SCBA's. In case of fire near storage area, cool the containers with water spray. If dry chemical is used to extinguish an MEKP fire, the extinguished area must be thoroughly wetted down with water to prevent re-ignition.
UNUSUAL FIRE AND EXPLOSION HAZARDS	The heat of decomposition of the peroxides adds to the heat of the fire. Dry chemical fire extinguishing agent may catalyze the decomposition.

**NOROX<sup>®</sup> MEKP-925H****SECTION 6 - ACCIDENTAL RELEASE MEASURES**

**STEPS TO BE TAKEN IN EVENT OF SPILL OR RELEASE** Dike spill to prevent runoff from entering drains, sewers, streams, etc. Wet spilled material with water and absorb with an inert absorbent material such as perlite, vermiculite, or sand. Sweep up using non-sparking tools and place in a clean polyethylene drum or a polyethylene pail. **DO NOT place into a steel container, lined or unlined, as a decomposition may occur.** Treat any contaminated cardboard packaging as hazardous waste. **Wet container contents with additional water prior to sealing.**

**SECTION 7 - HANDLING AND STORAGE**

**HANDLING** Rotate stock using the oldest material first. Avoid contact with skin, eyes and clothing. Use PPE as specified in Section 8. Keep containers closed to prevent contamination. Keep away from sources of heat, sparks or flame. Do not add to hot solvents or monomers as a violent decomposition and/or reaction may result. When using spray equipment, never spray raw MEKP onto curing or into raw resin or flues. Keep MEKP in its original container. **DO NOT USE NEAR FOOD OR DRINK.** Wash thoroughly after handling.

**STORAGE** The stability of MEKP formulations is directly related to the shipping and storage temperature history. Cool storage at 80°F or below is recommended for longer shelf life and stability. Prolonged storage at elevated temperatures of 100°F and higher will cause product degradation, gassing and potential container rupture which can result in a fire and/or explosion. Store out of direct sunlight in a well ventilated area away from combustible and incompatible materials. **DO NOT STORE WITH FOOD OR DRINK.** Refer to NFPA 400 Hazardous Materials Code from the National Fire Protection Association for additional storage information.

**OTHER PRECAUTIONS** Unmixed, uncontaminated material, remaining at the end of the day, shall be returned to a proper organic peroxide storage area. Under no circumstances should material be returned to the original container.

**SECTION 8 - EXPOSURE CONTROL/PERSONAL PROTECTION**

**VENTILATION** Mechanical, general.

**RESPIRATORY PROTECTION** If airborne concentrations are expected to exceed acceptable levels wear a NIOSH approved air-purifying respirator with an organic vapor cartridge or canister. When using respirators refer to OSHA's 29CFR 1910.134.

**EYE PROTECTION** Safety goggles recommended. Permanent eyewash is highly recommended.

**HAND PROTECTION** Protective gloves recommended, solvent resistant, such as butyl rubber, nitrile or neoprene.

**OTHER** A safety shower and eyewash is recommended when the risk of a significant exposure exists.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

<b>APPEARANCE AND ODOR:</b>	Water white liquid with a slight odor.		
<b>BOILING POINT:</b>	Not established.	<b>SPECIFIC GRAVITY:</b>	1.1
<b>VAPOR PRESSURE:</b>	Not established.	<b>FLASH POINT:</b>	>200°F (93°C) C.O.C.
<b>VAPOR DENSITY:</b>	> 1	<b>FLAMMABLE LIMITS:</b>	Not established.
<b>EVAPORATION RATE:</b>	Not established.	<b>SADT:</b>	>60°C (140°F)
<b>% VOLATILE BY VOLUME:</b>	Not established.	<b>pH:</b>	Not applicable.
<b>SOLUBILITY IN WATER:</b>	Slightly soluble in water.		

**SECTION 10 - STABILITY AND REACTIVITY**

**STABILITY** Stable when kept in original, closed container, out of direct sunlight at temperatures below 80°F (27°C).

**CONDITIONS TO AVOID** Contamination. Direct sunlight. Open flames. Prolonged storage above 100°F (38°C). Storage above SADT. Storage near flammable or combustible materials.

**MATERIALS TO AVOID** Dimethylaniline, cobalt naphthenate and other promoters, promoted resins, accelerators, oxidizing and reducing agents, strong acids, bases, metals, metal alloys and salts, sulfur compounds, amines or any hot material.

**HAZARDOUS DECOMPOSITION PRODUCTS** Decomposition products are flammable. Acrid smoke and irritating fumes.

**HAZARDOUS POLYMERIZATION** Will not occur.

**NOROX<sup>®</sup> MEKP-925H****SECTION 11 - TOXICOLOGICAL INFORMATION****Methyl Ethyl Ketone Peroxide****Hazard Data:**

**Inhalation:** Rat--LC<sub>50</sub>: 200 ppm/4 hr, lung, thorax, respiration, or dyspnea; Mouse--LC<sub>50</sub>: 170 ppm/4 hr, lung, thorax, respiration, or dyspnea.

**Intraperitoneal:** Rat--LD<sub>50</sub>: 65 mg/kg, behavioral, muscle weakness behavioral, ataxia.

**Oral:** Rat--LD<sub>50</sub>: 484 mg/kg; Mouse--LD<sub>50</sub>: 470 mg/kg; Human--TD<sub>Lo</sub>: 480 mg/kg, changes in structure or function of esophagus gastrointestinal, nausea or vomiting gastrointestinal.

**Skin:** Rabbit--LD<sub>50</sub>: 500 mg.

**Dimethyl Phthalate****Hazard Data:**

**Inhalation:** Cat--LC<sub>Lo</sub>: 9300 mg/m<sup>3</sup>/6.5 hr.

**Intraperitoneal:** Mouse--LD<sub>50</sub>: 1380 mg/kg.

**Oral:** Rat & Mouse--LD<sub>50</sub>: 6800 mg/kg, somnolence behavioral, withdrawal nutritional and gross metabolic, weight loss or decreased weight gain; Dog--LD: >1400 mg/kg; Rabbit--LD<sub>50</sub>: 4400 µL/kg.

**Subcutaneous:** Mouse--LD<sub>Lo</sub>: 6500 mg/kg, dyspnea lung, thorax, respiration, or cyanosis.

**Proprietary Phlegmatizer****Hazard Data:**

**Eye:** Rabbit: 93 mg, severe.

**Inhalation:** Human--TC<sub>Lo</sub>: 50mg/kg, eye effects, nose effects, and pulmonary system effects.

**Intraperitoneal:** Rat--LD<sub>Lo</sub>: 1500mg/kg; Mouse--LD<sub>50</sub>: 1299 mg/kg.

**Oral:** Rat--LD<sub>50</sub>: >1177 mg/kg.

**Skin:** Rabbit: 456 mg/24H, moderate; Rabbit--LD<sub>50</sub>: 8560 mg/kg.

**Hydrogen Peroxide****Hazard Data:**

**Inhalation:** Mouse--LC<sub>Lo</sub>: 227 ppm; Rat--TC<sub>Lo</sub>: 67 ppm/6hr/6W-1, dermatitis, irritative of the skin.

**Intraperitoneal:** Mouse--LD<sub>50</sub>: 880 mg/kg.

**Intravenous:** Rabbit--LD<sub>50</sub>: 15 gm/kg, behavioral, convulsions or effect on seizure threshold.

**Oral:** Rat--LD<sub>50</sub>: 376 mg/kg, gastrointestinal, peritonitis blood, pigmented or nucleated red blood cells; Mouse--LD<sub>50</sub>: 2 mg/kg.

**Subcutaneous:** Rat--LD<sub>50</sub>: 620 mg/kg; Mouse--LD<sub>50</sub>: 1072 mg/kg.

**Skin:** Rat--LD<sub>50</sub>: 4060 mg/kg, lung, thorax, respiration, or pulmonary emboli; Rabbit--LD<sub>Lo</sub>: 500 mg/kg, behavioral, convulsions or effect on seizure threshold.

**Methyl Ethyl Ketone****Hazard Data:**

**Eye:** Human: 350 ppm.

**Inhalation:** Rat--LC<sub>50</sub>: 23500 mg/m<sup>3</sup>/8hr.

**Intraperitoneal:** Rat--LD<sub>50</sub>: 607 mg/kg; Mouse--LD<sub>50</sub>: 616 mg/kg.

**Oral:** Rat--LD<sub>50</sub>: 2737 mg/kg; Mouse--LD<sub>50</sub>: 4050 mg/kg.

**Skin:** Rabbit--LD<sub>50</sub>: 6480 mg/kg.

**SECTION 12 - ECOLOGICAL INFORMATION**

No data is available on the preparation itself. The product should be prevented from entering drains, sewers, streams, etc.

**Ecotoxicity:** Methyl ethyl ketone peroxide: EC<sub>50</sub> (Guppy), 44.2 mg/L/96 hr, EC<sub>50</sub> (alga), 42,700 µg/L/96 hr.

**Environmental Fate:** Methyl ethyl ketone peroxide (MEKP) was evaluated for biodegradability in a closed bottle system and was reported to be readily biodegradable. An EC<sub>50</sub> of 16mg MEKP/L activated sludge was reported in an activated sludge respiration inhibition test.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

Prevent material from entering drains, sewers, streams, etc.

Immediately dispose of waste material at a RCRA approved hazardous waste management facility in accordance with federal, state and local regulations.



**NOROX<sup>®</sup> MEKP-925H****SECTION 14 - TRANSPORT INFORMATION**

**DOT Shipping Name:** ORGANIC PEROXIDE TYPE D, LIQUID  
 (METHYL ETHYL KETONE PEROXIDE, ≤45%)  
**DOT Hazard Class:** 5.2  
**UN/NA ID No.:** UN3105  
**DOT Packing Group:** PG II  
**DOT RQ:** RQ (if shipping container is greater than 29.4 lbs)  
**Labels:** 5.2 (Organic Peroxide)  
**2008 ERG GUIDE NO.:** 145

**SECTION 15 - REGULATORY INFORMATION**

The following chemicals are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Percent</u>
Dimethyl Phthalate	131-11-3	35 - 60
Methyl Ethyl Ketone	78-93-3	0 - 2

**Reportable Quantity**

2-Butanone Peroxide (MEKP): 10 lbs (4.54 kg)

**Australian Inventory of Chemical Substances (AICS)**

The ingredients in this product are listed in the Australian AICS Inventory.

**Canadian Domestic Substances List (DSL)**

The ingredients in this product are listed in the Canadian DSL Inventory.

**Chinese Inventory of Existing Chemical Substances Manufactured or Imported in China (IECSC)**

The ingredients in this product are listed in the Chinese IECSC Inventory.

**European Inventory of Existing Commercial Chemical Substances (EINECS)**

The ingredients in this product are listed in the European EINECS Inventory.

**Japanese Existing and New Chemical Substances (ENCS)**

The ingredients in this product are listed in the Japanese ENCS Inventory.

**Korean Existing Chemicals List (ECL)**

The ingredients in this product are listed in the Korean ECL Inventory.

**US Toxic Substances Control Act (TSCA)**

The ingredients in this product are listed in the US TSCA Inventory.

**Status of Carcinogenicity**

Not recognized as a carcinogen by the IARC, NTP or OSHA.

**SECTION 16 - OTHER INFORMATION****VOC Information**

Using ASTM Test Method D-2369-87, but at 40°C (since MEKP decomposes rapidly above 100°C and is not a VOC), MEKP-925H contains 6.7% VOC, by weight, or 74 grams per liter. For more information call Syrgis Performance Initiators, Inc.

**NFPA 400 Organic Peroxide Classification**

Class III

**NFPA 704 Rating**

Health  
3

Flammability  
2

Reactivity  
2

**HMIS Rating**

Health  
3

Flammability  
2

Reactivity  
2

MSDS Reference: MEKP-925H MSDS 1108.doc

MSDS Review Date: 8/23/11/2011

**DISCLAIMER OF LIABILITY**

The information in this MSDS was obtained from sources, which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use, or disposal of the product.

This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

**SAFETY DATA SHEET**

Revision Date: 06/25/2013

Print Date: 10/4/2013

MSDS Number: 100000001956

Version: 1.1

ACETONE  
20512

<b>1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING</b>
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Nexeo Solutions	Regulatory Information Number	1-855-429-2661
PO Box 2458	Telephone	1-855-429-2661
Columbus, OH 43216	Emergency telephone number	1-855-639-3648

Product name ACETONE

Product code 20512

<b>2. HAZARDS IDENTIFICATION</b>
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**Emergency Overview**

Appearance: liquid, clear

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. MAY AFFECT THE CENTRAL NERVOUS SYSTEM CAUSING DIZZINESS, HEADACHE OR NAUSEA. MAY CAUSE EYE IRRITATION.

**Potential Health Effects****Exposure routes**

Inhalation, Skin absorption, Skin contact, Eye Contact, Ingestion

**Eye contact**

Can cause eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes.

**Skin contact**

Unlikely to cause skin irritation or injury.

**Ingestion**

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Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.

### Inhalation

Breathing of vapor or mist is possible. It is possible to breathe this material under certain conditions of handling and use (for example, during heating, spraying, or stirring). Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful.

### Aggravated Medical Condition

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: Skin, lung (for example, asthma-like conditions), blood-forming system

### Symptoms

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness) and other central nervous system effects, coma

### Target Organs

This material (or a component) shortens the time of onset or worsens the liver and kidney damage induced by other chemicals. Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: mild, reversible liver effects, mild, reversible kidney effects, blood abnormalities

### Carcinogenicity

This material is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA).

### Reproductive hazard

This material (or a component) has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

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### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Components	CAS-No. / trade secret no.	Concentration
Acetone	67-64-1	90 - 100%

### 4. FIRST AID MEASURES

#### Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

#### Skin

First aid is not normally required. However, it is recommended that exposed areas be cleaned by washing with soap and water.

#### Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

#### Inhalation

If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

#### Notes to physician

**Hazards:** This material (or a component) has produced hyperglycemia and ketosis following substantial ingestion.

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**Treatment:** No information available.

### 5. FIREFIGHTING MEASURES

#### Suitable extinguishing media

Dry chemical, Carbon dioxide (CO<sub>2</sub>), Water spray

#### Hazardous combustion products

carbon dioxide and carbon monoxide

#### Precautions for fire-fighting

Material is volatile and readily gives off vapors which may travel along the ground or be moved by ventilation and ignited by pilot lights, flames, sparks, heaters, smoking, electric motors, static discharge or other ignition sources at locations near the material handling point. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively. Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA). Water may be ineffective for extinguishment unless used under favorable conditions by experienced fire fighters. Use water spray to cool fire exposed containers and structures until fire is out if it can be done with minimal risk. Avoid spreading burning material with water used for cooling purposes.

#### NFPA Flammable and Combustible Liquids Classification

Flammable Liquid Class IB

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions

For personal protection see section 8. Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Ensure adequate ventilation. Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Pay attention to the spreading of gases especially at ground level (heavier than air) and to the direction of the wind.

#### Environmental precautions

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Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not let product enter drains. Do not flush into surface water or sanitary sewer system. Local authorities should be advised if significant spillages cannot be contained.

### Methods for cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

### Other information

Comply with all applicable federal, state, and local regulations. Suppress (knock down) gases/vapours/mists with a water spray jet.

## 7. HANDLING AND STORAGE

### Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. Static ignition hazard can result from handling and use. Electrically bond and ground all containers, personnel and equipment before transfer or use of material. Special precautions may be necessary to dissipate static electricity for non-conductive containers. Use proper bonding and grounding during product transfer as described in National Fire Protection Association document NFPA 77.

### Storage

Store in a cool, dry, ventilated area, away from incompatible substances.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Exposure Guidelines

Acetone		67-64-1
ZCAAB_OEL	8-hour Occupational	500 ppm

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ZCAAB_OEL	Exposure Limit 8-hour Occupational Exposure Limit	1,200 mg/m <sup>3</sup>
ZCAAB_OEL	15-minute Occupational Exposure Limit	750 ppm
ZCAAB_OEL	15-minute Occupational Exposure Limit	1,800 mg/m <sup>3</sup>
ZCABC_OEL	8-hour time weighted average	250 ppm
ZCABC_OEL	short-term exposure limit	500 ppm
ZCAQC_OEL	Short-term exposure value	1,000 ppm
ZCAQC_OEL	Short-term exposure value	2,380 mg/m <sup>3</sup>
ZCAQC_OEL	Time-weighted average exposure value	500 ppm
ZCAQC_OEL	Time-weighted average exposure value	1,190 mg/m <sup>3</sup>

### General advice

These recommendations provide general guidance for handling this product. Personal protective equipment should be selected for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities.

