Covanta Marion, Inc.
4850 Brooklake Road NE
PO Box 9126
Brooks, OR 97305
Tel (503) 393-0890
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COVANTA
Powering Today. Protecting Tomorrow.

October 18, 2022

Ms. Julia DeGagne
Air Toxics Project Manager
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232
julia.degagne@deq.oregon.gov

RE: Covanta Marion, Inc. – Cleaner Air Oregon Emissions Inventory Submittal

Dear Ms. DeGagne:

Covanta Marion, Inc. (Covanta) is pleased to submit the Cleaner Air Oregon (CAO) Emission Inventory for its Brooks, Oregon facility (the Brooks Facility). On August 26, 2022, the Oregon Department of Environmental Quality (DEQ) extended the deadline for submittal of the CAO Emissions Inventory to October 19, 2022. Accordingly, with this letter, Covanta is submitting the enclosed CAO Emissions Inventory Form and associated documents to comply with the requirement to submit an emissions inventory pursuant to Oregon Administrative Rule (OAR) 340-245-0030.

The enclosed inventory form and supporting documentation was prepared using best engineering estimates, process knowledge, source test data, and/or published emission factors for toxic air contaminants (TAC) listed in OAR 340-247-8010, Table 1. Covanta reserves the right to update the enclosed documentation upon obtaining updated and/or additional emissions or facility operating data.

FACILITY DESCRIPTION

The Brooks Facility, located at 4850 Brooklake Road NE in Brooks, Oregon, is a Solid Waste-to-Energy Facility that operates under Title V Permit 24-5398-TV-01 and the Standard Industrial Classification (SIC) Code 4953: Refuse Systems.

The primary operations at the Brooks Facility are comprised of two municipal waste combustion units, in which permitted solid waste streams are combusted in a boiler, with the resulting generated heat used to produce steam. Steam is then directed to a turbine which drives the generator that produces electricity. Each combustion unit is equipped with a spray dryer adsorber (SDA) for acid gas removal, a selective non-catalytic reduction (SNCR) system for control of nitrogen oxides, a dry activated carbon injection system for control of mercury emissions, and a fabric filter baghouse (equipped with a bag leak detection system) for the control of particulate matter emissions. The facility also operates ancillary equipment including a cooling tower, an ash handling system, and a diesel fired fire pump. A process flow diagram is provided in Attachment 1 to this letter.

CAO EMISSION INVENTORY METHODOLOGY

Identification of Toxic Emission Units (TEUs)

Covanta has identified the following significant TEUs, which are consistent with the permitted emission units under Covanta's current Title V permit:

- MWC-1: Municipal Waste Combustor Unit 1 (during normal operation and during startup and shutdown when natural gas is used)
- MWC-2: Municipal Waste Combustor Unit 2 (during normal operation and during startup and shutdown when natural gas is used)
- RICE: Diesel fired emergency fire pump (during maintenance and readiness testing, and non-emergency operations only)

For units that are identified as aggregate insignificant (AI) activities (i.e., pebble lime storage system), Covanta has provided justification in Attachment 5 as to why these units should be considered exempt TEUs. Justifications to classify the other reagent storage systems, cooling tower, ash handling systems, routine maintenance and maintenance shop activities as exempt TEUs have also been provided in Attachment 5.

Additionally, Covanta has provided an updated AQ523 form identifying categorically exempt TEUs at the Brooks Facility in Attachment 6.

Identification of Toxic Air Contaminants Potentially Emitted

As part of the emission calculation process, Covanta utilized a combination of known pollutants emitted during the combustion of municipal solid waste. Covanta utilized the following sources to determine potential TAC:

- Oregon DEQ environmental regulations (i.e., MWC MACT standards);
- Comparable operations emission profiles;
- Emissions during source testing completed at the request of Oregon DEQ and the CAO program; and
- Pollutants emitted via published emission factors (i.e., Oregon DEQ approved natural gas/diesel combustion toxic emission factors).

Actual and Potential Throughputs

For potential annual throughput and/or annual hours of operation presented in this inventory as the requested potential to emit (PTE), Covanta utilized the following:

- Hours of normal operation for MWC-1 and MWC-2 (i.e., when municipal solid waste is combusted)
  - Continuous operating hours of 8,760 hours/year for PTE.
- Natural gas throughput for MWC-1 and MWC-2 (during startup and shutdown operations)
  - Potential annual throughput was estimated by applying a 50% safety factor to 2021 natural gas usage values (in million standard cubic feet [MMscf] per year) to account for any unanticipated increase in the number of startups in future years.
- Diesel-fired emergency fire pump
  - 100 hours of operation for maintenance, testing, and non-emergency operations as required by NESHAP ZZZZ for emergency use fire pumps. Per the documentation provided in Attachment 3, the fire pump utilizes a maximum of 10.4 gallons per hour of operation. This

value was utilized in conjunction with the hours of operation to determine the annual potential usage in thousand gallons (MGal).

For potential daily throughput and/or hours of operation presented as the requested PTE, Covanta utilized the following:

- Hours of normal operation for MWC-1 and MWC-2 (i.e., when municipal solid waste is combusted)
  - 24 hours of continuous operation
- Natural gas throughput for MWC-1 and MWC-2 (during startup and shutdown operations)
  - Maximum daily natural gas usage rate assuming one startup and shutdown event occurs in a single 24 hour period.
- Diesel-fired emergency fire pump
  - 24 hours of daily operation. The maximum hourly fuel usage rate was used to determine the daily potential fuel usage in MGal.

For actual values, Covanta utilized the 2021 calendar year hours of operation, natural gas usage, and diesel fuel usage.

Emission Calculation Methodology

To calculate emissions from the various TAC emitting activities, Covanta utilized the following methodologies to determine emission factors:

- MWC-1 and MWC-2 during normal operations
  - Emission factors were developed based on source testing completed at the request of Oregon DEQ on December 8, 2021, and March 9, 10 and 11, 2022, for various TACs.
  - The emission factors were developed based on the chronic source testing completed for both the annual and daily emission factors. Acute source testing was completed at production levels that are not considered normal operation of the Brooks Facility, nor are the production levels considered financially or technically viable for operation of the Brooks Facility, even in a 24-hour period. Covanta has utilized source test results indicative of expected maximum operations during the regulated acute 24-hour period.
  - Emission factors for actual operations are calculated using the methods described in Appendix G of Oregon DEQ's Recommended Procedures for TAC Health Risk Assessments (HRA) (July 2022), utilizing the concept that if a pollutant is not detected in all test runs, it has an emission rate of zero.
  - Emission factors for potential operations do not utilize the methods described in Oregon DEQ's Recommended Procedures for TAC HRA. Test results are reported using the average of the non-detect reported value even when no pollutant was detected. All tested emission parameters are included in the inventory.
  - The emission factor for polychlorinated dibenzo-p-dioxins (PCDDs) & dibenzofurans (PCDFs) toxic equivalency (TEQ) and polycyclic aromatic hydrocarbons (PAHs) were calculated in accordance with Appendix E and G of Oregon DEQ's Recommended Procedures for Toxic Air Contaminant Health Risk Assessments (July 2022). While several PCDD and PCDF pollutants were not detected in source testing, half the detection limit was used to determine the emission factor for the pollutant in the calculation of the PCDD & PCDF TEQ per Source Sampling Manual Volume 1 Revised November 2018, Section 2.11.c. This same methodology was also utilized in developing an emission factor for the PAH TEQ.
  - Source test results at the Brooks Facility included a Total Polychlorinated Biphenyls (PCB) emission factor. This emission factor is included in the inventory under CAS number 1336-

36-3. The PCB TEQ emission factor, listed as DEQ ID 645, was also determined using the same methodology as the PCDD & PCDF TEQ described above. Oregon DEQ requested emission factors using both methods to determine a PCB emission factor in the August 2022 letter.
    - An appropriate safety factor was then applied to every pollutant included in the emissions inventory.
- MWC-1 and MWC-2 during startup and shutdown operations
    - Emissions factors for natural gas combustion as provided by the Oregon DEQ for external combustion units with a maximum rated heat input capacity of greater than 100 million British thermal units per hour (MMBtu/hr).
- Diesel fired emergency fire pump
    - Emission factors as provided in the DEQ Combustion EF Tool for a diesel engine.