### Exposure controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.

### Eye protection

Wear chemical splash goggles when there is the potential for exposure of the eyes to liquid, vapor or mist.

### Skin and body protection

Wear resistant gloves (consult your safety equipment supplier).

### Respiratory protection

A NIOSH-approved air-purifying respirator with an appropriate cartridge and/or filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure

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limits (if applicable) or if overexposure has otherwise been determined. Protection provided by air-purifying respirators is limited. Use a positive pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are not known or any other circumstances where an air-purifying respirator may not provide adequate protection.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	liquid
Colour	clear
Odour	characteristic
Boiling point/boiling range	133 °F / 56 °C
pH	7
Flash point	0 °F / -18 °C
Lower explosion limit/Upper explosion limit	2.1 %(V) / 13 %(V)
Vapour pressure	18.530 mmHg @ 68 °F / 20 °C
Density	790 g/cm <sup>3</sup> @ 68 °F / 20 °C
Water solubility	soluble
Partition coefficient: n-octanol/water	0.2
Viscosity, dynamic	0.3 mPa.s

#### 10. STABILITY AND REACTIVITY

##### Stability

Stable.

##### Conditions to avoid

Heat, flames and sparks.

##### Incompatible products

Acids, alkalis, Amines, Ammonia, halogens, peroxides, Reducing agents, Strong oxidizing agents



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**Hazardous decomposition products**  
carbon dioxide and carbon monoxide

**Hazardous reactions**  
Product will not undergo hazardous polymerization.

### 11. TOXICOLOGICAL INFORMATION

#### Acute oral toxicity

Acute oral toxicity - : no data available  
Product

#### Acute oral toxicity - Components

Acetone : LD50: 5,800 mg/kg Species: rat Symptoms: tremors

#### Acute inhalation toxicity

Acute inhalation toxicity - : no data available  
Product

#### Acute inhalation toxicity - Components

Acetone : LC50: 16,000 mg/l Exposure time: 4 h Species: rat

#### Acute dermal toxicity

Acute dermal toxicity - : no data available  
Product

#### Acute dermal toxicity - Components

Acetone : LD50: 7,426 mg/kg Species: guinea pig

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### Acute toxicity (other routes of administration)

Acute toxicity (other routes of administration) : no data available

## 12. ECOLOGICAL INFORMATION

### Biodegradability

Biodegradability - Product : no data available

### Biodegradability - Components

Acetone : Remarks: Readily biodegradable

### Bioaccumulation

Bioaccumulation - Product : no data available

### Ecotoxicity effects

#### Toxicity to fish

Toxicity to fish - Product : no data available

#### Toxicity to fish - Components

Acetone : LC50: 6,100 mg/l  
Exposure time: 48 h  
Species: Oncorhynchus mykiss (rainbow trout)

### Toxicity to daphnia and other aquatic invertebrates

Toxicity to daphnia and other aquatic invertebrates - Product : no data available

#### Toxicity to daphnia and other aquatic invertebrates - Components

Acetone : EC50: 7,630 mg/l

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Exposure time: 48 h  
Species: Daphnia magna (Water flea)  
Test substance: Acetone

**Toxicity to algae**

Toxicity to algae - Product : no data available

**Toxicity to algae - Components**

Acetone :  
Remarks: no data available

**Toxicity to bacteria**

Toxicity to bacteria - Product : no data available

**13. DISPOSAL CONSIDERATIONS****Waste disposal methods**

For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact NEXEO's Environmental Services Group at 800-637-7922.

**14. TRANSPORT INFORMATION****REGULATION**

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ID NUMBER	PROPER SHIPPING NAME	*HAZARD CLASS	SUBSIDIARY HAZARDS	PACKING GROUP	MARINE POLLUTANT / LTD. QTY.
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### U.S. DOT - ROAD

UN 1090	Acetone	3		II	
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### U.S. DOT - RAIL

UN 1090	ACETONE	3		II	
---------	---------	---	--	----	--

### U.S. DOT - INLAND WATERWAYS

UN 1090	ACETONE	3		II	
---------	---------	---	--	----	--

### TRANSPORT CANADA - ROAD

UN 1090	ACETONE	3		II	
---------	---------	---	--	----	--

### TRANSPORT CANADA - RAIL

UN 1090	ACETONE	3		II	
---------	---------	---	--	----	--

### TRANSPORT CANADA - INLAND WATERWAYS

UN 1090	ACETONE	3		II	
---------	---------	---	--	----	--

### INTERNATIONAL MARITIME DANGEROUS GOODS

UN 1090	ACETONE	3		II	
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### INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

UN 1090	Acetone	3		II	
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### INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

UN 1090	ACETONE	3		II	
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### MEXICAN REGULATION FOR THE LAND TRANSPORT OF HAZARDOUS MATERIALS AND WASTES

UN 1090	ACETONA	3		II	
---------	---------	---	--	----	--

\*ORM = ORM-D, CBL = COMBUSTIBLE LIQUID

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Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

### 15. REGULATORY INFORMATION

#### WHMIS Classification

B2 Flammable liquid  
D2B Toxic Material Causing Other Toxic Effects

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.

#### California Prop. 65

WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.	Benzene
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#### Notification status

US. Toxic Substances Control Act	y (positive listing)
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133)	y (positive listing)
Australia. Industrial Chemical (Notification and Assessment) Act	y (positive listing)
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	y (positive listing)
Japan. Kashin-Hou Law List	y (positive listing)
Korea. Toxic Chemical Control Law (TCCL) List	y (positive listing)
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	y (positive listing)
China. Inventory of Existing Chemical Substances	y (positive listing)

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	<b>HMIS</b>	<b>NFPA</b>
Health	2	2
Flammability	3	3
Physical hazards	0	
Instability		0
Specific Hazard	--	---

**16. OTHER INFORMATION**

The information accumulated is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made become available subsequently to the date hereof, we do not assume any responsibility for the results of its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This MSDS has been prepared by NEXEO™ Solutions EHS Product Safety Department (1-855-429-2661) [MSDS@nexeosolutions.com](mailto:MSDS@nexeosolutions.com).

DURA

**MATERIAL SAFETY DATA SHEET**

Date Issued: 01/26/2012

MSDS No: 02706.00.0717

**1. PRODUCT AND COMPANY IDENTIFICATION****PRODUCT DESCRIPTION:** Duranap Cobalt 6%**PRODUCT CODE:** 02706.00.0717**MANUFACTURER**

DURA Chemicals, Inc.

2200 Powell Street

Suite 450

Emeryville, CA 94608

**Service Number:** 888-344-3872**24 HR. EMERGENCY TELEPHONE NUMBERS**

24 Hour Emergency Phone Number 1-800-424-

9300 CHEMTREC

**2. HAZARDS IDENTIFICATION****HAZARD DESIGNATION**

"Xn" - Harmful

"N" - Dangerous for the environment

**EMERGENCY OVERVIEW****PHYSICAL APPEARANCE:** Violet liquid.**IMMEDIATE CONCERNS:** NOTICE: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberate concentrating and inhaling the contents may be harmful or fatal.**POTENTIAL HEALTH EFFECTS****EYES:** Contact may cause eye irritation.**SKIN:** Repeated contact may cause Dermatitis.**INGESTION:** May cause gastrointestinal irritation (nausea, vomiting, diarrhea) and central nervous system depression.**INHALATION:** High concentrations may lead to central nervous system effects (drowsiness, dizziness, nausea, headaches, paralysis and loss of consciousness).**SIGNS AND SYMPTOMS OF OVEREXPOSURE****EYES:** Symptoms may include stinging, tearing, and redness.**SKIN:** Symptoms may include redness and burning of the skin. May cause skin defatting with prolonged exposure.**INGESTION:** Symptoms of ingestion may include nausea, vomiting, and diarrhea.**INHALATION:** Symptoms may include dizziness, drowsiness, weakness, fatigue, nausea, headache, and unconsciousness.**ACUTE TOXICITY:** May cause skin irritation and may cause eye and upper respiratory tract irritation.**CHRONIC EFFECTS:** Chronic respiratory disorders, skin disorders, liver and kidney disorders.**MEDICAL CONDITIONS AGGRAVATED:** Chronic respiratory disorders, skin disorders, liver and kidney disorders.**ROUTES OF ENTRY:** Inhalation and ingestion.**TARGET ORGAN STATEMENT:** May Cause (target organ or system) damage. (e.g., lung, nervous system, blood disorders, liver, kidney, immune system, cardiovascular system, thyroid, testicular, ovarian, etc.).**CANCER STATEMENT:** Cobalt Compounds: IARC states that Cobalt Compounds are possibly carcinogenic to humans - Group 2B Monograph 52.**SENSITIZATION:** Cobalt Compounds: May cause respiratory sensitization.**3. COMPOSITION / INFORMATION ON INGREDIENTS**

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Chemical Name	Wt. %	CAS	EINECS	Classification
Cobalt Naphthanate	~ 75	61789-51-3	263-064-0	Xn, N; R22, R38, R43, R51/53
Aliphatic Petrolleum Distillates	~ 50	64742-48-9	265-150-3	Xn; R65, R66

**COMMENTS:** Percentages are maximum content.

( Full text of R-Phrases can be found under heading 16 )

**4. FIRST AID MEASURES**

**EYES:** Immediately flush eyes with plenty of water. Get medical attention, if irritation persists.

**SKIN:** Wash with soap and water. Get medical attention if irritation develops or persists.

**INGESTION:** Get immediate medical attention. Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter lungs and cause Chemical Pneumonitis. Do not induce vomiting unless instructed to do so by poison center or physician.

**INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, administer oxygen. Contact a physican.

**NOTES TO PHYSICIAN:** Contains Petroleum Distillates.

**5. FIRE FIGHTING MEASURES**

**FLASH POINT AND METHOD:** 62°C (143°F) PMcc

**FLAMMABLE LIMITS:** 0.7 to 5.4

**FLAMMABLE CLASS:** Combustible Liquid

**EXTINGUISHING MEDIA:** Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.

**HAZARDOUS COMBUSTION PRODUCTS:** Carbon Monoxide and Carbon Dioxide.

**EXPLOSION HAZARDS:** Unopened containers may rupture in a fire situation.

**FIRE FIGHTING PROCEDURES:** During fire, water spray can scatter flames and should be used by experienced firefighters. Self-Contained Breathing Apparatus (SCBA) should be used when firefighting. Wear appropriate protective equipment as conditions warrant. Stop spill/leak if it can be done with minimal risk. Move undamaged containers from danger area if it can be done with minimal risk.

**FIRE FIGHTING EQUIPMENT:** Self-Contained Breathing Apparatus (SCBA) and appropriate Turn Out Gear.

**FIRE EXPLOSION:** Vapors may cause explosive mixtures with air. Vapors may travel to source of ignition and flash back. Runoff to sewers may create fire or explosion hazards.

**SENSITIVE TO STATIC DISCHARGE:** All containers should be appropriately grounded to prevent static build up.

**SENSITIVITY TO IMPACT:** None

**HAZARDOUS DECOMPOSITION PRODUCTS:** Thermal decomposition may produce Carbon Monoxide and Carbon Dioxide.

**6. ACCIDENTAL RELEASE MEASURES**

**SMALL SPILL:** Avoid runoff into storm sewers and ditches which lead to waterways.

**LARGE SPILL:** Eliminate all ignition sources. Prevent spilled material from entering storm sewers and waterways. Stop spill if it can be done with minimal risk. Keep unauthorized personnel from area.

**7. HANDLING AND STORAGE**

**GENERAL PROCEDURES:** Keep containers closed when not in use Store away from heat, sparks, and



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open flame. Bond and ground all equipment when transferring from one vessel to another.

**HANDLING:** Follow all MSDS/label precautions even after container is emptied because it may retain product residues.

**STORAGE:** Store in closed containers away from extreme heat, flame or strong oxidizing agents.

**STORAGE TEMPERATURE:** 0°C (32°F) Minimum to 49°C (120°F) Maximum

**SHELF LIFE:** Five (5) years from date of manufacture.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION****EXPOSURE GUIDELINES****OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)**

		EXPOSURE LIMITS			
		OSHA PEL		ACGIH TLV	
Chemical Name		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Cobalt Naphthanate	<b>TWA</b>		0.1		0.02
Aliphatic Petrolleum Distillates	<b>TWA</b>	100	400		

**ENGINEERING CONTROLS:** If current ventilation practices are not adequate to maintain airborne concentration below the established exposure limits, additional ventilation or exhaust systems may be required.

**PERSONAL PROTECTIVE EQUIPMENT**

**EYES AND FACE:** Wear Safety Glasses with side shields or Chemical Goggles.

**SKIN:** Depending on site-specific conditions of use, protective gloves, apron, boots, head and face protection may be required to prevent contact.

**RESPIRATORY:** Select equipment to provide protection from listed Hazardous Ingredients. Depending on site-specific environmental conditions, appropriate NIOSH approved respirators should be used to keep exposure below exposure levels.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Chemical Name	Flash Point (°C)
Aliphatic Petrolleum Distillates	140

**ODOR:** Characteristic odor.

**APPEARANCE:** Liquid.

**COLOR:** Violet.

**VAPOR PRESSURE:** 0.45 mm Hg

**VAPOR DENSITY:** 5.5 Air = 1

**BOILING POINT:** 190°C (374°F)

**FLASH POINT AND METHOD:** 62°C (143°F) PMcc

**EVAPORATION RATE:** < 0.06 Butyl Acetate = 1

**SPECIFIC GRAVITY:** 0.900 to 1.000 ASTM D1475-98

**10. STABILITY AND REACTIVITY**

**STABLE:** Yes

**HAZARDOUS POLYMERIZATION:** No

**STABILITY:** Stable.

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**CONDITIONS TO AVOID:** Extreme heat, open flame.**INCOMPATIBLE MATERIALS:** Oxidizing materials.**11. TOXICOLOGICAL INFORMATION****ACUTE**

Chemical Name	ORAL LD <sub>50</sub> (rat)	DERMAL LD <sub>50</sub> (rabbit)
Aliphatic Petroleum Distillates	5000	3160

**CHRONIC:** Chronic respiratory disorders, skin disorders, liver and kidney disorders.**CARCINOGENICITY**

Chemical Name	IARC Status
Cobalt Naphthanate	Cobalt Compounds: IARC states that Cobalt Compounds are possibly carcinogenic to humans - Group 2B Monograph 52.