The emission factor for each pollutant is multiplied by the expected throughput for each scenario to determine a chronic (annual) and acute (24-hour) emission rate.

Enclosed Documentation

Enclosed with this cover letter is the required CAO AQ520 form (Attachment 8) detailing actual and potential emissions from all significant TEUs, as well as the required CAO AQ523 form (Attachment 6) detailing categorically exempt TEUs at the Brooks Facility.

Additionally, Covanta has provided the following documentation to support the presented emission rates and the additional information requested by Oregon DEQ:

- Process flow diagram (Attachment 1)
- Supporting emission calculations in Excel format (Attachment 2)
- Specification sheets for the fire pump (Attachment 3)
- Auxiliary burner fuel usage documentation (Attachment 4)
- Exempt TEU Justifications (Attachment 5)
- Safety Data Sheets (SDS) for materials currently used at the Brooks Facility (Attachment 7)
- Diagrams displaying the stack height configuration to be utilized for the health risk assessment (HRA) modeling (Attachment 9)

We look forward to continuing to work with you and your team as we advance toward development of a HRA for Covanta. Please let me know if you have any questions.

Sincerely,

Covanta

Scott Anderson
Facility Manager

Cc: Michael Eisele, Oregon DEQ
Brian Kent, Covanta Marion Inc.

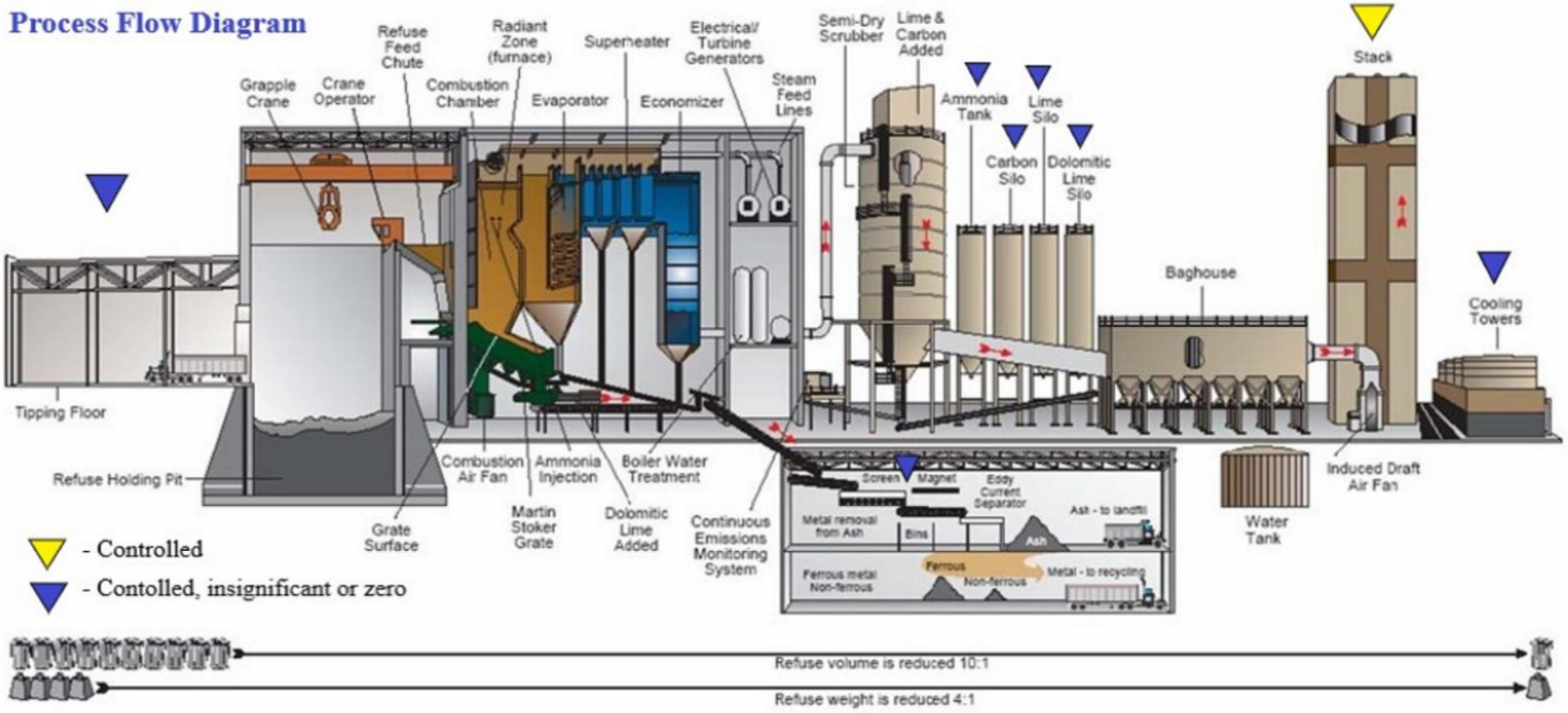
Terry Coble, Covanta Marion Inc.
Joseph Walsh, Covanta Marion Inc.
Jeffrey Hahn, Covanta Consultant
Jesse Gonzalez, Trinity Consultants

Attachments

ATTACHMENT 1

Process Flow Diagram

Process Flow Diagram



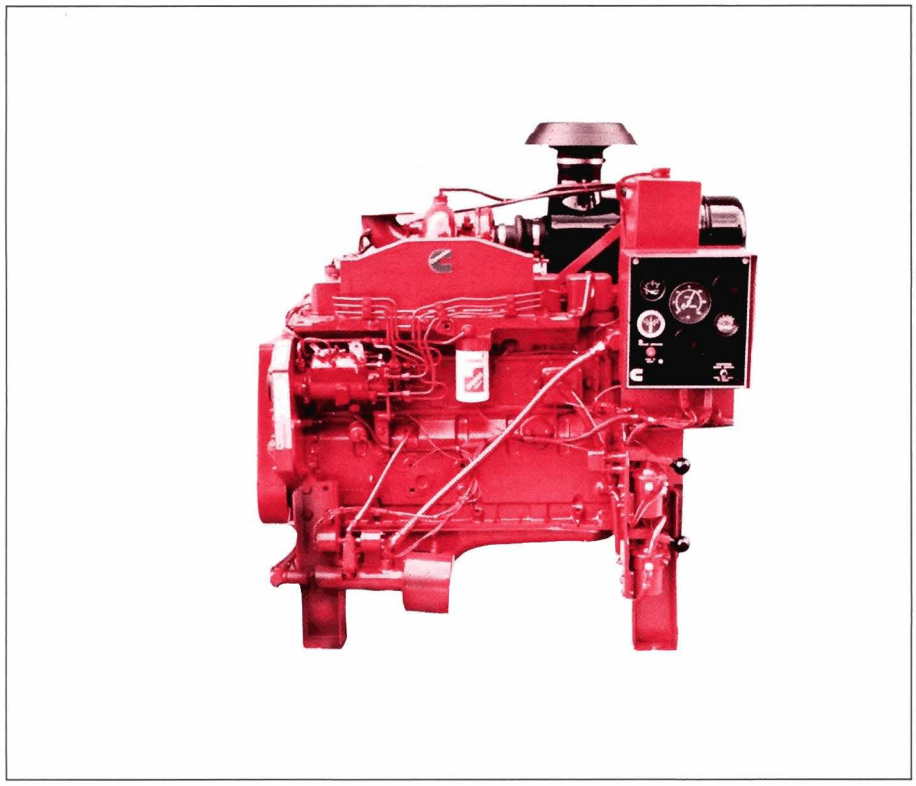
Attachment 2

Supporting Emission Calculation Information

Supporting emission calculation workbooks are provided electronically via email at the request of Oregon DEQ. The file name is "Covanta Pollutant Emissions Summary v2.0 - For DEQ.xlsx".