**TARGET ORGANS:** May cause nervous system, kidney or liver disorders.**12. ECOLOGICAL INFORMATION****ENVIRONMENTAL DATA:** Not Available**13. DISPOSAL CONSIDERATIONS****DISPOSAL METHOD:** Dispose in accordance with Federal, State and local regulations.**EMPTY CONTAINER:** In accordance with 40CFR 261.7.**14. TRANSPORT INFORMATION****DOT (DEPARTMENT OF TRANSPORTATION)****PROPER SHIPPING NAME:** Combustible Liquid n.o.s. (contains Petroleum Distillates)**PRIMARY HAZARD CLASS/DIVISION:** 3**UN/NA NUMBER:** 1993**PACKING GROUP:** III**OTHER SHIPPING INFORMATION:** 49CFR 173.150: This material may be reclassified as combustible liquid. It can be shipped as a non-hazardous material if the container is under 120 US gallons.**CUSTOM TARIFF NUMBER:** 3211.00.0000**ROAD AND RAIL (ADR/RID)****PROPER SHIPPING NAME:** Environmentally Hazardous Substance n.o.s. (contains Cobalt bis(2-ethylhexanoate))**UN NUMBER:** 3082**HAZARD CLASS:** 9**PACKING GROUP:** III

DURA

**MATERIAL SAFETY DATA SHEET**Date Issued: 01/26/2012  
MSDS No: 02706.00.0717**AIR (ICAO/IATA)****SHIPPING NAME:** Environmentally Hazardous Substance n.o.s. (contains Cobalt bis(2-ethylhexanoate))**UN/NA NUMBER:** 3082**PRIMARY HAZARD CLASS/DIVISION:** 9**PACKING GROUP:** III**VESSEL (IMO/IMDG)****SHIPPING NAME:** Environmentally Hazardous Substance n.o.s. (contains Cobalt bis(2-ethylhexanoate))**UN/NA NUMBER:** 3082**PRIMARY HAZARD CLASS/DIVISION:** 9**PACKING GROUP:** III**MARINE POLLUTANT #1:** P**15. REGULATORY INFORMATION****UNITED STATES****SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)****FIRE:** Yes **PRESSURE GENERATING:** No **REACTIVITY:** No **ACUTE:** Yes **CHRONIC:** Yes**313 REPORTABLE INGREDIENTS:** N096 Cobalt Compounds.**EPCRA SECTION 313 SUPPLIER NOTIFICATION**

Chemical Name	Wt. %	CAS	Comments
Cobalt Naphthanate	~ 75	61789-51-3	Percentages are maximum content.

**TSCA (TOXIC SUBSTANCE CONTROL ACT)**

Chemical Name	CAS
Cobalt Naphthanate	61789-51-3
Aliphatic Petrolleum Distillates	64742-48-9

**TSCA STATUS:** Listed on Inventory.**FDA (FOOD AND DRUG ADMINISTRATION):** 21CFR 175.300 (xxii) Resinous and Polymeric Coatings.**DEA (DRUG ENFORCEMENT PRECURSOR & ESSENTIAL CHEMICALS) LISTED SUBSTANCE:** None**CANADA****WHMIS HAZARD SYMBOL AND CLASSIFICATION**

Combustible Liquid

**WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):** Combustible Liquid.**WHMIS CLASS:** Class B.**DOMESTIC SUBSTANCE LIST (INVENTORY):** Listed on Inventory.**EUROPEAN COMMUNITY**

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**MATERIAL SAFETY DATA SHEET**Date Issued: 01/26/2012  
MSDS No: 02706.00.0717**EEC LABEL SYMBOL AND CLASSIFICATION**

"Xn" - Harmful



"N" - Dangerous for the environment

S24/25: Avoid contact with skin and eyes.

S36/39: Wear suitable protective clothing and eye/face protection.

S38: In case of insufficient ventilation, wear suitable respiratory equipment.

S62: If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

**COMMENTS** Listed on Inventory: EU (EINICS); Australia (AICS); New Zealand (NZIoC); China (IECSC).**16. OTHER INFORMATION****RELEVANT R-PHRASES:**R22: Harmful if swallowed.

R38: Irritating to skin.

R43: May cause sensitisation by skin contact.

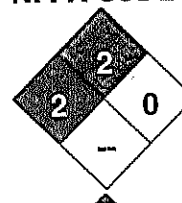
R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R65: Harmful: may cause lung damage if swallowed.

R66: Repeated exposure may cause skin dryness or cracking.

**REVISION SUMMARY:** New MSDS**HMIS RATING**

<b>HEALTH:</b>	*	2
<b>FLAMMABILITY:</b>		2
<b>PHYSICAL HAZARD:</b>		0
<b>PERSONAL PROTECTION:</b>		B

**NFPA CODES****HMIS RATINGS NOTES:** \*Chronic Health Hazard.**MANUFACTURER DISCLAIMER: THE PRESENT INFORMATION IS ACCURATE TO THE BEST OF OUR KNOWLEDGE, BUT WITHOUT ANY GUARANTEE. USERS SHOULD SATISFY THEMSELVES ON THE SUITABILITY OF THIS PRODUCT FOR THEIR PURPOSES. IF NECESSARY, THEY CAN CONSULT OUR TECHNICAL STAFF.**

# ATTACHMENT J (3 PAGES)

Product Name: **HONEY WAX**  
Revision Date: 1 APR 2012  
Page 1 of 3



## 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

<b>Product Code</b>	<b>P52314 R</b>
<b>Product Name</b>	<b>HONEY WAX</b>
<b>Recommended Use</b>	<b>PASTE WAX</b>
<b>Manufacturer</b>	
Specialty Products Co	Telephone Number: +1 951-479-0179
6868 Airport Dr.	Email Address: sales@specialtyproductsco.com
Riverside, CA 92504 USA	Emergency Phone Number: +1 703-527-3887 (CHEMTREC)
	+1 800-424-9300 in the US

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient Name	CAS Number	% Wt
Naphtha (petroleum), hydro-treated heavy	64742-48-9	60 - 70
Naphtha (petroleum) light aromatic	64742-95-6	3 - 4

## 3. HAZARDS IDENTIFICATION

### HAZARDOUS IDENTIFICATION

#### HMIS RATING/ NFPA

Health: 1      Flammability: 2      Reactivity: 0      Protection: See Sec. 8

#### VARIABILITY AMONG INDIVIDUALS

Health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists, or fumes should be minimized.

#### EFFECTS OF OVEREXPOSURE (Signs and symptoms of exposure)

High vapor concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

#### PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Petroleum Solvents/Petroleum Hydrocarbons - Skin contact may aggravate an existing dermatitis.

#### CAUTION: FLAMMABLE SOLID. MAY CAUSE SKIN IRRITATION.

Wash thoroughly after handling. Keep away from heat and flame.

#### Potential Health Effects

**Eyes:** Exposure is not expected to cause significant irritation.

**Skin:** Prolonged skin contact may cause skin irritation and/or dermatitis. High standards of skin care and personal hygiene should be exercised at all times.

**Inhalation:** Prolonged exposure through inhalation may cause damage to health.

**Ingestion:** Ingestion may cause gastrointestinal irritation, nausea, vomiting, and diarrhea.

#### Effect of overexposure: (Signs and symptoms of exposure)

High vapor concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

## 4. FIRST AID MEASURES

### EYE CONTACT

If splashed into the eyes, flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

### SKIN

In case of skin contact, wash skin with soap and water. Consult physician if required.

### INHALATION

Remove to fresh air. Call a physician immediately.

### INGESTION

If ingested, DO NOT induce vomiting; call a physician immediately.

## 5. FIRE-FIGHTING MEASURES

COMBUSTIBLE - per DOT 49 CFR 173.120



#### FLAMMABLE PROPERTIES

**Flash point:** > 104°F

**Extinguishing media:** Water spray or fog, foam, dry chemical, CO<sub>2</sub>.

**Fire fighting instructions**

Wear self-contained breathing apparatus and protective suit.

**Further information:** Keep containers and surroundings cool with water spray.

**Inappropriate Extinguishing Media:** Straight Streams of Water

#### 6. ACCIDENTAL RELEASE MEASURES

##### Steps to be taken in case of spill or leak

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations.

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. U.S. regulations require reporting releases of this material to the environment which exceed the reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

##### ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

#### 7. HANDLING AND STORAGE

Keep product away from ignition sources, such as heat, sparks, pilot lights, static electricity, and open flames.

#### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

##### EXPOSURE LIMIT FOR NAPHTHA (PETROLEUM) HYDROTREATED HEAVY

300 ppm (1800 mg/m<sup>3</sup>) for an 8-hour workday. Recommended by the manufacturer of the solvent.

##### VENTILATION

Use only with ventilation sufficient to prevent exceeding recommended exposure

No smoking or use of flame or other ignition sources.

##### PROTECTIVE GLOVES

Use chemical-resistant gloves, if needed, to avoid prolonged or repeated skin contact

##### EYE PROTECTION

Use splash goggles when eye contact may occur.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

##### General Information

Appearance	Solid Wax
Color	Yellow
Odor	Hydrocarbon-like

##### Important Health, Safety and Environmental Information

Boiling Point	340°F (171°C)
Solubility (water)	Negligible
Vapor Pressure	<5 mm Hg at 68°F (20°C)
Vapor Density (Air=1)	>1
Viscosity	Unknown
Formula Weight	Mixture
Density	7.273 lbs/gal
Specific Gravity (H <sub>2</sub> O=1, at 4°C)	0.871
pH	Neutral
Evaporation Rate	<1 (BuAc=1)
% Volatile	<50%

##### Other Information

Melting Point/Range	Not determined
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#### 10. STABILITY AND REACTIVITY

**Conditions to avoid:** Keep away from heat and sources of ignition.



**Hazardous decomposition products:** Hazardous gases and vapors produced in fire are oxides of carbon.  
**Store away from other materials:** Oxidizing agents  
**Hazardous polymerization:** None.

#### 11. TOXICOLOGICAL INFORMATION

##### NATURE OF HAZARD AND TOXICITY INFORMATION

Prolonged or repeated skin contact with this product tends to remove skin oils, possibly leading to irritation and dermatitis; however, based on human experience and available toxicological data, this product is judged to be neither a "corrosive" nor an "irritant" by OSHA criteria.

Product contacting the eyes may cause eye irritation.

Product has a low order of acute oral and dermal toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

This product is judged to have an acute oral LD50 (rat) greater than 5 g/kg of body weight, and an acute dermal LD50 (rabbit) greater than 3.16 g/kg of body weight.

The toxicity information is based on data available for Naphtha (Petroleum) Hydro-treated Heavy, a solvent component of the product.

Data for Finished product is not available.

#### 12. ECOLOGICAL INFORMATION

Do not discharge this product into public waters or waterways.

**Regulatory Requirements:** Follow applicable OSHA regulations (29 CFR 1910.120).

Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH
	TWA	STEL	TWA	STEL	TWA	STEL	IDLH
Isoparaffinic Hydrocarbons	500 ppm	500 ppm	500 ppm	500 ppm	500 ppm	500 ppm	1100 ppm
Wax Blend	None est.	None est.	None est.	None est.	None est.	None est.	None established

#### 13. DISPOSAL CONSIDERATIONS

**Disposal methods:** Dispose of only in accordance with local, state, and federal regulations

#### 14. TRANSPORT INFORMATION

**Department of Transportation / IMDG -**

Non-bulk packagings (capacity less than or equal to 119 gallons)

Not regulated per 49CFR 173.151

**IATA -**

UN1325, Flammable solid, organic, n.o.s. (Mineral Spirits), 4.1, III, Ltd. Qty

#### 15. REGULATORY INFORMATION

Components are listed in TSCA inventory.

#### 16. OTHER INFORMATION

**Prepared By** SPECIALTY PRODUCTS CO.  
**Issuing Date** 9 March 2011  
**Revision Date** 1 April 2012

##### Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information, and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

**SECTION 1 – PRODUCT INFORMATION**

Product Name:	Propane	Supplier:	Superior Propane A Division of Superior Plus LP 1111 - 49th Avenue N.E. Calgary, AB T2E 8V2 Business: (403) 730-7500
Trade Name:	LPG (Liquefied Petroleum Gas), LP-Gas	24-Hour Emergency Contact:	Canutec (513) 996-6666
Chemical Formula:	C <sub>3</sub> H <sub>8</sub>		
WHMIS Classification	Class A – Compressed Gas Class B, Division 1 – Flammable G		

Application and Use: Propane is commonly used as a fuel for heating, cooking, automobiles, forklift trucks, crop drying and welding and cutting operations. Propane is used in Industry as a refrigerant, solvent and as a chemical feedstock.

**SECTION 2 – HAZARDOUS INGREDIENTS**

Propane	74-98-6	90% -99%	Not Applicable
Propylene	115-07-1	0% - 5%	Not Applicable
Ethane	74-84-0	0% - 5%	Not Applicable
Butane and heavier hydro carbons	106-97-8	0% - 2.5%	Not Applicable

Occupational Exposure Limit:  
Based upon animal test data, the acute toxicity of this product is expected to be inhalation: 4 hour LC50 = 280,000 ppm (Rat)  
Note: Composition is typical for HD-5 Propane per The Canadian General Standard Board CGSB 3.14 National Standard of Canada.  
Exact composition will vary from shipment to shipment.

**SECTION 3 – CHEMICAL AND PHYSICAL DATA**

Form:	Liquid and vapour while stored under pressure	pH:	Not available
Boiling Point:	-42°C @ 1 atm	Solubility in Water:	Slight, 6.1% by volume @ 17.8°C
Freezing Point:	-188°C	Specific Gravity:	0.51 (water = 1)
Evaporation Rate:	Rapid (Gas at normal ambient conditions)	Appearance/Odour:	Colourless liquid and vapour while stored under pressure. Colourless and odourless gas in natural state at any concentration. Commercial propane has an odourant added, ethyl mercaptan, which has an odour similar to boiling cabbage.
Vapour Pressure:	1435 kPa (maximum) @ 37.8°C		
Vapour Density:	1.52 (Air = 1)		

Coefficient of Water/Oil Distribution: Not available  
Odour Threshold: 4800 ppm  
With proper handling, transportation and storage, adding a chemical odourant such as ethyl mercaptan has proven to be a very effective warning device, but all odourants have certain limitations. The effectiveness of the odourant may be diminished by a person's sense of smell, by competing odours and by oxidation which may cause a potentially dangerous situation.

**SECTION 4 – FIRE OR EXPLOSION HAZARD**

Flash Point: -103.4°C  
Method: Closed cup  
Flammable Limits: Lower 2.4%, Upper 9.5%  
Auto Ignition Temperature: 432 °C  
Hazardous Combustion Products: Carbon monoxide can be produced when primary air and secondary air are deficient while combustion is taking place.  
Fire and Explosive Hazards: Explosive air - vapour allowed to leak to atmosphere.  
Sensitivity to Impact: No  
Sensitivity to Static Discharge: Yes

Fire Extinguishing Precautions: Use water spray to cool exposed cylinders or tanks. Do not extinguish fire unless the source of the escaping gas that is fueling the fire can be turned off. Fire can be extinguished with carbon dioxide and/or dry chemical (BC). Container metal shells require cooling with water to prevent impingement and the weakening of metal. If sufficient water is not available to protect the container shell from weakening, the area will be required to be evacuated. If gas has not ignited, liquid or vapour may be dispersed by water spray or flooding.

Special Fire Fighting Equipment: Protective clothing, hose monitors, fog nozzles, self-contained breathing apparatus material, drains and openings to building

**SECTION 5 – REACTIVITY DATA**

Conditions to Avoid: Keep separate from oxidizing agents.  
Gas explodes spontaneously when mixed with chlorine dioxide.  
Incompatibility: Remove sources of ignition and observe distance requirements for storage tanks from combustible

Hazardous Decomposition Products: Deficient primary and secondary air can produce carbon monoxide.  
Hazardous Polymerization: Will not occur.



### SECTION 6 - TOXICOLOGICAL PROPERTIES OF MATERIAL

Routes of Entry: Skin Contact, Eye Contact, Inhalation

Inhalation: Simple asphyxiant. No effect at concentrations of 10,000 ppm (peak exposures). Higher concentrations may cause central nervous system disorder and/or damage. Lack of oxygen may cause dizziness, loss of coordination, weakness, fatigue, euphoria, mental confusion, blurred vision, convulsions, breathing failure, coma and death. Breathing high vapour concentrations (saturated vapours) for a few minutes may be fatal. Saturated vapours may be encountered in confined spaces and/or under conditions of poor ventilation. Avoid breathing vapours or mist.

Skin and Eye Contact: Exposure to vaporizing liquid may cause frostbite (cold burns) and permanent eye damage.

Ingestion: Not considered to be a hazard.

Acute Exposure: Contact with Liquefied Petroleum Gas may cause frostbite or cold burns. Propane acts as a simple asphyxiant as oxygen content in air is displaced by the propane. At increasing concentration levels, propane may cause dizziness, headaches, loss of coordination, fatigue, unconsciousness and death.

Chronic Exposure: No reported effects from long term low level exposure.

Sensitization to Product: Not known to be a sensitizer.

Occupational Exposure Limits: American Conference of Governmental Industrial Hygienists (ACGIH) lists as a simple asphyxiant.