Attachment 3

Fire Pump Documentation



6BTA

6BTA5.9 F1

FIRE PUMP ENGINE

SPECIFICATIONS

Four Stroke Cycle, Turbocharged-Aftercooled, In-Line, 6 Cylinder Diesel Engine

Bore and Stroke	4.02 x 4.72 in.	(102x120 mm)
Displacement	359 cu. in.	(5.88 L)
Oil System Capacity	15 U.S. qts.	(14.2 L)
Engine Coolant Capacity	21.8 U.S. gal.	(20.7 L)
Dry Weight, With Std. Accessories	1,170 lb.	(530 kg)

INSTALLATION CONSIDERATIONS

Maximum raw water pressure must not exceed 20 PSI (137 kPa). Minimum acceptable raw water flow at 90° F (32° C) raw water temperature and 100° F (38° C) ambient air temperature should be at least 25 G.P.M. (68 L/min.) at the 2100 RPM listed rating.

Ventilation air required for engine combustion is 385 CFM @ 208 and 283 CFM @ 182 hp. This is for engine air combustion only and does not take into consideration additional air required for normal room cooling.

This symbol on the nameplate means the product is Listed by Underwriters' Laboratories, Inc.

This symbol on the nameplate means the product is approved by the Factory Mutual Research Corporation.

This symbol on the nameplate means the product is Listed by Underwriters' Laboratories of Canada.

LISTED AGENCY RATINGS

182 HP @ 1760 RPM
208 HP @ 2100 RPM

All of the above ratings are listed by the following agencies:

Underwriters' Laboratories Inc.

Factory Mutual

Underwriters' Laboratories of Canada

The agency-approved horsepower ratings published are already derated for fire pump service. The ratings show horsepower available for driving the fire pump at standard SAE J1995 conditions of 29.61 in. (752 mm) Hg barometer and 77° F (25° C) inlet air temperature (approximately 300 ft. [91.4 m] above sea level). The only additional deration necessary is for higher ambient temperatures and elevations as follows: 3% for each 1000 ft. (305 m) above 300 ft. (91.4 m) and 1% for each 10° F (5.6° C) above 77° F (25° C) in accordance with National Fire Association Pamphlet No. 20.

6BTA

6BTA5.9 F1

FIRE PUMP ENGINE

DESIGN FEATURES

Aftercooler: Large capacity aftercooler results in cooler, denser air for more efficient combustion and reduced internal stress for longer life.

Direct Fuel Injection System: With high swirl intake ports for thorough mixing of air and fuel to provide low fuel consumption.

Holset Exhaust Gas Driven Turbocharger: Provides more power, improved fuel economy, altitude compensation, and lower smoke and noise levels.

Compact Size: For ease of installation and easy access for routine maintenance.

Fewer Parts: For less inventory and faster maintenance and repair. Parts simplicity also enables engines to be serviced and repaired with ordinary hand tools.

Cast Iron Skirted Block: With main bearing supports between each cylinder, for maximum strength and rigidity, low weight, and optimum crankshaft support.

Forged Steel, I-beam Cross Section Connecting Rods: With angle split cap-to-rod interface and capscrew attachment for maximum structural strength and ease of service.

Side Mounted Gear Driven Camshaft: For low engine height and minimum maintenance.

Single Piece Cross Flow Cylinder Head: For short length and maximum structural stiffness of the block/head assembly, for fewer head gasket problems.

Two Valves Per Cylinder: With single valve springs, for fewer parts.

Single Belt Fan, Alternator, and Water Pump Drive: With self-tensioning idler for minimum belt maintenance.

STANDARD EQUIPMENT

Air Cleaner: 15 inch (318 mm) diameter dry air cleaner.

Belt and Damper Shield Guard: Protection from alternator, accessory drive, and water pump belts and vibration damper.

Coolant Pump: Belt driven, centrifugal type.

Corrosion Resistor: Mounted, checks rust and corrosion, controls acidity, and removes impurities from coolant.

Electrical Equipment: 12 volt negative ground system, including: a 12 volt starting motor; a 12 volt, 65 alternator; manually operable contactors; and a junction box with enclosed terminal strip.

Engine Support: Pedestal type, front and rear.

Exhaust Manifold: Wet.

Exhaust Outlet: 3 in. (76 mm) diameter, 90° elbow.

Filters: Spin-on, replaceable lubricating oil filter. Single spin-on, replaceable fuel filter.

Flywheel: Machined for stubshaft mounting.

Flywheel Housing: SAE No. 3 with industrial supports.

Governor: Mechanical flyweight, mechanical variable speed type.

Heat Exchanger: Copper nickel tube bundle, mounted.

Instrument Panel: Mounted. Electrical instruments only. Includes amp meter, tachometer, hour meter, water temperature gauge, and lubricating oil pressure gauge.

Lubricating Oil Cooler: Tubular type, jacket water cooled.

Oil Pan: Steel stamp, rear sump type, 15 U.S. quarts (14.2 litre) capacity. Provision for optional oil heater.

Oil Pressure Switch: Provides signal to activate alarm (not included) for low oil pressure.

Overspeed Switch: Mounted, overspeed shutdown with manual reset, stop crank contacts.

Stubshaft: Mounted on flywheel.

Throttle Control: Hydraulic, with no manual override.

Vibration Damper: Viscous type.

Water Jacket Heater: Mounted beside oil pan, 120/240 volt, 1000 watt.

Water Temperature Switch: Provides signal to activate alarm (not included) for high water temperature.

Cummins has always been a pioneer in product improvement. Thus specifications may change without notice. Illustrations may include optional equipment.

Cummins Engine Company, Inc.
Box 3005
Columbus, IN 47202-3005
U.S.A.