ACGIH TLV: 1000 ppm

Carcinogenicity, Reproductive Toxicity, Teratogenicity, Mutagenicity: No effects reported.

Other Toxicological Effects: None

### SECTION 7 - PREVENTATIVE MEASURES

Eyes: Safety glasses or chemical goggles are recommended when transferring product.

Skin: Insulated gloves required if contact with liquid or liquid cooled equipment is expected. Wear gloves and long sleeves when transferring product.

Inhalation: Where concentration in air would reduce the oxygen level below 18% air or exceed occupational exposure limits in section 6, self-contained breathing apparatus is required.

Ventilation: Use in well-ventilated areas. Use with explosion proof mechanical ventilation in confined spaces or poorly ventilated areas.

### SECTION 8 - EMERGENCY AND FIRST AID PROCEDURES

Eyes: Should eye contact with liquid occur, flush eyes with lukewarm water for 15 minutes. Obtain immediate medical care.

Skin: In case of "Cold Burn" from contact with liquid, immediately place affected area in lukewarm water and keep at this temperature until circulation returns. If fingers or hands are frostbitten, have the victim hold his hand next to his body such as under the armpit. Obtain immediate medical care.

Ingestion: None considered necessary.

Inhalation: Remove person to fresh air. If breathing is difficult or has stopped, administer artificial respiration. Obtain immediate medical care.

Spill or Leak: Eliminate leak if possible. Eliminate source of ignition. Ensure cylinder is upright. Disperse vapours with hose streams using fog nozzles. Monitor low areas as propane is heavier than air and can settle into low areas. Remain upwind of leak. Keep people away. Prevent vapour and/or liquid from entering into sewers, basements or confined areas.

### SECTION 9 - TRANSPORTATION, HANDLING AND STORAGE

- Transport and store cylinders and tanks secured in an upright position in a ventilated space away from ignition sources (so the pressure relief valve is in contact with the vapour space of the cylinder or tank).
- Cylinders that are not in use must have the valves in the closed position and be equipped with a protective cap or guard.

- Do not store with oxidizing agents, oxygen, or chlorine cylinders.
- Empty cylinders and tanks may contain product residue. Do not pressurize, cut, heat or weld empty containers.
- Transport, handle and store according to applicable federal and provincial codes and regulations.

Transportation of Dangerous Goods (TDG)  
TDG Classification: Flammable Gas 2.1

TDG Shipping Name: Liquefied Petroleum Gas (Propane)  
PIN Number: UN1075

### SECTION 10 - PREPARATION INFORMATION

Prepared by: Superior Propane  
Health Safety and Environment Team

Telephone: (403) 730-7500  
Revision: January 17, 2014  
Supersedes: January 17, 2011

The information contained herein is believed to be accurate. It is provided independently of any sale of the product. It is not intended to constitute performance information concerning the product. No express warranty, implied warranty of merchantability or fitness for a particular purpose is made with respect to the product information contained herein.

## Material Safety Data Sheet

DIESEL FUEL



## 1. Product and company identification

Product name	: DIESEL FUEL
Synonym	: Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, D60, P40, P50, Arctic Diesel, Farm Diesel, Marine Diesel, Low Sulphur Diesel, LSD, Ultra Low Sulphur Diesel, ULSD, Mining Diesel, Naval Distillate, Dyed Diesel, Marked Diesel, Coloured Diesel, Furnace special, Biodiesel blend, B1, B2, B5, Diesel Low Cloud (LC).
Code	: W104, W293
Material uses	: Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining diesels, marine diesels, MDO and naval distillates may have a higher flash point requirement.
Manufacturer	: PETRO-CANADA P.O. Box 2844 150 - 6th Avenue South-West Calgary, Alberta T2P 3E3
<u>In case of emergency</u>	: Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

## 2. Hazards identification

Physical state	: Bright oily liquid.
Odour	: Mild petroleum oil like.
WHMIS (Canada)	: <p>Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).</p>
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview	: WARNING! COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION. Combustible liquid. Severely irritating to the skin. Irritating to eyes. Keep away from heat, sparks and flame. Do not get in eyes. Avoid breathing vapour or mist. Avoid contact with skin and clothing. Use only with adequate ventilation. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
<u>Potential acute health effects</u>	
Inhalation	: Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Ingestion	: Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.
Skin	: Severely irritating to the skin.
Eyes	: Irritating to eyes.
<u>Potential chronic health effects</u>	
Chronic effects	: No known significant effects or critical hazards.
Carcinogenicity	: Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.

## 2. Hazards identification

- Developmental effects : No known significant effects or critical hazards.  
 Fertility effects : No known significant effects or critical hazards.  
 Medical conditions aggravated by over-exposure : Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.

See toxicological information (Section 11)

## 3. Composition/information on ingredients

Name	CAS number	%
Hydrotreated Renewable Diesel/ Fuels, diesel/ Fuel Oil No. 1/ Fuel Oil No. 2	64742-81-0/	95 - 100
	68334-30-5/	
	8008-20-6/	
	68476-30-2	
Alkanes, C10 – 20 Branched and Linear (R100)	928771-01-1	10 - 20
	61788-61-2 /	0 - 5
Fatty acids methyl esters	67784-80-9 /	
	73891-99-3	

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 skin thoroughly with soap and water or use recognised skin cleanser. 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. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- 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 : Combustible liquid
- Extinguishing media
- Suitable : Use dry chemical, CO<sub>2</sub>, 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.
- Products of combustion : Carbon oxides (CO, CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>), sulphur compounds (H<sub>2</sub>S), smoke and irritating vapours as products of incomplete combustion.
- 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.

## 5. Fire-fighting measures

- Special remarks on fire hazards : Flammable in presence of open flames, sparks and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.
- Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Runoff to sewer may create fire or explosion hazard.

## 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 spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour 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 spilt 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. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill : Stop leak if without risk. Move containers from spill area. Approach the 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). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt 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. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. 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 earthing 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 unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

## 8 . Exposure controls/personal protection

Ingredient	Exposure limits
Fuels, diesel	<b>ACGIH TLV (United States). Absorbed through skin.</b> TWA: 100 mg/m <sup>3</sup> , (Inhalable fraction and vapour) 8 hour(s).
Fuel oil No. 2	<b>ACGIH TLV (United States). Absorbed through skin.</b> TWA: 100 mg/m <sup>3</sup> , (Inhalable fraction and vapour) 8 hour(s).
Hydrotreated Renewable Diesel	<b>ACGIH TLV (United States). Absorbed through skin.</b> TWA: 200 mg/m <sup>3</sup> 8 hour(s).
Fuel oil No. 1	<b>ACGIH TLV (United States). Absorbed through skin.</b> TWA: 200 mg/m <sup>3</sup> 8 hour(s).

### 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.
- 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, vapour 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.

### 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. Recommended: organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
- 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.  
Recommended: nitrile, neoprene, polyvinyl alcohol (PVA), Viton®. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
- 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.
- 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	: Bright oily liquid.
Flash point	: Diesel fuel and other distillate fuels: Closed cup: $\geq 40^{\circ}\text{C}$ ( $\geq 104^{\circ}\text{F}$ ) Marine Diesel/MDO/Naval Distillate: Closed Cup: $\geq 60^{\circ}\text{C}$ ( $\geq 140^{\circ}\text{F}$ ) Mining Diesel: Closed Cup: $\geq 52^{\circ}\text{C}$ ( $\geq 126^{\circ}\text{F}$ )
Auto-ignition temperature	: $225^{\circ}\text{C}$ ( $437^{\circ}\text{F}$ )
Flammable limits	: Lower: 0.7% Upper: 6%
Colour	: Clear to yellow (This product may be dyed red for taxation purposes).
Odour	: Mild petroleum oil like.
Odour threshold	: Not available.
pH	: Not available.
Boiling/condensation point	: $150$ to $371^{\circ}\text{C}$ ( $302$ to $699.8^{\circ}\text{F}$ )
Melting/freezing point	: Not available.
Relative density	: $0.80$ to $0.88$ kg/L @ $15^{\circ}\text{C}$ ( $59^{\circ}\text{F}$ )
Vapour pressure	: $1$ kPa ( $7.5$ mm Hg) @ $20^{\circ}\text{C}$ ( $68^{\circ}\text{F}$ ).
Vapour density	: $4.5$ [Air = 1]
Volatility	: Not available.
Evaporation rate	: Not available.
Viscosity	: Diesel fuel: $1.3$ - $4.1$ cSt @ $40^{\circ}\text{C}$ ( $104^{\circ}\text{F}$ ) Marine Diesel Fuel: $1.3$ - $4.4$ cSt @ $40^{\circ}\text{C}$ ( $104^{\circ}\text{F}$ )
Pour point	: Not available.
Solubility	: Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

## 10 . Stability and reactivity

Chemical stability	: The product is stable.
Hazardous polymerisation	: Under normal conditions of storage and use, hazardous polymerisation will not occur.
Materials to avoid	: Reactive with oxidising agents and acids.
Hazardous decomposition products	: May release COx, NOx, SOx, H <sub>2</sub> S, smoke and irritating vapours when heated to decomposition.

## 11 . Toxicological information

### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Fuels, diesel	LD50 Dermal	Mouse	24500 mg/kg	-
	LD50 Oral	Rat	7500 mg/kg	-
Fuel oil No. 2	LD50 Oral	Rat	12000 mg/kg	-
	LD50 Dermal	Rabbit	>2000 mg/kg	-
Fuel oil No. 1	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation	Rat	>5000 mg/m <sup>3</sup>	4 hours
	Vapour			
	LD50 Dermal	Rabbit	>2000 mg/kg	-
Hydrotreated Renewable Diesel	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation	Rat	>5200 mg/m <sup>3</sup>	4 hours
	Vapour			

Conclusion/Summary : Not available.

### Chronic toxicity

Conclusion/Summary : Not available.

### Irritation/Corrosion

Conclusion/Summary : Not available.

### Sensitiser

## 11. Toxicological information

Conclusion/Summary : Not available.

### Carcinogenicity

Conclusion/Summary : Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

### Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Fuels, diesel	A3	3	-	-	-	-
Fuel oil No. 1	A3	3	-	-	-	-
Fuel oil No. 2	A3	3	-	-	-	-
Hydrotreated Renewable Diesel	A3	3	-	-	-	-

### Mutagenicity

Conclusion/Summary : Not available.

### Teratogenicity

Conclusion/Summary : Not available.

### Reproductive toxicity

Conclusion/Summary : Not available.

## 12. Ecological information

Environmental effects : No known significant effects or critical hazards.

### Aquatic ecotoxicity

Conclusion/Summary : Not available.

### Biodegradability

Conclusion/Summary : Not available.


## 13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. 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. 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 spilt 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

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1202	DIESEL FUEL	3	III		-
DOT Classification	Not available.	Not available.	Not available.	-		-

**14 . Transport information**

PG\* : Packing group

**15 . Regulatory information**United StatesHCS Classification : Combustible liquid  
Irritating materialCanadaWHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).  
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.

International regulations

Canada inventory : All components are listed or exempted.

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

Europe inventory : All components are listed or exempted.

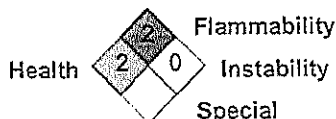
**16 . Other information**

Label requirements : COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION.

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

Health	2
Flammability	2
Physical hazards	0
Personal protection	H

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

References : Available upon request.  
™ Trademark of Suncor Energy Inc. Used under licence.

Date of printing : 6/28/2013.

Date of issue : 28 June 2013

Date of previous issue : 6/28/2013.

Responsible name : Sécurité de produit - KKB

 Indicates information that has changed from previously issued version.For Copy of (M)SDS : Internet: [www.petro-canada.ca/msds](http://www.petro-canada.ca/msds)

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader



## 16 . Other information

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.

**PINCHIN**  
ENVIRONMENTAL

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**Air Dispersion Modeling & POI  
Compliance Assessment**

**Structural Composite Technologies Ltd.  
100 Hoka Street  
Winnipeg, Manitoba  
R2C 3T4**

Prepared for: Tony Ma

March 11, 2014

Pinchin File: 81397

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2.0 EMISSION ESTIMATES..... 1  
3.0 DISPERSION MODELLING..... 1  
4.0 RESULTS ..... 2  
5.0 CONCLUSIONS..... 3

**APPENDICES**

Appendix A Tables  
Appendix B Drawings  
Appendix C Insignificant Sources  
Appendix D Emission Calculations  
Appendix E AERMOD Dispersion Modelling Inputs and Outputs

## 1.0 INTRODUCTION

Pinchin Environmental Ltd. (*Pinchin*) was retained by Structural Composite Technologies Ltd. (*SCT*) to complete emissions calculations, air dispersion modelling and a Point of Impingement (*POI*) compliance assessment for its facility located at 100 Hoka Street, Winnipeg. The facility designs and manufactures fiberglass reinforced plastic products and process equipment.

The NAICS code for the facility is 327990 (All Other Non-Metallic Mineral Product Manufacturing), which encompasses fiberglass insulation products manufacturing. Compliance was assessed against Manitoba Conservation AAQCs where available, and the Ontario Ministry of the Environment Ontario Regulation 419 standards where AAQCs were not available. Dispersion modelling was completed using the US EPA AERMOD dispersion model.

A list of sources at the facility, the source summary table showing emission rates, and the emission summary table showing POI concentrations and POI limits are included in Appendix A.

The following is a summary of the assessment.

## 2.0 EMISSION ESTIMATES

Emissions of particulate matter from the resin spraying and glass lay-up operations were estimated using an engineering calculation based on the transfer efficiency of the resin, and the filter efficiency on the exhausts. Emissions of volatile components of the resin were estimated using a mass balance approach, assuming 100 % of volatiles are emitted to the atmosphere. Emissions of styrene were estimated using an emission factor developed by the Composite Fabricator's Association (*CFA*).

Emissions from the grinding operations were considered insignificant relative to emissions from resin spraying since emissions from grinding are routed through a dust collector and vented internally back into the plant.

Emissions from material cutting were deemed insignificant since a shear cutting method is used, which is not expected to produce fine dust.

Appendix C includes a table of insignificant sources and Appendix D includes the emissions estimates.

## 3.0 DISPERSION MODELLING

The AERMOD dispersion model (v.09292) was used to determine the maximum off-property POI concentration of each significant contaminant from SCT's facility. The modelling was conducted in accordance with the "Guidelines for Air Dispersion Modelling in Manitoba", November 2006.

The single building on-site and all roof heights were included in the model to allow for building downwash. Drawings showing the building, sources, property line, and fences can be found in Appendix B.

A standard multi-tier receptor grid (up to 5000m from source centroid) was placed around the facility in accordance with the Air Dispersion Modelling Guideline of Manitoba. The terrain data used was downloaded in AERMOD from the WebGIS data for Canada – 60m. The base elevations for the building, all sources, and all receptors are those assigned by the terrain processor.

The surrounding area is predominantly rural; therefore, the “RURAL” dispersion factor was chosen. The meteorological data (upper air data and surface data) used was from the Bismark, North Dakota weather station and was downloaded from the following site: <http://www.webmet.com/>. The data was processed through the AERMET processor. The land use types were entered into the processor and the surface characteristics used were those assigned by the processor. The land use drawing can be seen in Appendix B.

All significant sources were modelled as individual point sources, with the exception of the natural gas-fired comfort heating equipment, which were modelled as volume sources.

The emissions from the sources were modelled as follows:

- Emissions of particulate matter were modelled individually.
- Due to the large number of contaminants, it was deemed impractical to model each contaminant individually. Instead, a base emission rate of 1 g/s was entered into each source with the resulting concentration from each source used as a ‘dispersion factor’. It should be recognized that this approach is conservative, as the aggregate maximum POI concentrations would be higher than modelling each contaminant with its corresponding emission rate from the various individual sources.
- All sources operating simultaneously, 24/7.

Appendix E includes the AERMOD inputs for the models.

#### 4.0 RESULTS

AERMOD results for the base case modelling are shown in Tables E3-1 and E3-2 (Appendix E) and POI concentrations can be found in the Emission Summary Table in Appendix A.