CUMMINS ENGINE COMPANY, INC.
Engine Data Sheet

Engine Model: FIREPUMP 6BTA5.9 F1
Gross Power BHP (kW): 208 (155) @ 2100
Configuration Number: D403018FX02

Data Sheet: DS-9374
Date: 12May97
CPL Code: 1165

GENERAL ENGINE DATA

Type	4 cycle, Inline, 6 cylinder
Aspiration:	Turbocharged, Aftercooled
Bore - in. (mm) & Stroke - in. (mm)	4.02 (102) x 4.72 (120)
Displacement - $in.^3$ (litre)	359.0 (5.88)
Compression Ratio	15.5:1
Valves per Cylinder: - Intake	1
- Exhaust	1
Engine Weight & Center of Gravity (With Standard Accessories)	
Reference Installation Diagram	3884450
Dry Weight - lb. (kg)	1170 (530)
Wet Weight - lb. (kg)	1230 (561)
C.G. Distance from F.F.O.B. - in. (mm)	18.375 (466.7)
C.G. Distance Above Crankshaft Centerline - in. (mm)	12.52 (318.0)
Maximum Allowable Bending Moment @ Rear Face of Block - lb.-ft. (N•m)	1000 (1350)

AIR INDUCTION SYSTEM

Maximum Allowable Temperature Rise Between Ambient Air and Engine Air Inlet (Ambients 32°F [0°C] to 100°F [38°C]) - °F (°C)	30 (15)
Maximum Allowable Intake Restriction With a Dirty Air Filter Element in. H_2O (mm H_2O)	25 (635)
Part Number of Standard Air Filter Element (Dry Type)	3915185

LUBRICATION SYSTEM

Oil Pressure @ Rated Speeds - PSI (kPa)	40 - 60 (276 - 414)
Oil Flow @ Maximum Rated Speeds (Nominal) - U.S. GPM (litre/s)	15.5 (1.0)
Oil Pan Capacity (High - Low) U.S. quarts (litre)	15 - 13 (14.2 - 12.3)
Full Flow Lube Oil Filter Capacity - U.S. gal (litre)	0.25 (0.9)
Part Number of Standard Oil Pan	3915703
Part Number of Standard Oil Filter Element	3908615

COOLING SYSTEM

Heat Exchanger Cooled (Shell & Tube Type)	
Part Number of Tube Bundle	3911840
Raw Water Working Pressure Range at Heat Exchanger - PSI (kPa)	60 (414) MAX
Recommended Minimum Water Supply Pipe Size to Heat Exchanger (Reference Only) - in. (mm) dia	0.75 (19.1)
Recommended Minimum Water Discharge Pipe Size From Heat Exchanger (Reference Only) - in. (mm) dia	1.0 (30.1)
Coolant Water Capacity (Engine Side) - U.S. gal (litre)	5.5 (20.8)
Standard Thermostat- Type	Modulating
- Range - °F (°C)	181-203 (83-95)
Minimum Raw Water Flow with Water Temperatures to 90°F (32°C) - U.S. GPM (litre/s)	25 (1.6)

A jacket water heater is mandatory on this engine. The recommended heater wattage is 1000 down to 40°F (4°C)

EXHAUST SYSTEM

Maximum Allowable Back Pressure Imposed by Piping & Silencer - in. Hg (mm Hg)	3 (75)
Exhaust Pipe Size Normally Acceptable - in. (mm) dia	3 (76)

FUEL SYSTEM

Supply Line Size - in. (mm) 0.25 (6)
Drain Line Size - in. (mm) 0.125 (3)
Maximum Fuel Line Length Between Supply Tank & Fuel Pump - ft. m) 40 (12)
Maximum Fuel Height Above CL Crankshaft - in. (mm) 80 (2030)
Part Number of Standard Fuel Filter 3903640
Part Number of Standard Fuel Filter Element 3903640
Maximum Allowable Restriction to Fuel Pump with Dirty Filter - in. Hg (mm Hg) 3.5 (89)
Maximum Allowable Return Line Restriction - in. Hg (mm Hg) 5.0 (127)

ELECTRICAL SYSTEM

Battery Voltage 12
Battery Cable Size (Maximum Cable Length Not to Exceed 10 ft. (3.0 m) AWG) 00
Wiring for Automatic Starting (Negative Ground) ..... Standard
Alternator (Standard) 12 Volt, Internally Regulated - Ampere 53
Manually Operable Contactors ..... Standard
Minimum Recommended Battery Capacity
- 70°F (21°C) Minimum Temperature - CCA 450
- 32°F (0°C) Minimum Temperature - CCA 640

Reference Wiring Diagram Number 3884450

PERFORMANCE DATA

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and alternator; not included are compressor, fan, optional equipment and driven components. Data is based on operation at SAE standard J1995 conditions of 300 ft. (91 m) altitude (29.61 in. [752mm] Hg dry barometer), 77° F (25° C) intake air temperature, using No. 2 diesel or a fuel corresponding to ASTM D2.

All data is subject to change without notice.

Altitude Above Which Output Should be Limited - ft. (m) 300 (91)
- Correction Factor per 1000 ft. (300 m) above Altitude Limit 3%

Temperature Above Which Output Should be Limited -°F (°C) 77 (25)
- Correction Factor per 10°F (11°C) Above Temperature Limit 1% (2%)

FM Approved and UL Listed Ratings For: 6BTA5.9F1

Listed/ Approved Ratings BHP (kW)	Engine Speed RPM	Ventilation Air Required for Combustion CFM (litre/s)	Heat Rejection to Coolant BTU/min (kW)	Heat Rejection to Ambient Air* BTU/min (kW)	Exhaust Gas Flow CFM (litre/s)	Exhaust Gas Temp. °F (°C)	Fuel Consumption Gal/h (litre/h)
208 (155)	2100	385 (181)	7280 (128)	955 (27)	953 (449)	815 (435)	10.4 (39.4)
182 (136)	1760	283 (133)	6279 (110)	715 (20)	745 (351)	890 (476)	9.2 (35)

* - Does not include exhaust piping.

Cummins Engine Company, Inc.

Exhaust Emissions Data Sheet

Data Sheet: DS-9374
Date: 12May97

Engine

Model:	6BTA5.9-F1	**Application:**	Firepump
Type:	4 cycle, In-Line, 6 Cylinder Diesel	**Config. Number:**	D403018FX02
Aspiration:	Turbocharged and Aftercooled	**Bore:**	4.02 in. (102 mm)
Compression Ratio:	15.5:1	**Stroke:**	4.72 in. (120 mm)
Emissions Control Device:	Turbo, Aftercooling	**Displacement:**	359 cu. in. (5.9 liters)

Performance Data	2100 RPM	1760 RPM
BHP	208	182
Fuel Consumption (gallons/hour)	10.4	9.0
Air to Fuel Ratio	23.0	19.1
Exhaust Gas Flow (CFM)	953	745
Exhaust Gas Temperature (^{o}F)	815	890

Exhaust Emissions Data

(All values are grams/hp-hour)

Component		2100 RPM	1760 RPM
HC	(Total Unburned Hydrocarbons)	1.13	0.77
NOx	(Oxides of Nitrogen as NO_2)	4.58	4.94
CO	(Carbon Monoxide)	2.60	1.31
PM	(Particulate Matter)	0.25	0.25
SO_2	(Sulfur Dioxide)	0.62	0.63
CO_2	(Carbon Dioxide)	510	520
N_2	(Nitrogen)	2800	2400
O_2	(Oxygen)	320	180
H_2O	(Water Vapor)	190	190

Test Conditions

Data was recorded during steady-state rated engine speed ($\pm$ 25 RPM) with full load ($\pm$ 2%). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	ASTM D975 No. 2-D diesel fuel with 0.2% sulfur content (by weight) and 42-50 cetane number.
Fuel Temperature:	99^{o} F $\pm$ 9^{o} (at fuel pump inlet)
Intake Air Temperature:	77^{o} F $\pm$ 9^{o}
Barometric Pressure:	29.6 in. Hg $\pm$ 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H_2O/lb. dry air

The HC, NOx, and CO emissions data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimates. This data is subject to instrumentation, measurement, and engine-to-engine variability. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

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Attachment 4

Auxiliary Burner Fuel Usage Documentation

This file is being provided electronically via email to Oregon DEQ.

The Excel Spreadsheet “GHG Reporting 2021 rev 8.15.22” has been verified by a third party and lists the amount of Natural Gas (NG) consumed by each boiler during 2021. The NG usage value is reported in Therms and converted to million standard cubic feet (mmscf) using the conversion factors of 0.1 MMBtu/therm and 1,026 MMBtu/mmscf as provided in Table C-1 of 40 CFR Part 98, Subpart C.