The results from the Particulate Matter model (PM.isc) can be found in the Emission Summary Table in Appendix A.

For the Particulate Matter model, the highest 24-hour concentrations per meteorological year were discarded to account for certain extreme, rare, and transient meteorological conditions.

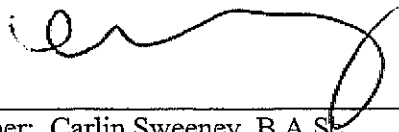
As per the Air Dispersion Modelling Guideline of Manitoba, the ambient air quality in the region (Winnipeg, Manitoba) was also considered when comparing the POI concentrations to the POI

limits. Ambient air data was found at: <http://maps-cartes.ec.gc.ca/mspa-naps/data.aspx?lang=en>. The data from the most recent year with applicable results was used. The average concentration of the pollutant over the course of measuring was taken and added to the POI concentration from the facility.

All emissions from the facility meet the Manitoba AAQCs or the Ontario Ministry of the Environment Ontario Regulation 419 limits, where Manitoba AAQCs were unavailable.

## 5.0 CONCLUSIONS

All facility contaminants are below their Manitoba AAQC limit or Ontario Ministry of the Environment Ontario Regulation 419 limit (where no AAQC is available).



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per: Carlin Sweeney, B.A.Sc.  
*Project Technologist*  
Emissions Reduction & Compliance  
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*Senior Project Engineer*  
Emissions Reduction & Compliance  
[amadan@pinchin.com](mailto:amadan@pinchin.com)

Pinchin Master Report Guide, Ver. 1, May 2007

J:\81000s\81397 StructuralComp,100Hoka,Wnpg,ENVNS,COA\ECA - AERMOD Sch. 3\ESDM\81397 - Structural Composite Technologies Compliance Assessment Report 11-03 2014.docx

**APPENDIX A**  
**TABLES**  
**(3 PAGES)**

**Table A1. Sources and Contaminant Identification Table**

Source Information			Expected Contaminants	Significant Yes/No ?	Rationale
Source ID	Source Description	General Location			
UH1 to UH5, RAU1 to RAU4, RTU1 to RTU5	Natural Gas Fired Comfort Heating Equipment	Main Bldg.	Nitrogen Oxides	Yes	
EF1	Plant Process Exhaust	Main Bldg.	Volatile Organic Compounds, Particulate Matter	Yes	
EF2	Plant Process Exhaust	Main Bldg.	Volatile Organic Compounds, Particulate Matter	Yes	
EF3	Plant Process Exhaust	Main Bldg.	Volatile Organic Compounds, Particulate Matter	Yes	
EF4	Plant Process Exhaust	Main Bldg.	Volatile Organic Compounds, Particulate Matter	Yes	
Fugitive	Grinding Dust Collector (Internal)	Main Bldg.	Particulate Matter	No	Refer to Section 3.2.
Fugitive	Cutting Operations	Main Bldg.	Particulate Matter	No	Refer to Section 3.2.



Table A2. Source Summary Table

Source ID	Source Description	Source Data						Emission Data						
		Flow Rate (m <sup>3</sup> /s)	Exit Gas Temp (°C)	Inner Dia. (m)	Height Above Grade (m)	Height Above Roof (m)	Discharge Type	Contaminant	CAS #	Maximum Emission Rate (g/s)	Avg. Period (h)	Emission Estimating Technique	Emissions Data Quality	% of Overall Emissions
UH1 to UH5, RAU1 to RAU4, RTU1 to RTU5	Natural Gas Fired Comfort Heating Equipment	-	-	-	-	-	-	Nitrogen Oxides	10102-44-0	1.50E-01	1, 24, annual	EF	AADQ	100%
EF1	Plant Process Exhaust	14.16	20	0.91	12.5	4.9	vertical	Styrene	100-42-5	1.39E-01	24	EF	ADQ	23%
								Methanol	67-56-1	2.03E-03	24	MB	AADQ	25%
								Hydrogen Peroxide	7722-84-1	2.89E-03	24	MB	AADQ	25%
								Methyl Ethyl Ketone	78-93-3	5.79E-03	24	MB	AADQ	25%
								Particulate Matter	n/a	5.02E-02	24	EC	ADQ	22%
EF2	Plant Process Exhaust	14.16	20	0.91	12.5	4.9	vertical	Styrene	100-42-5	1.39E-01	24	EF	ADQ	23%
								Methanol	67-56-1	2.03E-03	24	MB	AADQ	25%
								Hydrogen Peroxide	7722-84-1	2.89E-03	24	MB	AADQ	25%
								Methyl Ethyl Ketone	78-93-3	5.79E-03	24	MB	AADQ	25%
								Particulate Matter	n/a	5.02E-02	24	EC	ADQ	22%
EF3	Plant Process Exhaust	9.44	20	0.81	11.6	4.0	vertical	Styrene	100-42-5	1.86E-01	24	EF	ADQ	31%
								Methanol	67-56-1	2.03E-03	24	MB	AADQ	25%
								Hydrogen Peroxide	7722-84-1	2.89E-03	24	MB	AADQ	25%
								Methyl Ethyl Ketone	78-93-3	5.79E-03	24	MB	AADQ	25%
								Particulate Matter	n/a	8.26E-02	24	EC	ADQ	35%
EF4	Plant Process Exhaust	3.78	20	0.61	9.8	2.1	vertical	Styrene	100-42-5	1.39E-01	24	EF	ADQ	23%
								Methanol	67-56-1	2.03E-03	24	MB	AADQ	25%
								Hydrogen Peroxide	7722-84-1	2.89E-03	24	MB	AADQ	25%
								Methyl Ethyl Ketone	78-93-3	5.79E-03	24	MB	AADQ	25%
								Particulate Matter	n/a	5.02E-02	24	EC	ADQ	22%
Fugitive	Grinding Dust Collector (Internal)	-	-	-	-	-	-	Insignificant Emissions	-	-	-	-	-	-
Fugitive	Cutting Operations	-	-	-	-	-	-	Insignificant Emissions	-	-	-	-	-	-

EF : Emission Factor  
EC : Engineering Calculation  
MB : Mass Balance

AADQ : Above Average Data Quality  
ADQ : Average Data Quality

Table A3. Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Maximum POI Concentration ( $\mu\text{g}/\text{m}^3$ )	Averaging Period (h)	POI Limit ( $\mu\text{g}/\text{m}^3$ )	Limiting Effect	Reg. Sch. No.	% of POI Limit	Ambient Air Concentration ** ( $\mu\text{g}/\text{m}^3$ )	% of POI Limit (Including Ambient Air)
Styrene	100-42-5	6.04E-01	AERMOD	1.56E+02	24	400	-	AAQC	39%	3.70E-02	39%
Nitrogen Oxides	10102-44-0	1.50E-01	AERMOD	6.71E+01	24	200	-	AAQC	34%	-	-
			AERMOD	3.24E+02	1	400	-	AAQC	81%	-	-
			AERMOD	1.98E+01	annual	60	-	AAQC	33%	-	-
Methanol	67-56-1	8.10E-03	AERMOD	2.07E+00	24	4000	Health	3	0.1%	-	-
Hydrogen Peroxide	7722-84-1	1.16E-02	AERMOD	2.95E+00	24	30	Health	G	10%	-	-
Methyl Ethyl Ketone	78-93-3	2.31E-02	AERMOD	5.90E+00	24	1000	Health	3	1%	-	-
Particulate Matter	n/a	2.33E-01	AERMOD	4.52E+01*	24	60	-	AAQC	75%	7.32E+00	88%

\*After removal of highest day per meteorological year.

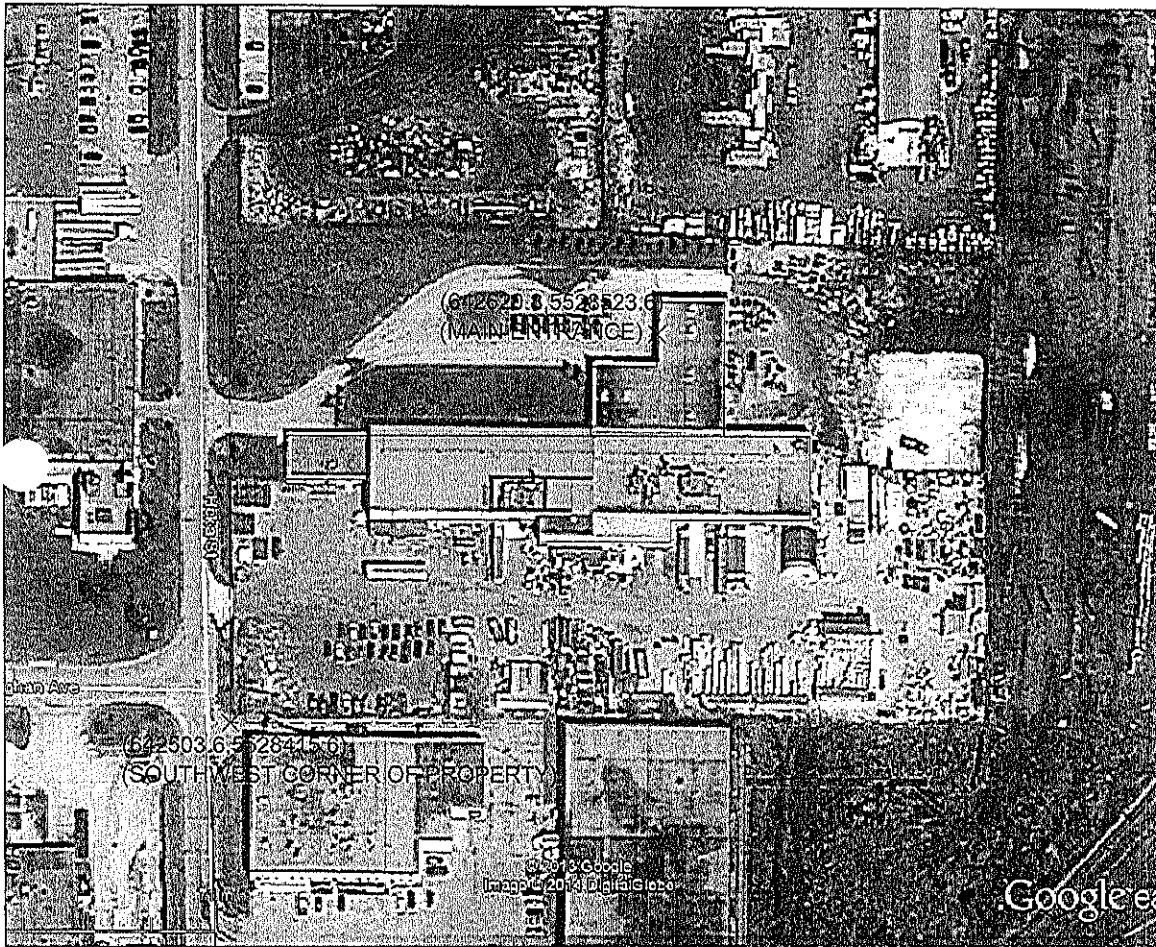
\*\*Ambient air concentration values for the most recent year available (2007). Values are the average for Winnipeg. Values can be downloaded at the following site: <http://maps-cartes.ec.gc.ca/nspa-naps/data.aspx?lang=en>

Reg. Sch. or Regulation Schedule: 3 Standard - Schedule 3 of Ontario Regulation 419.

AAQC Guideline published by Manitoba Conservation, July 2005.

G Guideline - Summary of Standards and Guidelines to support Ontario Regulation 419: Air Pollution - Local Air Quality, April 2012

**APPENDIX B  
DRAWINGS  
(5 PAGES)**

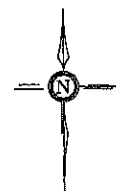


2470 MILLTOWER COURT  
MISSISSAUGA, ONTARIO L5N 7W5

PROJECT NAME:  
STRUCTURAL COMPOSITE  
TECHNOLOGIES LTD.  
100 HOKA STREET  
WINNPEG, MANITOBA

DRAWING NAME:  
SCALED AREA LOCATION PLAN

SCALE: AS SHOWN	PROJECT NO: 81397
DATE: JAN 2014	REVISION NO: 1
DRAWN BY: DGB	DRAWING NO: B1
CHECKED BY:	

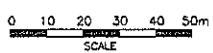
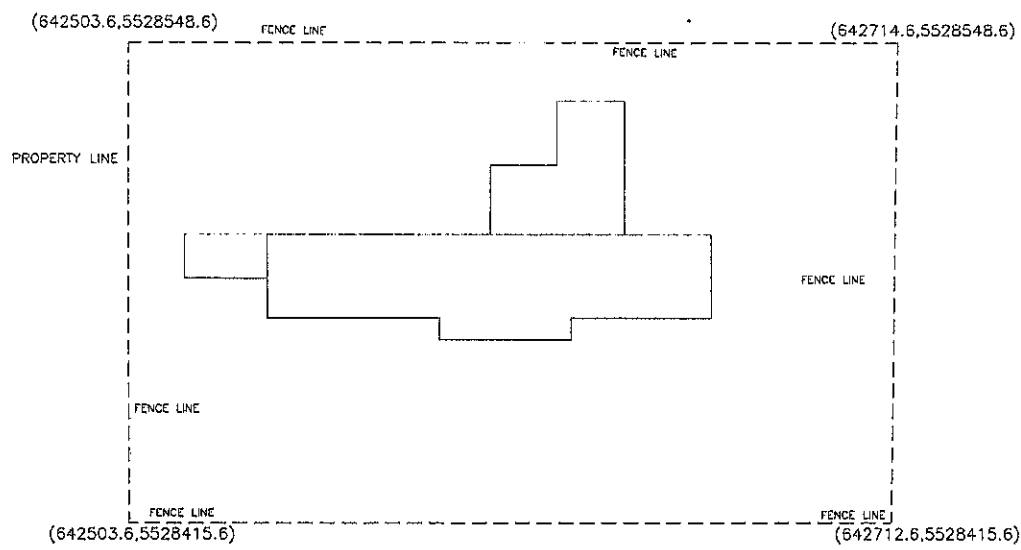


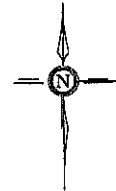
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MISSISSAUGA, ONTARIO L5N 7W5

PROJECT NAME:  
STRUCTURAL COMPOSITE  
TECHNOLOGIES LTD.  
100 HOKA STREET  
WINNEPEG, MANITOBA

DRAWING NAME:  
SITE PLAN

SCALE: AS SHOWN	PROJECT NO: 81397
DATE: JAN 2014	REVISION NO: 1
DRAWN BY: DGB	DRAWING NO: B2
CHECKED BY:	



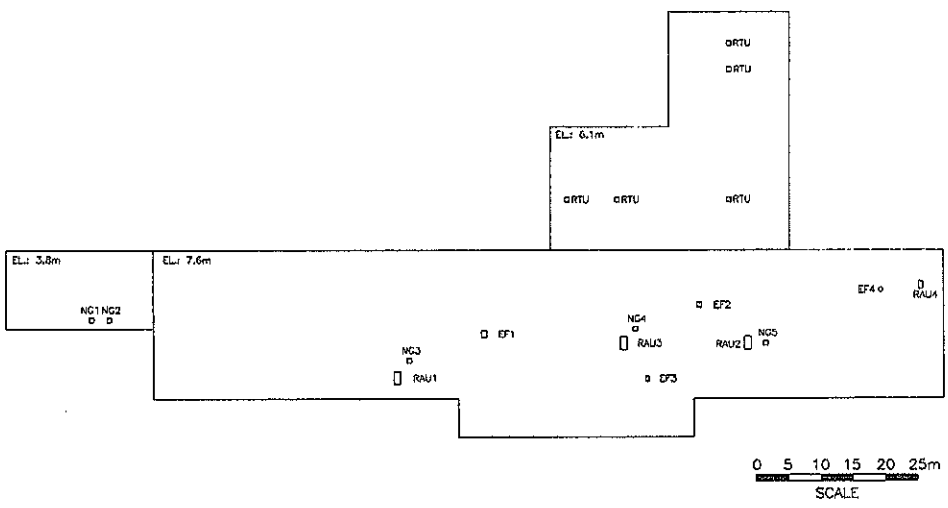


2470 MILLTOWER COURT  
MISSISSAUGA, ONTARIO L5N 7W5

PROJECT NAME:  
STRUCTURAL COMPOSITE  
TECHNOLOGIES LTD.  
100 HOKA STREET  
WINNIPEG, MANITOBA

DRAWING NAME:  
SOURCE LOCATIONS

SCALE: AS SHOWN	PROJECT NO: 81397
DATE: JAN 2014	REVISION NO: 1
DRAWN BY: DGB	DRAWING NO: B3
CHECKED BY:	



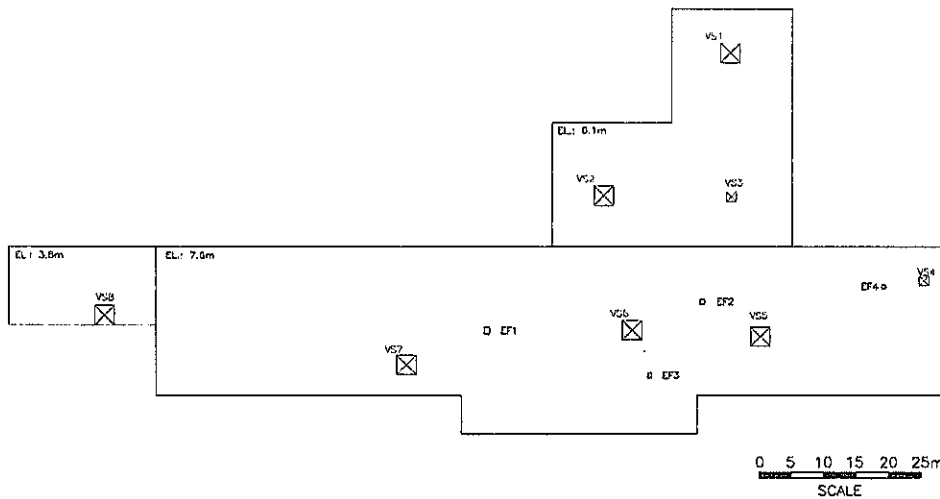


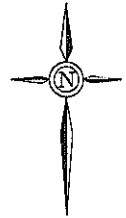
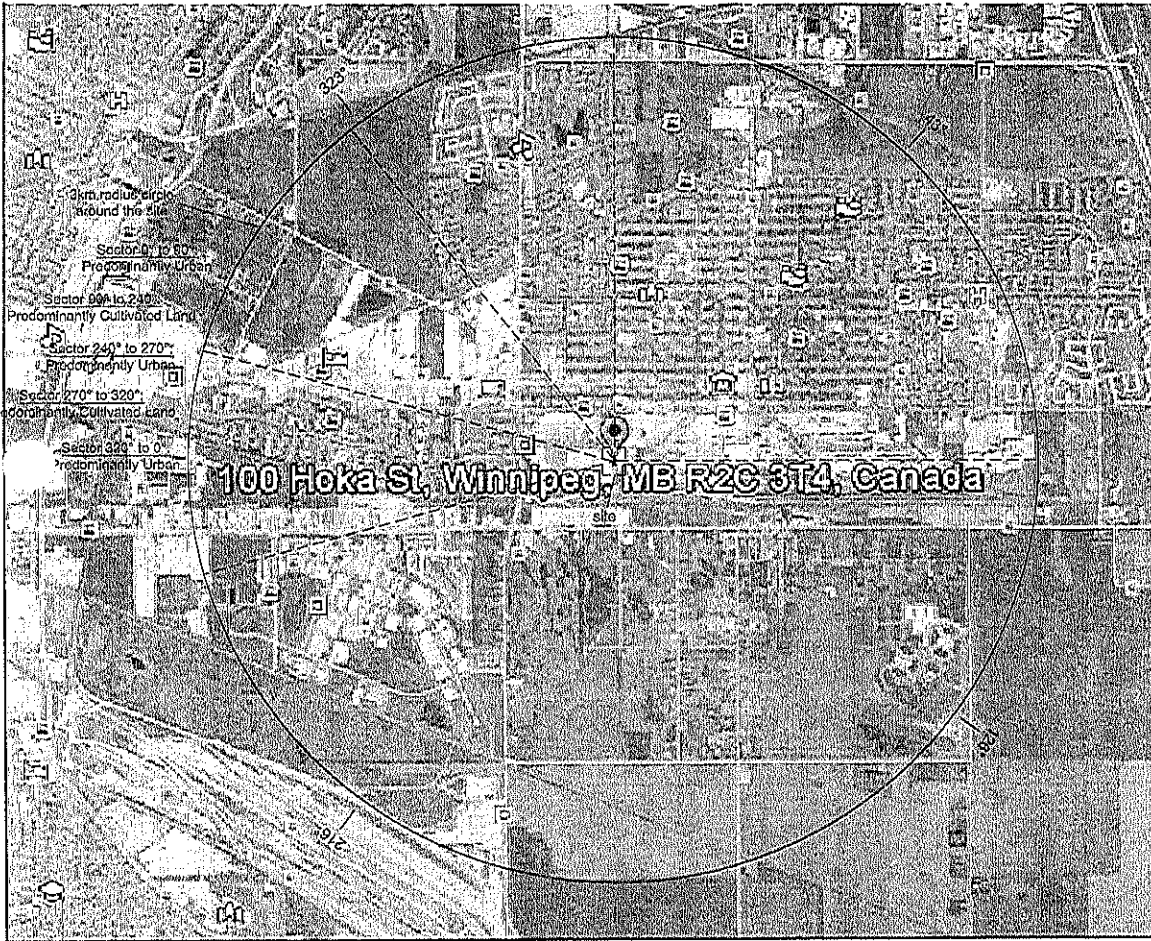
2470 MILLTOWER COURT  
MISSISSAUGA, ONTARIO L5N 7W5

PROJECT NAME:  
STRUCTURAL COMPOSITE  
TECHNOLOGIES LTD.  
100 HOKA STREET  
WINNIPEG, MANITOBA

DRAWING NAME:  
AERMOD PARAMETERS

SCALE: AS SHOWN	PROJECT NO: 81397
DATE: JAN 2014	REVISION NO: 1
DRAWN BY: DGB	DRAWING NO:
CHECKED BY:	B4





2470 Milltower Court  
Mississauga, Ontario, L5N 7W5

PROJECT NAME:  
STRUCTURAL COMPOSITE  
TECHNOLOGIES LTD.  
100 HOKA STREET  
WINNIPEG

DRAWING NAME:  
Land use around the  
site

SCALE: AS SHOWN	PROJECT NO: 81397
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DATE: FEB. 2014	REVISION NO:
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DRAWN BY: SXL	DRAWING NO:
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CHECKED BY:	B5
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**APPENDIX C**  
**INSIGNIFICANT SOURCES**  
**(1 PAGE)**

**Table C1. Insignificant Sources/Contaminants**

Processing Area / Equipment	Insignificant	
	Contaminant	Source
Grinding Dust Collector (Internal)	Particulate Matter	Fugitive
Cutting Operations	Particulate Matter	Fugitive

**APPENDIX D**  
**EMISSION CALCULATIONS**  
**(10 PAGES)**

### Comfort Heating Equipment

**Description:** Combustion in comfort heating equipment.

#### Process Operating Conditions

- All combustion equipment below fueled by
- All equipment operating simultaneously at the following maximum capacities:

Source Description	Source ID	No. of Units	Max. Thermal Energy Input	Total Thermal Energy Input (Btu/h)	Total Thermal Energy Input (kJ/h)
			(Btu/h) per unit		
Make-Up Air Units	RAU1, RAU2	2	3,564,000	7,128,000	7,520,040
Make-Up Air Units	RAU3	1	2,376,000	2,376,000	2,506,680
Make-Up Air Units	RAU4	1	950,000	950,000	1,002,250
Unit Heaters	NG1 to NG5	5	216,000	1,080,000	1,139,400
Radiant Tube Heaters	RTU	5	120,000	600,000	633,000
<b>Total</b>				12,134,000	12,801,370

#### Emission Estimation Methodology

Emissions were calculated using USEPA AP-42 emission factors for uncontrolled natural gas combustion equipment <100MMBtu.

Contaminant	CAS #	Emission Factor (lb/MMBtu)	Maximum Emission Rate (g/s)
Nitrogen Oxides	10102-44-0	9.80E-02	1.50E-01

#### Sample Calculation

$$\begin{aligned}
 \text{Nitrogen Oxides Emission Rate} &= \text{Fuel Input} \times \text{Emission Factor} \\
 &= 12.134 \text{ MMBtu/h} \times 0.098 \text{ lb/MMBtu} \div 3600 \text{ s/h} \times 453.6 \text{ g/lb} \\
 &= 0.150 \text{ g/s}
 \end{aligned}$$

#### Process Emissions Summary

Contaminant	CAS #	Maximum Emission Rate (g/s)	Emission Estimation Technique	Data Quality
Nitrogen Oxides	10102-44-0	1.50E-01	EF	AADQ

EF: Emission Factor

AADQ: Above Average Data Quality

#### References

- 1) Thermal input ratings provided by Structural Composite Technologies, Wednesday January 22, 2014, via email.
- 2) USEPA AP-42 Emission Factors. Natural Gas Combustion, Chapter 1.4. Table 1.4-1. July 1998.  
 <<http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf>>.

**Emissions from Resin Spraying**

**Source ID:** EF1  
**Description:** Emissions from resin spraying and glass lay-up are vented through one (1) of four (4) general production exhausts (EF1 to EF4), which are equipped with filters. This datasheet provides emission estimates for emissions vented through EF1.

**Process Operating Conditions**

**Actual operating times:** 12 hours per day

<b>Spray rate (fibreglass lay-up):</b>	8.33	kg/20-min
<b>Spray rate (laminating resin):</b>	25	kg/20-min
<b>Spray rate (rovings &amp; laminate resin):</b>	18.3	kg/20-min
<b>Styrene emission factor:</b>	354	lb/tonne of resin
<b>Amount of time sprayed:</b>	20 minutes	within a 1-hour period
<b>Filter efficiency (initial):</b>	20	%
<b>Filter efficiency (after filter):</b>	30	%

**Emission Estimation Methodology**

Multiple resins are sprayed, each having different formulations. For a worst-case scenario, the maximum composition of each contaminant from all the resins was used to determine the emission rates (Refer to "Product Formulations" datasheet for a listing of all resins and their components). Emissions calculations were also based on the following assumptions:

- All spray guns are spraying simultaneously
- A transfer efficiency of 95% was assumed to determine the Particulate Matter emissions.
- Individual solid components (and non-volatiles) of the spray have been deemed insignificant since they are expected to remain in the product.
- Volatile components were assumed to be 100% emitted to atmosphere.
- Emissions for the individual solids components of the resins was determined by multiplying the Particulate Matter emission rate by the maximum percent composition of the individual component.
- Emissions of styrene were determined using an emission factor developed by the Composite Fabricator's Association. The emission factor for mechanical atomized spraying was used as the spray guns are equipped with atomizers.
- The resulting emission rates have been divided by 4 to account for the emissions being equally distributed among 4 exhausts.
- Resulting emission rates have been multiplied by 12/24 to convert to a 24-h averaging period, since the plant only operates 12 hours in a 24-h period.

**Worst-case MSDS Material Blend (does not include gel coat, which exhausts solely through EF3)**

Contaminant	CAS #	Max. Wt. Percent	Maximum Emission Rate (g/s)
Methyl Ethyl Ketone Peroxide*	1338-23-4	35%	insignificant
Dimethyl Phthalate	131-11-3	60%	insignificant
Phlegmatizer**	Proprietary	26%	insignificant
Hydrogen Peroxide	7722-84-1	1%	2.89E-03
Methyl Ethyl Ketone	78-93-3	2%	5.79E-03
Fibreglass	65997-17-3	100%	insignificant
Polyester	25038-59-9	25%	insignificant
Styrene	100-42-5	50%	1.39E-01
Cobalt	7440-48-4	1%	insignificant
Methanol	67-56-1	1%	2.03E-03

\*Emissions from Methyl Ethyl Ketone Peroxide are considered insignificant since the role of this chemical is to act as a hardener and stabilizer for the resin, and must remain in the resin to perform its function.

\*\*Emissions from phlegmatizer are considered insignificant since the role of the phlegmatizer is as a stabilizer and therefore must remain in the product.

**Emissions from Resin Spraying**

**Sample Calculations**

$$\begin{aligned} \text{Particulate Matter Emission Rate} &= \text{Spray Rate (All Materials)} \times \text{Amount of Time Sprayed} \times (100\% - \text{Transfer Efficiency}) \times (100\% - \text{Filter Efficiency (Initial)}) \times (100\% - \text{Filter Efficiency (After Filter)}) \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= (8.33+25+18.3) \text{ kg/20-min} \times (20\text{min}/60\text{min}) \times (100\% - 95\%) \times (100\% - 20\%) \times (100\% - 30\%) \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.0502 \text{ g/s} \end{aligned}$$

$$\begin{aligned} \text{Hydrogen Peroxide Emission Rate} &= \text{Spray Rate (Fiberglass Lay-up)} \times \text{Amount of Time Sprayed} \times \text{Max. Wt. Percent} \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= 8.33 \text{ kg/20-min} \times 20\text{-min}/60\text{-min} \times 1\% \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.00289 \text{ g/s} \end{aligned}$$

$$\begin{aligned} \text{Styrene Emission Rate} &= \text{Spray Rate (Laminating Resin)} \times \text{Styrene Emission Factor} \times \text{Amount of Time Sprayed} \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= 25 \text{ kg/20-min} \times 354 \text{ lb/tonne of resin} \times 20\text{min}/60\text{min} \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 0.4536 \text{ kg/lb} \div 1000 \text{ kg/tonne} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.139 \text{ g/s} \end{aligned}$$

**Process Emissions Summary**

Contaminant	CAS #	Maximum Emission Rate (g/s)	Emission Estimation Technique	Data Quality
Particulate Matter	n/a	5.02E-02	EC	ADQ
Styrene	100-42-5	1.39E-01	EC	ADQ
Methanol	67-56-1	2.03E-03	EC	ADQ
Hydrogen Peroxide	7722-84-1	2.89E-03	EC	ADQ
Methyl Ethyl Ketone	78-93-3	5.79E-03	EC	ADQ

EC: Engineering Calculation

ADQ: Average Data Quality

**References**

- 1) Spray rates provided by Structural Composite Technologies. January 14, 2014 and February 19, 2014. via e-mail.
- 2) MSDSs provided by Structural Composite Technologies. January 23, 2014. via e-mail.
- 3) Transfer efficiency and filter efficiencies provided by Structural Composite Technologies. February 24, 2014, February 25, 2014 and February 27, 2014. via email

**Emissions from Resin Spraying**

**Source ID:** EF2  
**Description:** Emissions from resin spraying and glass lay-up are vented through one (1) of four (4) general production exhausts (EF1 to EF4), which are equipped with filters. This datasheet provides emission estimates for emissions vented through EF2.

**Process Operating Conditions**

<b>Actual operating times:</b> 12 hours per day		
<b>Spray rate (fibreglass lay-up):</b>	8.33	kg/20-min
<b>Spray rate (laminating resin):</b>	25	kg/20-min
<b>Spray rate (roving &amp; laminate resin):</b>	18.3	kg/20-min
<b>Styrene emission factor:</b>	354	lb/tonne of resin
<b>Amount of time sprayed:</b>	20 minutes	within a 1-hour period
<b>Filter efficiency (initial):</b>	20	%
<b>Filter efficiency (after filter):</b>	30	%

**Emission Estimation Methodology**

Multiple resins are sprayed, each having different formulations. For a worst-case scenario, the maximum composition of each contaminant from all the resins was used to determine the emission rates (Refer to "Product Formulations" datasheet for a listing of all resins and their components). Emissions calculations were also based on the following assumptions:

- All spray guns are spraying simultaneously
- A transfer efficiency of 95% was assumed to determine the Particulate Matter emissions.
- Individual solid components (and non-volatiles) of the spray have been deemed insignificant since they are expected to remain in the product.
- Volatile components were assumed to be 100% emitted to atmosphere.
- Emissions for the individual solids components of the resins was determined by multiplying the Particulate Matter emission rate by the maximum percent composition of the individual component.
- Emissions of styrene were determined using an emission factor developed by the Composite Fabricator's Association. The emission factor for mechanical atomized spraying was used as the spray guns are equipped with atomizers.
- The resulting emission rates have been divided by 4 to account for the emissions being equally distributed among 4 exhausts.
- Resulting emission rates have been multiplied by 12/24 to convert to a 24-h averaging period, since the plant only operates 12 hours in a 24-h period.