Unit 1 used 333,634 Therms or 33 mmscf of NG

Unit 2 used 229,027 Therms or 22 mmscf of NG

Attachment 5

Exempt TEU Justifications

COVANTA MARION'S AIR POLLUTION CONTROL EQUIPMENT'S REAGENT HANDING AND STORAGE EQUIPMENT SHOULD BE CLASSIFIED BY CAO AS AN EXEMPT TEU AND CATEGORICALLY AS TRACE SINCE THE ACTIVITIES OF RECEIVING, STORING AND USING THE REAGENTS ARE UNLIKELY TO EMIT TOXIC AIR CONTAMINANTS IN GREATER THAN TRACE AMOUNTS

Covanta Marion's Title V Permit (24-5398-TV-01) has permit conditions that list the reagent receiving and storage silos of pebble and dolomitic lime, aqueous ammonia and powdered activated carbon and their associated air pollution control equipment that limits any fugitive reagent from being released to the environment, as follows:

Title V Permit Conditions 4, 6 and Table 1:

Emission Unit ID Aggregate Insignificant (AI)

Emissions unit AI activities include the following:

b. Pneumatic delivery of pebble and dolomitic lime into the storage silos, which are equipped with baghouses.

c. Pneumatic delivery of powdered activated carbon to the carbon storage silo which is equipped with a baghouse.

The facility receives deliveries of dolomitic and pebble lime, and powdered activated carbon into storage silos on an as-needed basis.

These materials are transferred pneumatically from the delivery trucks into the silos. The silos are equipped with baghouses to control particulate matter emissions.

The combined particulate matter emissions from these activities are less than 0.153 tons/year as shown on Page 25 of Appendix A (attached).

NOx Controls:

The principal components of the system include: an aqueous ammonia storage tank, an ammonia feed pump skid, a carrier water supply from the existing

demineralized water system, a purge air system, and injection nozzles. The storage tank is closed and is equipped with a diked safety system, which includes ammonia monitoring equipment to prevent any release of ammonia.

Covanta Marion data for the 2021 monthly and annual APC reagents delivered is attached. Any reagent data from prior years can be made available upon request.

The APC reagent's MSDS's are attached.

EXPERTISE | RELIABILITY | COMPLIANCE

Section 1. Identification of Product and Company

Supplier
ADA
8051 E. Maplewood, Suite 210
Greenwood Village, CO 80111-4742
Telephone Number: 888-843-8416

Manufacturer
ADA
Red River Mine Rd.
Coushatta, LA 71109
Telephone Number: 888-843-8416

Supplier Emergency Contacts & Phone Number
CHEMTREC: 800-424-9300

Manufacturer Emergency Contacts & Phone Number
CHEMTREC: 800-424-9300

Product Name: S PAC, PowerPAC®, PowerPAC Premium®, PowerPAC Premium Plus™, PowerPAC WS™, FastPAC®, FastPAC Premium®, FastPAC Platinum™, FastPAC Platinum Plus™, FastPAC NH™, PowerPAC NH™ FastPAC Platinum TR™

CAS Number: 7440-440

Product/Material Uses

Powdered carbon sorbent for vapor-phase mercury removal in flue gas, primarily in coal-fired power plants.

Section 2. Hazard(s) Identification

GHS Classification

WARNING:

Hazard and Precautionary Statements

H316: Causes mild skin irritation.
H320: Causes eye irritation.
H335: May cause respiratory irritation.

P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P261: Avoid breathing dust/fume/gas/ mist/ vapors/ spray.
P281: Use personal protective equipment as required.
P285: In case of inadequate ventilation wear respiratory protection.

Dust explosion potential, avoid ignition sources; such as flame, sparks and extended high heat. Avoid dust dispersions (clouds) in a confined space.

Activated carbon (especially when wet) removes oxygen from air and can lower the concentration of oxygen inside vessels and other confined spaces. Activated carbon is an eye irritant and eye protection must be worn when handling. Avoid breathing dust; product contains particles less than 10 microns, which are considered a nuisance dust under OSHA guidelines. High airborne concentrations of low-toxicity dusts may cause coughing, sneezing, and mild temporary irritation. Respiratory protection must be worn when excess dusting occurs.

Store in sealed containers in a clean cool, dry, well-ventilated area away from strong oxidizers, ignition sources, combustible materials, and heat. Do not store near, or allow contact with, moisture or strong oxidizers. Dispose in accordance with applicable federal, state, and local government regulations. Dispose in accordance with applicable federal, state, and local government regulations.

Primary Routes of Entry

Inhalation

May cause respiratory irritation, mild gastrointestinal tract irritation and diarrhea.

High airborne concentrations of low-toxicity dusts may cause coughing, sneezing, and mild temporary irritation.

Avoid use in confined spaces. Wet activated carbon can absorb and deplete oxygen from the air, causing a severe hazard to workers.

Skin Hazards

Prolonged or repeated skin contact may cause irritation, drying, and redness.

Eye Hazards

Dust may cause mild mechanical irritation.

Ingestion Hazards

May cause mild gastrointestinal tract irritation and diarrhea.

Carcinogenicity - See Section 11.

Section 3. Composition/Information on Ingredients

Ingredient Name	CAS Number	Percent of Total Weight
Carbon, activated	7440-44-0	85–100
Non-relevant Chemicals per 29 CFR 1910.1200	Not given	0-15

Section 4. First Aid Measures

Inhalation

May cause respiratory irritation.

High airborne concentrations of low-toxicity dusts may cause coughing, sneezing, and mild temporary irritation.

Avoid use in confined spaces. Wet activated carbon can absorb and deplete oxygen from the air, causing a severe hazard to workers.

Remove person from source of exposure and into fresh air. Get medical attention if irritation or breathing difficulties develop.

Skin

Prolonged or repeated skin contact may cause irritation, drying, and redness.

Wash affected areas with soap and water. Get medical attention immediately if irritation develops.

Eye

Dust may cause mild mechanical irritation.

Hold eyelids apart and flush eyes with copious amounts of water for at least 20 minutes.

Fine particles of activated carbon may not be detected in the eyes following an exposure event, so appropriate medical attention is advised.

Ingestion

May cause mild gastrointestinal tract irritation and diarrhea.

If person is fully conscious, give one or two cups of water or milk to drink. Get medical attention immediately if large quantities are ingested.

Section 5. Fire-Fighting Measures

Fire and Explosion Hazards

High dust concentrations may form explosive mixtures with air, which can be ignited by spark or flame. Dusts may accumulate a static charge. Explosivity: Class ST 1.

Fire is possible at elevated temperatures or by self-heating when exposed to strong oxidizers. Activated carbon tends to burn slowly without producing smoke or flame. Material allowed to smolder for long periods in enclosed spaces may produce carbon monoxide, which may reach a lower explosive limit for carbon monoxide (12.5%) in air. Wet activated carbon depletes oxygen from the air. Thermal decomposition may produce toxic gases of oxides of carbon, sulfur, nitrogen, sodium and nitriles of carbon.

Warning: Electrostatic precipitator and baghouse hoppers containing powdered activated carbon or fly ash with activated carbon can auto ignite and present a smoldering fire hazard when exposed to elevated temperature and other sources of heat, such as heaters. If activated carbon is present, hoppers should be emptied frequently and particular care should be exercised when hopper heaters are in use. Cutting or welding operations should not be used near this material due to potential for smoldering combustion. This material is not a self-heating material as classified for transportation.

Extinguishing Media

In case of fire use dry chemical, N2 or CO2. Use water to cool fire-exposed containers. Water will be adsorbed by activated carbon and will displace surface oxygen. Upon drying activated carbon will passivate with oxygen which will cause localized heat build-up. Use water only when necessary.

Fire-Fighting Instructions

Firefighters should wear self-contained breathing apparatus and full protective gear. Remove product from building to a non-hazardous area, preferably outdoors, if safe to do so.

Section 6. Accidental Release Measures

In case of inadequate ventilation to control dust, use NOISH-approved respirator for particulates (e.g., N95). Safety glasses with side shields are recommended as minimum industrial eye protection. Protective gloves are recommended to minimize skin contact. Wash thoroughly with soap and water after handling. Provide maximum dilution or appropriate exhaust ventilation. Avoid generating dust. Pick up released product with appropriate implements and return to original container if reusable or dispose.

Section 7. Handling and Storage

Handling Precautions

Follow good handling and housekeeping practices. Avoid spills and accumulations of dust, or generation of airborne dust.

Do not enter places where bulk material is used or stored until adequately ventilated to prevent asphyxiation.

As with all finely divided materials, precautions should be taken to avoid inhalation and eye contact. Ground all transfer, blending, and dust collecting equipment to prevent static discharge in accordance with NFPA 70, National Electric Code," NFPA 499, "Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas," NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids," and OSHA Combustible Dust standards. Minimize ignition sources from enclosed material handling, transfer and processing areas where dust may be present.

If activated carbon is present, hoppers should be emptied frequently and particular care should be exercised when hopper heaters are in use. Cutting or welding operations should not be used near this material.

Storage Precautions

Store in sealed containers in a clean cool, dry, well-ventilated area away from strong oxidizers, ignition sources, combustible materials, and heat. Do not store near, or allow contact with, moisture or strong oxidizers.

Warning: Wet activated carbon depletes oxygen, creating oxygen-deficient atmospheres in confined spaces.

Work/Hygienic Practices

Wash thoroughly with soap and water after handling.

Section 8. Exposure Controls/Personal Protection

Lower Explosive Limit: N/A
Upper Explosive Limit: N/A

Engineering Controls

Use with adequate general and local exhaust ventilation to prevent excessive airborne dust concentrations. Local exhaust ventilation should be provided, to maintain exposures below recommended occupational exposure limits. Confined spaces where activated carbon is present should be well ventilated and monitored for oxygen content.

Eye/Face Protection

Safety glasses with side shields are recommended as minimum industrial eye protection when handling bulk product or performing spill cleanup.

Skin Protection

Protective gloves are recommended to minimize skin contact. Use a lab coat or disposable coveralls to prevent excessive contamination to personal clothing.

Respiratory Protection

In case of inadequate ventilation to control dust, use NOISH-approved respirator for particulates (e.g., N95). Supplied air respirators may be needed for entering confined spaces where product is stored or handled to protect against oxygen deficiency. Always follow specific company confined space entry procedures.

Ingredients – Exposure Limits

Carbon, activated.

OSHA PEL-TWA: 15 mg/m^3, total dust, as particulates not otherwise specified.
OSHA PEL-TWA: 5 mg/m^3, respirable dust, as particulates not otherwise specified.

Section 9. Physical and Chemical Properties

Appearance	grey to black, free flowing powder
Odor	slight sulfur odor may be present
Odor threshold	Not available
pH	5-12
Melting point/freezing point	Not available
Initial boiling point and boiling range	Not available
Flash Point	Not available
Evaporation rate	Not available
Flammability (solid/gas)	Not available
Vapor pressure	Not available
Vapor Density	Not available
Relative Density (Tapped)	0.4-0.7 g/ml
Solubility	Activated carbon is not soluble in water
Partition coefficient: n-octanol/water	NA
Auto-ignition temperature	> 400 °C
Decomposition Temperature	NA
Viscosity	NA

Section 10. Stability and Reactivity

Reactivity: Powdered activated carbons adsorbs most chemical compounds some may be reacted to the Surface of the carbon.

Stability: Stable under ordinary conditions of shipment, storage, and use.

Possibility of Hazardous Reactions

No hazardous reactions are known. Activated carbon is a known health and environmental control for hazardous material.

Conditions to Avoid

Concentrated strong acids and bases at high concentration. Avoid getting the activated carbon wet with drying cycles, as passivation of the surfaces may release heat.

Incompatible Materials

Avoid contact with strong oxidizing agents such as sulfuric acid and nitric acid.

Hazardous Decomposition Products

Thermal decomposition ("burning") may produce irritating toxic gases of oxides or hydrides of carbon, sulfur, nitrogen, sodium and nitriles of carbon. The exact chemicals formed depend on many factors including temperature, oxygen content and heating rate.

Section 11. Toxicological Information

Ingredients – Toxicological Data

Complete toxicological data is not available for activated carbon.

Carbon, activated.

LC50 (inhal, rat): > 64,400 mg/m^3

LD50 (oral, rat): > 10,000 mg/kg

Chronic/Carcinogenicity

The product is not listed as potentially carcinogenic by NTP, IARC, OSHA, or ACGIH. Contains a component (crystalline silica) that is listed by IARC as group 1, by ACGIH as group A2, and by NTP as a known human carcinogen.

Section 12. Ecological Information

Ecotoxicological Information

Ecotoxicity

No information available for the product. However, ecotoxicity is expected to be minimal.

Persistence and Degradability

Activated carbon is not biodegradable.

Bioaccumulative Potential

No information available for the product.

Mobility in Soil

No information available for the product.

Other Adverse Effects

This material will increase the conductivity of water by increasing dissolved solids. Activated carbon may exhibit characteristics of the adsorbed material.

Section 13. Disposal Considerations

Dispose in accordance with applicable federal, state, and local government regulations.

When used for mercury sorption in most combustion flue gas, and mixed with combustion residues such as fly ash, the spent product is typically non-hazardous. Spent granular activated carbon may be recyclable, although in special situations the spent material could be a hazardous waste. Dispose of material in approved landfill. Avoid dispersal of spilled material and runoff into soil waterways, drains, and sewers.

Section 14. Transport Information

Additional Shipping Paper Description

UN Number: 1362

Shipping name: Activated Carbon.

Transport hazard class(es): NA

Packing group: NA
Environmental Hazards: NA
This product is NOT considered spontaneously combustible under the “Self-Heating Test for Carbon” protocol listed in the United Nations Manual of Tests and Criteria [33.3.1].

Section 15. Regulatory Information

U.S. Regulatory Information

Toxic Substance Control Act (TSCA): All ingredients of the product are listed on the TSCA 8(b) Chemical Substance Inventory or are exempt.

Product is subject to SARA 311/312: See section 2 for more information.

Product does not have a CERCLA RQ.

SARA Section 313 Notification

This product does not contain any ingredients regulated under Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 or 40 CFR 372.

Canadian Regulatory Information

Product is not regulated or controlled under WHMIS (Canada). This product is not classifiable as hazardous under the Canadian Hazardous Products Act (HPA). DSL: 6798

California Proposition 65

This product contains the following Proposition 65 chemicals.