**Worst-case MSDS Material Blend (does not include gel coat, which exhausts solely through EF3)**

Contaminant	CAS #	Max. Wt. Percent	Maximum Emission Rate (g/s)
Methyl Ethyl Ketone Peroxide*	1338-23-4	35%	insignificant
Dimethyl Phthalate	131-11-3	60%	insignificant
Phlegmatizer**	Proprietary	26%	insignificant
Hydrogen Peroxide	7722-84-1	1%	2.89E-03
Methyl Ethyl Ketone	78-93-3	2%	5.79E-03
Fibreglass	65997-17-3	100%	insignificant
Polyester	25038-59-9	25%	insignificant
Styrene	100-42-5	50%	1.39E-01
Cobalt	7440-48-4	1%	insignificant
Methanol	67-56-1	1%	2.03E-03

\*Emissions from Methyl Ethyl Ketone Peroxide are considered insignificant since the role of this chemical is to act as a hardener and stabilizer for the resin, and must remain in the resin to perform it's function.

\*\*Emissions from phlegmatizer are considered insignificant since the role of the phlegmatizer is as a stabilizer and therefore must remain in the product.

**Emissions from Resin Spraying**

**Sample Calculations**

$$\begin{aligned} \text{Particulate Matter Emission Rate} &= \text{Spray Rate (All Materials)} \times \text{Amount of Time Sprayed} \times (100\% - \text{Transfer Efficiency}) \times (100\% - \text{Filter Efficiency (Initial)}) \times (100\% - \text{Filter Efficiency (After Filter)}) \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= (8.33+25+18.3) \text{ kg/20-min} \times (20\text{min}/60\text{min}) \times (100\% - 95\%) \times (100\% - 20\%) \times (100\% - 30\%) \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.0502 \text{ g/s} \end{aligned}$$

$$\begin{aligned} \text{Hydrogen Peroxide Emission Rate} &= \text{Spray Rate (Fiberglass Lay-up)} \times \text{Amount of Time Sprayed} \times \text{Max. Wt. Percent} \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= 8.33 \text{ kg/20-min} \times 20\text{-min}/60\text{-min} \times 1\% \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.00289 \text{ g/s} \end{aligned}$$

$$\begin{aligned} \text{Styrene Emission Rate} &= \text{Spray Rate (Laminating Resin)} \times \text{Styrene Emission Factor} \times \text{Amount of Time Sprayed} \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= 25 \text{ kg/20-min} \times 354 \text{ lb/tonne of resin} \times 20\text{min}/60\text{min} \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 0.4536 \text{ kg/lb} \div 1000 \text{ kg/tonne} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.139 \text{ g/s} \end{aligned}$$

**Process Emissions Summary**

Contaminant	CAS #	Maximum Emission Rate (g/s)	Emission Estimation Technique	Data Quality
Particulate Matter	n/a	5.02E-02	EC	ADQ
Styrene	100-42-5	1.39E-01	EC	ADQ
Methanol	67-56-1	2.03E-03	EC	ADQ
Hydrogen Peroxide	7722-84-1	2.89E-03	EC	ADQ
Methyl Ethyl Ketone	78-93-3	5.79E-03	EC	ADQ

EC: Engineering Calculation

ADQ: Average Data Quality

**References**

- 1) Spray rates provided by Structural Composite Technologies. January 14, 2014 and February 19, 2014. via e-mail.
- 2) MSDSs provided by Structural Composite Technologies. January 23, 2014. via e-mail.
- 3) Transfer efficiency and filter efficiencies provided by Structural Composite Technologies. February 24, 2014, February 25, 2014 and February 27, 2014. via email.



**Emissions from Resin Spraying**

**Source ID:** EF3  
**Description:** Emissions from resin spraying and glass lay-up are vented through one (1) of four (4) general production exhausts (EF1 to EF4), which are equipped with filters. Emissions from gel coat spraying are also vented through EF3. This datasheet provides emission estimates for emissions vented through EF3.

Process Operating Conditions

Actual operating times: 12 hours per day

Spray rate (fibreglass lay-up):	8.33	kg/20-min
Spray rate (laminating resin):	25	kg/20-min
Spray rate (roving & laminate resin):	18.3	kg/20-min
Spray rate (gel coat):	8.33	kg/20-min
Maximum styrene emission factor:	354	lb/tonne of resin
Amount of time sprayed:	20 minutes	within a 1-hour period
Filter efficiency (initial):	20	%
Filter efficiency (after filter):	30	%

Emission Estimation Methodology

Multiple resins are sprayed, each having different formulations. For a worst-case scenario, the maximum composition of each contaminant from all the resins was used to determine the emission rates (Refer to "Product Formulations" datasheet for a listing of all resins and their components). Emissions calculations were also based on the following assumptions:

- All spray guns are spraying simultaneously
- A transfer efficiency of 95% was assumed to determine the Particulate Matter emissions.
- Individual solid components (and non-volatiles) of the spray have been deemed insignificant since they are expected to remain in the product.
- Volatile components were assumed to be 100% emitted to atmosphere.
- Emissions for the individual solids components of the resins was determined by multiplying the Particulate Matter emission rate by the maximum percent composition of the individual component.
- Emissions of styrene were determined using an emission factor developed by the Composite Fabricator's Association. The emission factor for mechanical atomized spraying was used as the spray guns are equipped with atomizers. To be conservative the mechanical atomized emission factor was applied to the gel coat and the resin spraying applications. This is conservative since the emission factor for gel coat spraying (based on the weight percent of styrene in the gel coat) is less than the emission factor for mechanical atomized spraying.
- The resulting emission rates (with the exception of emissions from gel coat spraying) have been divided by 4 to account for the emissions being equally distributed among 4 exhausts.
- Resulting emission rates have been multiplied by 12/24 to convert to a 24-h averaging period, since the plant only operates 12 hours in a 24-h period.

Worst-case MSDS Material Blend

Contaminant	CAS #	Max. Wt. Percent	Maximum Emission Rate (g/s)
Methyl Ethyl Ketone Peroxide*	1338-23-4	35%	insignificant
Dimethyl Phthalate	131-11-3	60%	insignificant
Phlegmatizer**	Proprietary	26%	insignificant
Hydrogen Peroxide	7722-84-1	1%	2.89E-03
Methyl Ethyl Ketone	78-93-3	2%	5.79E-03
Fibreglass	65997-17-3	100%	insignificant
Polyester	25038-59-9	25%	insignificant
Styrene	100-42-5	50%	1.86E-01
Titanium Dioxide	13463-67-7	20%	insignificant
Silica	7631-86-9	5%	insignificant
Silica Gel	112926-00-8	5%	insignificant
Aluminum Oxide	1344-28-1	5%	insignificant
Cobalt	7440-48-4	1%	insignificant
Methanol	67-56-1	1%	2.03E-03

\*Emissions from Methyl Ethyl Ketone Peroxide are considered insignificant since the role of this chemical is to act as a hardener and stabilizer for the resin, and must remain in the resin to perform it's function.

\*\*Emissions from phlegmatizer are considered insignificant since the role of the phlegmatizer is as a stabilizer and therefore must remain in the product.

**Emissions from Resin Spraying**

Sample Calculations

Particulate Matter Emission Rate = ((Spray Rate (Resins) + Number of Exhausts) + Spray Rate (Gel Coat)) x Amount of Time Sprayed x (100 % - Transfer Efficiency) x (100 % - Filter Efficiency (Initial)) x (100 % - Filter Efficiency (After Filter)) x Conversion to 24-h

$$= (((8.33+25+18.3) \text{ kg/20-min}) + 4 \text{ exhausts}) + 8.33 \text{ kg/20-min}) \times (20\text{min}/60\text{min}) \times (100 \% - 95 \%) \times (100 \% - 20 \%) \times (100 \% - 30 \%) \times 12\text{-h}/24\text{-h} \times 1000 \text{ g/kg} + 60 \text{ s/min}$$

$$= 0.0826 \text{ g/s}$$

Hydrogen Peroxide Emission Rate = Spray Rate (Fiberglass Lay-up) x Amount of Time Sprayed x Max. Wt. Percent+ Number of Exhausts x Conversion to 24-h

$$= 8.33 \text{ kg/20-min} \times 20\text{-min}/60\text{-min} \times 1 \% \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 1000 \text{ g/kg} \div 60 \text{ s/min}$$

$$= 0.00289 \text{ g/s}$$

Styrene Emission Rate= Spray Rate (Laminating Resin & Gel Coat) x Styrene Emission Factor x Amount of Time Sprayed ÷ Number of Exhausts x Conversion to 24-h

$$= (25 + 8.33) \text{ kg/20-min} \times 354 \text{ lb/tonne of resin} \times 20\text{min}/60\text{min} \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 0.4536 \text{ kg/lb} \div 1000 \text{ kg/tonne} \times 1000 \text{ g/kg} + 60 \text{ s/min}$$

$$= 0.186 \text{ g/s}$$

Process Emissions Summary

Contaminant	CAS #	Maximum Emission Rate (g/s)	Emission Estimation Technique	Data Quality
Particulate Matter	n/a	8.26E-02	EC	ADQ
Styrene	100-42-5	1.86E-01	EC	ADQ
Methanol	67-56-1	2.03E-03	EC	ADQ
Hydrogen Peroxide	7722-84-1	2.89E-03	EC	ADQ
Methyl Ethyl Ketone	78-93-3	5.79E-03	EC	ADQ

EC: Engineering Calculation

ADQ: Average Data Quality

References

- 1) Spray rates provided by Structural Composite Technologies. January 14, 2014 and February 19, 2014. via e-mail.
- 2) MSDSs provided by Structural Composite Technologies. January 23, 2014. via e-mail.
- 3) Transfer efficiency and filter efficiencies provided by Structural Composite Technologies. February 24, 2014, February 25, 2014 and February 27, 2014. via email.

**Emissions from Resin Spraying**

**Source ID:** EF4  
**Description:** Emissions from resin spraying and glass lay-up are vented through one (1) of four (4) general production exhausts (EF1 to EF4), which are equipped with filters. This datasheet provides emission estimates for emissions vented through EF4.

**Process Operating Conditions**

Actual operating times: 12 hours per day  
 Spray rate (fibreglass lay-up): 8.33 kg/20-min  
 Spray rate (laminating resin): 25 kg/20-min  
 Spray rate (roving & laminate resin): 18.3 kg/20-min  
 Styrene emission factor: 354 lb/tonne of resin  
 Amount of time sprayed: 20 minutes within a 1-hour period  
 Filter efficiency (initial): 20 %  
 Filter efficiency (after filter): 30 %

**Emission Estimation Methodology**

Multiple resins are sprayed, each having different formulations. For a worst-case scenario, the maximum composition of each contaminant from all the resins was used to determine the emission rates (Refer to "Product Formulations" datasheet for a listing of all resins and their components). Emissions calculations were also based on the following assumptions:

- All spray guns are spraying simultaneously
- A transfer efficiency of 95% was assumed to determine the Particulate Matter emissions.
- Individual solid components (and non-volatiles) of the spray have been deemed insignificant since they are expected to remain in the product.
- Volatile components were assumed to be 100% emitted to atmosphere.
- Emissions for the individual solids components of the resins was determined by multiplying the Particulate Matter emission rate by the maximum percent composition of the individual component.
- Emissions of styrene were determined using an emission factor developed by the Composite Fabricator's Association. The emission factor for mechanical atomized spraying was used as the spray guns are equipped with atomizers.
- The resulting emission rates have been divided by 4 to account for the emissions being equally distributed among 4 exhausts.
- Resulting emission rates have been multiplied by 12/24 to convert to a 24-h averaging period, since the plant only operates 12 hours in a 24-h period.

**Worst-case MSDS Material Blend (does not include gel coat, which exhausts solely through EF3)**

Contaminant	CAS #	Max. Wt. Percent	Maximum Emission Rate (g/s)
Methyl Ethyl Ketone Peroxide*	1338-23-4	35%	insignificant
Dimethyl Phthalate	131-11-3	60%	insignificant
Phlegmatizer**	Proprietary	26%	insignificant
Hydrogen Peroxide	7722-84-1	1%	2.89E-03
Methyl Ethyl Ketone	78-93-3	2%	5.79E-03
Fibreglass	65997-17-3	100%	insignificant
Polyester	25038-59-9	25%	insignificant
Styrene	100-42-5	50%	1.39E-01
Cobalt	7440-48-4	1%	insignificant
Methanol	67-56-1	1%	2.03E-03

\*Emissions from Methyl Ethyl Ketone Peroxide are considered insignificant since the role of this chemical is to act as a hardener and stabilizer for the resin, and must remain in the resin to perform it's function.

\*\*Emissions from phlegmatizer are considered insignificant since the role of the phlegmatizer is as a stabilizer and therefore must remain in the product.

**Emissions from Resin Spraying**

**Sample Calculations**

$$\begin{aligned} \text{Particulate Matter Emission Rate} &= \text{Spray Rate (All Materials)} \times \text{Amount of Time Sprayed} \times (100\% - \text{Transfer Efficiency}) \times (100\% - \text{Filter Efficiency (Initial)}) \times (100\% - \text{Filter Efficiency (After Filter)}) \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= (8.33+25+18.3) \text{ kg/20-min} \times (20\text{min}/60\text{min}) \times (100\% - 95\%) \times (100\% - 20\%) \times (100\% - 30\%) \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.0502 \text{ g/s} \end{aligned}$$

$$\begin{aligned} \text{Hydrogen Peroxide Emission Rate} &= \text{Spray Rate (Fiberglass Lay-up)} \times \text{Amount of Time Sprayed} \times \text{Max. Wt. Percent} \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= 8.33 \text{ kg/20-min} \times 20\text{-min}/60\text{-min} \times 1\% \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.00289 \text{ g/s} \end{aligned}$$

$$\begin{aligned} \text{Styrene Emission Rate} &= \text{Spray Rate (Laminating Resin)} \times \text{Styrene Emission Factor} \times \text{Amount of Time Sprayed} \div \text{Number of Exhausts} \times \text{Conversion to 24-h} \\ &= 25 \text{ kg/20-min} \times 354 \text{ lb/tonne of resin} \times 20\text{min}/60\text{min} \div 4 \text{ exhausts} \times 12\text{-h}/24\text{-h} \times 0.4536 \text{ kg/lb} \div 1000 \text{ kg/tonne} \times 1000 \text{ g/kg} \div 60 \text{ s/min} \\ &= 0.139 \text{ g/s} \end{aligned}$$

**Process Emissions Summary**

Contaminant	CAS #	Maximum Emission Rate (g/s)	Emission Estimation Technique	Data Quality
Particulate Matter	n/a	5.02E-02	EC	ADQ
Styrene	100-42-5	1.39E-01	EC	ADQ
Methanol	67-56-1	2.03E-03	EC	ADQ
Hydrogen Peroxide	7722-84-1	2.89E-03	EC	ADQ
Methyl Ethyl Ketone	78-93-3	5.79E-03	EC	ADQ

EC: Engineering Calculation

ADQ: Average Data Quality

**References**

- 1) Spray rates provided by Structural Composite Technologies. January 14, 2014 and February 19, 2014. via e-mail.
- 2) MSDSs provided by Structural Composite Technologies. January 23, 2014. via e-mail.
- 3) Transfer efficiency and filter efficiencies provided by Structural Composite Technologies. February 24, 2014, February 25, 2014 and February 27, 2014. via email.