Chemical Name	California Proposition 65
Quartz (respirable) 14808-60-7 (<10)	Carcinogen

Section 16. Other Information

NFPA Rating
Health: 1
Fire: 1
Reactivity: 0

HMIS Rating
Health: 0
Fire: 0
Reactivity: 0
Personal Protection: B

Disclaimer

This information relates to the product designated herein and does not relate to its use in combination with any other material or in any other process. To the best of ADA Carbon Solutions (Red River), LLC's and ADA-ES, Inc.'s knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability, and completeness are not guaranteed. Users are responsible to verify this data for their own particular use and they assume all risks of their reliance upon information contained herein. ADA Carbon Solutions (Red River), LLC and ADA-ES, Inc., shall under no circumstances be liable for incidental or consequential damages as a result of reliance upon information contained herein.

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GRAYMONT

SAFETY DATA SHEET

HIGH CALCIUM QUICKLIME

Section 1. Identification

GHS product identifier : HIGH CALCIUM QUICKLIME

Product code : Not available.

Other means of identification : Lime, Quicklime, Calcium Oxide, Burnt Lime, Unslaked Lime, Fluxing Lime.

Product type : Solid.

Relevant identified uses of the substance or mixture and uses advised against

Identified uses
Neutralization, flocculation, flux(met.), caustic agent, absorption, stabilization.

Supplier/Manufacturer : GRAYMONT
#200-10991 Shellbridge Way
Richmond, BC V6X 3C6
Canada
Phone: 1 604 207-4292
Toll free: 1 866 207-4292
Fax: 1 604 207-9014
Web Site: http://www.graymont.com/

Emergency telephone number (with hours of operation) : CHEMTREC, US (800-424-9300)
INTERNATIONAL: (703-527-3887)

Section 2. Hazards identification

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

Classification of the substance or mixture : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
CARCINOGENICITY - Category 1A
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Section 2. Hazards identification

Hazard statements : H315 - Causes skin irritation.
H318 - Causes serious eye damage.
H335 - May cause respiratory irritation.
H350 - May cause cancer. (inhalation)
H372 - Causes damage to organs through prolonged or repeated exposure. (respiratory tract)

Precautionary statements

Prevention : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P280 - Wear protective gloves, protective clothing and eye or face protection.
P271 - Use only outdoors or in a well-ventilated area.
P260 - Do not breathe dust.
P270 - Do not eat, drink or smoke when using this product.
P264 - Wash thoroughly after handling.

Response : P308 + P313 - IF exposed or concerned: Get medical advice or attention.
P304 + P340, P312 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.
P362 + P364 - Take off contaminated clothing and wash it before reuse.
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P332 + P313 - If skin irritation occurs: Get medical advice or attention.
P305 + P351 + P338, P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.

Storage : P401 - Store to minimize dust generation.

Disposal : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements : Not applicable.

Hazards not otherwise classified : Reacts violently with water, generating heat which can ignite combustible materials.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Lime, Quicklime, Calcium Oxide, Burnt Lime, Unslaked Lime, Fluxing Lime.

Ingredient name	%	CAS number
Calcium oxide	≥90	1305-78-8
Crystalline silica, respirable powder	0.0001 - 1	14808-60-7

Crystalline silica has been found in some products at or above detection level 0.1%. Concentration is dependent upon limestone source.

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician.

Inhalation : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. When used under normal conditions quicklime doesn't generate fumes. However dust (Particulates) may be generated. Use dust-mask if dust is present. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : May cause respiratory irritation.

Skin contact : Causes skin irritation.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
burning sensation

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : Adverse symptoms may include the following:
stomach pains

Section 4. First aid measures

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical fire extinguisher.

Unsuitable extinguishing media : Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of quicklime.

Specific hazards arising from the chemical : Not applicable.

Hazardous thermal decomposition products : None.

Special protective actions for fire-fighters : First move people out of line-of-sight of the scene and away from windows.

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.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Move containers from spill area. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

Large spill : Move containers from spill area. Do not use water on bulk material spills. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous.

Advice on general occupational hygiene : 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. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : 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. Store to minimize dust generation. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Calcium oxide	**ACGIH TLV (United States, 3/2019).** TWA: 2 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 2 mg/m³ 10 hours. **OSHA PEL (United States, 5/2018).** TWA: 5 mg/m³ 8 hours.
Crystalline silica, respirable powder	**OSHA PEL Z3 (United States, 6/2016).** TWA: 250 mppcf 8 hours. Form: Respirable TWA: 10 mg/m³ 8 hours. Form: Respirable TWA: 5 mg/m3 Form: Respirable fraction TWA: 15 mg/m3 Form: Total dust **NIOSH REL (United States, 10/2016).** TWA: 0.05 mg/m³ 10 hours. Form: Respirable dust TWA: 5 mg/m3 Form: Respirable fraction TWA: 10 mg/m3 Form: Total dust **OSHA PEL (United States, 5/2018).** TWA: 50 µg/m³ 8 hours. Form: Respirable dust **ACGIH TLV (United States, 3/2019).**

Section 8. Exposure controls/personal protection

	TWA: 0.025 mg/m³ 8 hours. Form: Respirable fraction **MSHA PEL** TWA 8/40 hours: 30 mg/m3/(%SiO2)+2 mg/m3 Form: Total dust 10 mg/m3/(%SiO2)+2 mg/m3 Form: Respirable dust

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Engineering controls may be required to control the primary or secondary risks associated with 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.

Individual protection measures

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.

Eye/face protection : 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, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : 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.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, particulate filter 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. Wear an appropriate NIOSH approved respirator if concentration levels exceed the safe exposure limits.

Section 9. Physical and chemical properties

Appearance

Physical state : Solid. [Crystalline.]

Color : White.

Odor : Odorless + soil like smell.

Odor threshold : Not available.

pH : 12.45 [Sat. soln.] at 25°C

Melting point : 2570 to 2625°C (4658 to 4757°F)

Boiling point : 2850°C (5162°F)

Flash point : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Not available.

Relative density : 3.25 to 3.28

Solubility in water : 0.125 g/100 g at 20°C

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

Flow time (ISO 2431) : Not available.

Section 10. Stability and reactivity

Reactivity : Reacts violently with strong acids. Reacts with water to form Calcium Hydroxide. The heat generated when mixed with water or moist air is sufficient to ignite surrounding materials such as paper, wood or cloth.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Exothermic reaction to water.

Conditions to avoid : Do not allow quicklime to come into contact with incompatible materials. e.g. Water, acids, reactive fluoridated compounds, reactive brominated compounds, reactive powdered metals, organic acid anhydrides, nitro-organic compounds, reactive phosphorous compounds, interhalogenated compounds.

Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials, acids and moisture.

Hazardous decomposition products : None.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

There is no data available.

Irritation/Corrosion

There is no data available.

Sensitization

There is no data available.

Mutagenicity

There is no data available.

Carcinogenicity

Classification

Product/ingredient name	OSHA	IARC	NTP
Crystalline silica, respirable powder	-	1	Known to be a human carcinogen.

Reproductive toxicity

There is no data available.

Teratogenicity

There is no data available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Calcium oxide	Category 3	-	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Crystalline silica, respirable powder	Category 1	inhalation	respiratory tract

Aspiration hazard

There is no data available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : May cause respiratory irritation.

Skin contact : Causes skin irritation.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Section 11. Toxicological information

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
burning sensation

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : Adverse symptoms may include the following:
stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : No known significant effects or critical hazards.

Potential delayed effects : No known significant effects or critical hazards.

Long term exposure

Potential immediate effects : No known significant effects or critical hazards.

Potential delayed effects : No known significant effects or critical hazards.

Potential chronic health effects

General : Causes damage to organs through prolonged or repeated exposure.

Carcinogenicity : May cause cancer if inhaled. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

There is no data available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Calcium oxide	Chronic NOEC 100 mg/L Fresh water	Fish - Oreochromis niloticus - Juvenile (Fledgling, Hatchling, Weanling)	46 days

Persistence and degradability

There is no data available.