Product Formulations

Source ID: EPI to EP4  
Description: Fibreglass fabrication involves the spray application of several different materials. This dataset provides the weight percent of the constituents of each material.

Process	Fibreglass Lay-up	Continuous Strand Weaving	Chop Strand	Chop Strand	Gelcoat Spraying	Laminating Resin	Laminating Resin	Class Weaving	Laminating Weaving	Overall Maximum Composition																
Product Code/Name	NOROX MEKP-925H	DDROV	CSM	RTM	Gel Coat	Vinyl Ester Resin	Polyester Resin	SPKROV	QIB																	
Supplier	Sceptre	Nexco Solutions	Ashland	Vestemby	AOC	Ashland	AOC	Ashland	Jushi Group																	
Date on MSDS	23-Aug-11	16-Jan-11	9-Jan-09	14-Mar-12	28-Feb-08	24-Aug-12	3-Jan-12	5-Jan-09	1-Jan-12																	
Specific Gravity	1.1	2.56	2.50	2.0	1.4	1.079	1.1	2.50	2.54																	
Constituent	CAS #	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	
Methyl Ethyl Ketone Peroxide	1338-23-4	32%	35%	34%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35%
Dimethyl Phthalate	331-11-3	35%	60%	48%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60%
Phlegmatizer	Proprietary	6%	20%	10%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20%
Hydrogen Peroxide	7722-84-1	-	1%	1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1%
Methyl Ethyl Ketone	78-93-3	0%	2%	1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2%
Fibreglass	65997-17-3	-	-	-	100%	100%	-	100%	100%	80%	100%	90%	-	-	-	-	-	-	-	-	-	-	-	-	-	100%
Polyester	28038-69-9	-	-	-	-	-	-	-	-	0%	25%	13%	-	-	-	-	-	-	-	-	-	-	-	-	-	25%
Styrene	100-42-5	-	-	-	-	-	-	-	-	-	-	-	29.3%	29.8%	40%	30%	45%	-	43%	43%	-	-	-	-	-	50%
Titanium Dioxide	13463-67-7	-	-	-	-	-	-	-	-	-	-	-	10%	20%	15%	-	-	-	-	-	-	-	-	-	-	20%
Silica	7621-86-9	-	-	-	-	-	-	-	-	-	-	-	1%	5%	3%	-	-	-	-	-	-	-	-	-	-	5%
Silica Gel	112928-00-8	-	-	-	-	-	-	-	-	-	-	-	1%	5%	3%	-	-	-	-	-	-	-	-	-	-	5%
Aluminum Oxide	1344-28-1	-	-	-	-	-	-	-	-	-	-	-	1%	5%	3%	-	-	-	-	-	-	-	-	-	-	5%
Cobalt	7440-48-4	-	-	-	-	-	-	-	-	-	-	-	0.1%	1%	0.6%	-	-	-	0.1%	1%	0.6%	-	-	-	-	1%
Methanol	67-56-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7%	0.7%	-	-	-	-	-	1%

**APPENDIX E**  
**AERMOD DISPERSION MODELING INPUTS AND OUTPUTS**  
**(6 PAGES)**

**Table E1. Dispersion Modelling Input Summary Table**

Section Title	Description of How the Approved Dispersion Model was Used
Negligible Sources	See Section 3 of this Report
Same Structure Contamination	Not Applicable
Operating Conditions	See Section 4.1 of this Report
Source of Contaminant Emission Rates	See Section 4.2 of this Report
Combined Effect of Assumptions for Operating Conditions and Emission Rates	Not Applicable
Meteorological Conditions	Data from Bismark Weather Station, North Dakota
Area of Modelling Coverage	5000m from source centroid; grid spacing as per ADMGM
Stack Height for Certain New Sources of Contaminant	Not Applicable
Terrain Data	Terrain data assigned by terrain processor in AERMOD (WEBGIS).
Averaging Periods	1-h, 24-h, annual

Table E2-1. Model Inputs - Base Case Emissions

base.isc

Source ID	Easting Coordinate (m)	Northing Coordinate (m)	Base Elevation (m)	Release Type	Release Height (m)	Emission Rate (g/s)	Exit Temp. (K)	Exit Velocity (m/s)	Exit Diameter (m)	Description	Operating Times	Side Length (m)	Building Height (m)	Initial Lateral Dimension (m)	Initial Vertical Dimension (m)
EF1	642592.3	5528482.7	230	vertical	12.5	1	293.15	21.56	0.91	Plant Process Exhaust	24/7	-	-	-	-
EF2	642625.5	5528487.1	230	vertical	12.5	1	293.15	21.56	0.91	Plant Process Exhaust	24/7	-	-	-	-
EF3	642617.4	5528475.7	230	vertical	11.6	1	293.15	18.18	0.81	Plant Process Exhaust	24/7	-	-	-	-
EF4	642653.6	5528489.5	230	vertical	9.8	1	293.15	12.94	0.61	Plant Process Exhaust	24/7	-	-	-	-
VS1	642629.8	5528525.6	230	volume	6.1	1	-	-	-	Two RTUs	24/7	3.0	6.1	0.70	2.84
VS2	642610.5	5528503.5	230	volume	6.1	1	-	-	-	Two RTUs	24/7	3.0	6.1	0.70	2.84
VS3	642630.0	5528503.3	230	volume	6.1	1	-	-	-	One RTU	24/7	1.5	6.1	0.35	2.84
VS4	642659.8	5528490.4	230	volume	7.6	1	-	-	-	RAU4	24/7	1.5	7.6	0.35	3.53
VSS	642634.5	5528481.8	230	volume	7.6	1	-	-	-	RAU2, NG5	24/7	3.0	7.6	0.70	3.53
VS6	642614.7	5528482.7	230	volume	7.6	1	-	-	-	RAU3, NG4	24/7	3.0	7.6	0.70	3.53
VS7	642579.9	5528477.3	230	volume	7.6	1	-	-	-	RAU1, NG3	24/7	3.0	7.6	0.70	3.53
VSS	642533.6	5528485.0	230	volume	3.8	1	-	-	-	NG1, NG2	24/7	3.0	3.8	0.70	1.77



**Table E2-2. Model Inputs - Particulate Matter Emissions**

PM<sub>10</sub>

Source ID	Easting Coordinate (m)	Northing Coordinate (m)	Base Elevation (m)	Release Type	Release Height (m)	Emission Rate (g/s)	Exit Temp. (K)	Exit Velocity (m/s)	Exit Diameter (m)	Description	Operating Times
EF1	642592.3	5528482.7	230	vertical	12.5	5.02E-02	293.15	21.56	0.91	Plant Process Exhaust	24/7
EF2	642625.5	5528487.1	230	vertical	12.5	5.02E-02	293.15	21.56	0.91	Plant Process Exhaust	24/7
EF3	642617.4	5528475.7	230	vertical	11.6	8.26E-02	293.15	18.18	0.81	Plant Process Exhaust	24/7
EF4	642653.6	5528489.5	230	vertical	9.8	5.02E-02	293.15	12.94	0.61	Plant Process Exhaust	24/7

Table E3-1. AERMOD Outputs (24-h results)

Contaminant	CAS #	EF1		EF2		EF3		EF4		VS1		VS2		VS3	
		Emission Rate (g/s)	Dispersion Factor (177 ug/m3)	Emission Rate (g/s)	Dispersion Factor (232 ug/m3)	Emission Rate (g/s)	Dispersion Factor (288 ug/m3)	Emission Rate (g/s)	Dispersion Factor (323 ug/m3)	Emission Rate (g/s)	Dispersion Factor (989 ug/m3)	Emission Rate (g/s)	Dispersion Factor (638 ug/m3)	Emission Rate (g/s)	Dispersion Factor (637 ug/m3)
Styrene	100-42-5	1.39E-01	2.47E+01	1.39E-01	3.23E+01	1.86E-01	5.36E+01	1.39E-01	4.50E+01	-	-	-	-	-	-
Nitrogen Oxides	10102-44-0	-	-	-	-	-	-	-	-	2.96E-03	2.93E+00	2.96E-03	1.89E+00	1.48E-03	9.44E-01
Methanol	67-56-1	2.03E-03	3.59E-01	2.03E-03	4.69E-01	2.03E-03	5.84E-01	2.03E-03	6.54E-01	-	-	-	-	-	-
Hydrogen Peroxide	7722-84-1	2.89E-03	5.13E-01	2.89E-03	6.70E-01	2.89E-03	8.34E-01	2.89E-03	9.34E-01	-	-	-	-	-	-
Methyl Ethyl Ketone	78-93-3	5.79E-03	1.03E+00	5.79E-03	1.34E+00	5.79E-03	1.67E+00	5.79E-03	1.87E+00	-	-	-	-	-	-
Particulate Matter	n/a	5.02E-02	8.90E+00	5.02E-02	1.16E+01	8.26E-02	2.38E+01	5.02E-02	1.02E+01	-	-	-	-	-	-

$$\begin{aligned}
 \text{Styrene POI Concentration} &= \text{Sum} \{[\text{emission rate from source group}] \times [\text{dispersion factor for source group}]\} \\
 &= (0.139 \text{ g/s} \times 177 (\mu\text{g}/\text{m}^3)/(\text{g}/\text{s})) + (0.139 \text{ g/s} \times 232 (\mu\text{g}/\text{m}^3)/(\text{g}/\text{s})) + (0.186 \text{ g/s} \times 288 (\mu\text{g}/\text{m}^3)/(\text{g}/\text{s})) + (0.139 \text{ g/s} \times 323 (\mu\text{g}/\text{m}^3)/(\text{g}/\text{s})) \\
 &= 156 \mu\text{g}/\text{m}^3
 \end{aligned}$$

Table E3-1. AERMOD Outputs (24-h results)

Contaminant	CAS #	VS4		VS5		VS6		VS7		VS8		Total POI Concentration ( $\mu\text{g}/\text{m}^3$ )
		Emission Rate (g/s)	Dispersion Factor 463 $\mu\text{g}/\text{m}^3$	Emission Rate (g/s)	Dispersion Factor 394 $\mu\text{g}/\text{m}^3$	Emission Rate (g/s)	Dispersion Factor 353 $\mu\text{g}/\text{m}^3$	Emission Rate (g/s)	Dispersion Factor 340 $\mu\text{g}/\text{m}^3$	Emission Rate (g/s)	Dispersion Factor 1928 $\mu\text{g}/\text{m}^3$	
Styrene	100-42-5	-	-	-	-	-	-	-	-	-	-	1.56E+02
Nitrogen Oxides	10102-44-0	1.17E-02	5.49E+00	4.67E-02	1.84E+01	3.20E-02	1.13E+01	4.67E-02	1.59E+01	5.34E-03	1.03E+01	6.71E+01
Methanol	67-56-1	-	-	-	-	-	-	-	-	-	-	2.07E+00
Hydrogen Peroxide	7722-84-1	-	-	-	-	-	-	-	-	-	-	2.95E+00
Methyl Ethyl Ketone	78-93-3	-	-	-	-	-	-	-	-	-	-	5.90E+00
Particulate Matter	n/a	-	-	-	-	-	-	-	-	-	-	6.06E+01

Table E3-2. AERMOD Outputs (1-h results)

Contaminant	CAS #	VS1		VS2		VS3		VS4		VS5		VS6		VS7		VS8		Total POI Concentration ( $\mu\text{g}/\text{m}^3$ )
		Emission Rate (g/h)	Dispersion Factor 4532 $\mu\text{g}/\text{m}^3$	Emission Rate (g/h)	Dispersion Factor 3523 $\mu\text{g}/\text{m}^3$	Emission Rate (g/h)	Dispersion Factor 3513 $\mu\text{g}/\text{m}^3$	Emission Rate (g/h)	Dispersion Factor 2134 $\mu\text{g}/\text{m}^3$	Emission Rate (g/h)	Dispersion Factor 1844 $\mu\text{g}/\text{m}^3$	Emission Rate (g/h)	Dispersion Factor 1843 $\mu\text{g}/\text{m}^3$	Emission Rate (g/h)	Dispersion Factor 1812 $\mu\text{g}/\text{m}^3$	Emission Rate (g/h)	Dispersion Factor 7494 $\mu\text{g}/\text{m}^3$	
Nitrogen Oxides	10102-44-0	2.968-03	1.34E+01	2.966-03	1.04E+01	1.48E-03	5.21E+00	1.17E-02	2.50E+01	4.67E-02	8.61E+01	3.20E-02	5.90E+01	4.67E-02	8.46E+01	2.34E-03	4.00E+01	3.24E+02

Nitrogen Oxides POI Concentration = Sum [(emission rate from source group) x (dispersion factor for source group)]  
 = (0.00296 g/s x 4532 ( $\mu\text{g}/\text{m}^3$ )(g/s)) + (0.00296 g/s x 3523 ( $\mu\text{g}/\text{m}^3$ )(g/s)) + (0.00148 g/s x 3513 ( $\mu\text{g}/\text{m}^3$ )(g/s)) + (0.0117 g/s x 2134 ( $\mu\text{g}/\text{m}^3$ )(g/s)) + (0.0467 g/s x 1844 ( $\mu\text{g}/\text{m}^3$ )(g/s)) + (0.0320 g/s x 1843 ( $\mu\text{g}/\text{m}^3$ )(g/s)) + (0.0467 g/s x 1812 ( $\mu\text{g}/\text{m}^3$ )(g/s)) + (0.00534 g/s x 7494 ( $\mu\text{g}/\text{m}^3$ )(g/s))  
 = 324  $\mu\text{g}/\text{m}^3$

Table E3-3, AERMOD Outputs (annual results)

Contaminant	CAS #	VS1		VS2		VS3		VS4		VS5		VS6		VS7		VS8		Total POI Concentration ( $\mu\text{g}/\text{m}^3$ )
		Emission Rate (g/h)	Dispersion Factor ( $\mu\text{g}/\text{m}^3$ )	Emission Rate (g/h)	Dispersion Factor ( $\mu\text{g}/\text{m}^3$ )	Emission Rate (g/h)	Dispersion Factor ( $\mu\text{g}/\text{m}^3$ )	Emission Rate (g/h)	Dispersion Factor ( $\mu\text{g}/\text{m}^3$ )	Emission Rate (g/h)	Dispersion Factor ( $\mu\text{g}/\text{m}^3$ )	Emission Rate (g/h)	Dispersion Factor ( $\mu\text{g}/\text{m}^3$ )	Emission Rate (g/h)	Dispersion Factor ( $\mu\text{g}/\text{m}^3$ )	Emission Rate (g/h)	Dispersion Factor ( $\mu\text{g}/\text{m}^3$ )	
Nitrogen Oxides	10102-44-0	2.96E+03	3.40E-01	2.96E+03	3.25E-01	1.48E+03	1.62E-01	1.17E+02	8.65E-01	4.67E-02	2.52E+00	3.20E-02	1.13E+01	4.67E-02	2.40E+00	2.34E-03	1.67E+00	1.98E+01

Nitrogen Oxides POI Concentration = Sum [(emission rate from source group) x (dispersion factor for source group)]  
 =  $(0.00296 \text{ g/s} \times 182 \text{ } (\mu\text{g}/\text{m}^3)/(\text{g/s})) + (0.00296 \text{ g/s} \times 109 \text{ } (\mu\text{g}/\text{m}^3)/(\text{g/s})) + (0.00148 \text{ g/s} \times 199 \text{ } (\mu\text{g}/\text{m}^3)/(\text{g/s})) + (0.0117 \text{ g/s} \times 74 \text{ } (\mu\text{g}/\text{m}^3)/(\text{g/s})) + (0.0467 \text{ g/s} \times 54 \text{ } (\mu\text{g}/\text{m}^3)/(\text{g/s})) + (0.0320 \text{ g/s} \times 353 \text{ } (\mu\text{g}/\text{m}^3)/(\text{g/s})) + (0.0467 \text{ g/s} \times 51 \text{ } (\mu\text{g}/\text{m}^3)/(\text{g/s})) + (0.00534 \text{ g/s} \times 316 \text{ } (\mu\text{g}/\text{m}^3)/(\text{g/s}))$   
 = 19.8  $\mu\text{g}/\text{m}^3$