Section 12. Ecological information

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Calcium oxide	-	2.34	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

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

Section 13. Disposal considerations

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

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	UN1910
UN proper shipping name	-	-	CALCIUM OXIDE
Transport hazard class(es)	-	-	8 
Packing group	-	-	III
Environmental hazards	No.	No.	No.

AERG : 157

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

CEPA/ DSL: All components are listed or exempted.

RCRA classification: Calcium Oxide is not listed or classified.

CWA-311: Calcium Oxide has been withdrawn from the Clean Water Act (CWA) list of hazardous substances. (11/13/79) (44FR65400).

CERCLA: Calcium Oxide is not listed.

FDA: Calcium Oxide has been determined as “Generally Recognized As Safe” (GRAS) by FDA. See 21CFR184.1210. (CFR Title 21 Part 184 - - Direct food substances affirmed as generally recognized as safe).

RCRA classification: Calcium Oxide is not listed or classified.

CWA-311: Calcium Oxide has been withdrawn from the Clean Water Act (CWA) list of hazardous substances. (11/13/79) (44FR65400).

CERCLA: Calcium Oxide is not listed.

FDA: Calcium Oxide has been determined as “Generally Recognized As Safe” (GRAS) by FDA. See 21CFR184.1210. (CFR Title 21 Part 184 - - Direct food substances affirmed as generally recognized as safe).

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
CARCINOGENICITY - Category 1A
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

Composition/information on ingredients

Name	%	Classification
Calcium oxide	≥90	SKIN CORROSION/IRRITATION - Category 2 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
Crystalline silica, respirable powder	0.0001 - 1	CARCINOGENICITY - Category 1A SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

Section 15. Regulatory information

State regulations

Massachusetts : The following components are listed: Calcium oxide; Crystalline silica, respirable powder

New York : None of the components are listed.

New Jersey : The following components are listed: Calcium oxide; Crystalline silica, respirable powder

Pennsylvania : The following components are listed: Calcium oxide; Crystalline silica, respirable powder

California Prop. 65

⚠ **WARNING**: This product can expose you to Crystalline silica, respirable powder, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
Crystalline silica, respirable powder	-	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan : **Japan inventory (ENCS)**: All components are listed or exempted.
Japan inventory (ISHL): Not determined.

New Zealand : All components are listed or exempted.

Philippines : All components are listed or exempted.

Republic of Korea : All components are listed or exempted.

Taiwan : All components are listed or exempted.

Thailand : Not determined.

Turkey : All components are listed or exempted.

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

Viet Nam : All components are listed or exempted.

Section 16. Other information

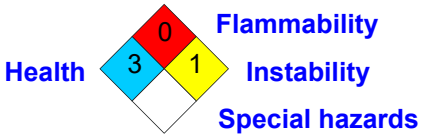
Hazardous Material Information System (U.S.A.)

Health	*	3
Flammability		0
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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



Procedure used to derive the classification

Classification	Justification
SKIN CORROSION/IRRITATION - Category 2	Expert judgment
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1	On basis of test data
CARCINOGENICITY - Category 1A	Expert judgment
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1	Calculation method

History

Date of issue/Date of revision : 06/15/2020

Date of previous issue : 02/15/2019

Version : 5

Prepared by : KMK Regulatory Services Inc.

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
SGG = Segregation Group
UN = United Nations

References : Not available.

Section 16. Other information

Notice to reader

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

GRAYMONT

SAFETY DATA SHEET

DOLOMITIC HYDRATED LIME

Section 1. Identification

GHS product identifier : DOLOMITIC HYDRATED LIME

Product code : Not available.

Other means of identification : Hydrated dolomitic lime ($Ca(OH)_2MgO$), Double hydrated dolomitic lime ($CaMg(OH)_4$)

Product type : Solid.

Relevant identified uses of the substance or mixture and uses advised against

Identified uses
Neutralization, flocculation, stabilization, polishing, masonry mortar, plaster, stucco, fresco paints and lime wash.

Supplier/Manufacturer : GRAYMONT
#200-10991 Shellbridge Way
Richmond, BC V6X 3C6
Canada
Phone: 1 604 207-4292
Toll free: 1 866 207-4292
Fax: 1 604 207-9014
Web Site: http://www.graymont.com/

Emergency telephone number (with hours of operation) : CHEMTREC, US (800-424-9300)
INTERNATIONAL: (703-527-3887)

Section 2. Hazards identification

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

Classification of the substance or mixture : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
CARCINOGENICITY - Category 1A
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Section 2. Hazards identification

Hazard statements : H315 - Causes skin irritation.
H318 - Causes serious eye damage.
H335 - May cause respiratory irritation.
H350 - May cause cancer. (inhalation)
H372 - Causes damage to organs through prolonged or repeated exposure. (respiratory tract)

Precautionary statements

Prevention : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P280 - Wear protective gloves, protective clothing and eye or face protection.
P271 - Use only outdoors or in a well-ventilated area.
P260 - Do not breathe dust.
P270 - Do not eat, drink or smoke when using this product.
P264 - Wash thoroughly after handling.

Response : P308 + P313 - IF exposed or concerned: Get medical advice or attention.
P304 + P340, P312 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.
P362 + P364 - Take off contaminated clothing and wash it before reuse.
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P332 + P313 - If skin irritation occurs: Get medical advice or attention.
P305 + P351 + P338, P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.

Storage : P401 - Store to minimize dust generation.

Disposal : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Hydrated dolomitic lime ($Ca(OH)_2MgO$),
Double hydrated dolomitic lime ($CaMg(OH)_4$)

Ingredient name	%	CAS number
Calcium Hydroxide	≥50 - ≤75	1305-62-0
Magnesium oxide	≥50 - ≤75	1309-48-4
Crystalline silica, respirable powder	0.0001 - 1	14808-60-7

Crystalline silica has been found in some products at or above detection level 0.1%. Concentration is dependent upon limestone source.

Any concentration shown as a range is to protect confidentiality or is due to batch variation. If a generic chemical name is shown and/or the CAS number is not disclosed, the specific chemical identity has been withheld as a trade secret.

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

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician. Get medical attention immediately. Call a poison center or physician.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : May cause respiratory irritation.

Skin contact : Causes skin irritation.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
burning sensation

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : Adverse symptoms may include the following:
burning sensation
abdominal cramps and pain
vomiting

Section 4. First aid measures

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : No specific fire or explosion hazard.

Hazardous thermal decomposition products : None.

Special protective actions for fire-fighters : No special measures are required.

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.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Move containers from spill area. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous.

Advice on general occupational hygiene : 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. See also Section 8 for additional information on hygiene measures.

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

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Calcium Hydroxide	**OSHA PEL (United States, 5/2018).** TWA: 5 mg/m³ 8 hours. Form: Respirable fraction TWA: 15 mg/m³ 8 hours. Form: Total dust **ACGIH TLV (United States, 3/2020).** TWA: 5 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 5 mg/m³ 10 hours. **MSHA PEL** TWA 8/40 hours: 5 mg/m^3
Magnesium oxide	**ACGIH TLV (United States, 3/2020).** TWA: 10 mg/m³ 8 hours. Form: Inhalable fraction **OSHA PEL (United States, 5/2018).** TWA: 15 mg/m³ 8 hours. Form: Total particulates
Crystalline silica, respirable powder	**OSHA PEL Z3 (United States, 6/2016).** TWA: 250 mppcf 8 hours. Form: Respirable TWA: 10 mg/m³ 8 hours. Form: Respirable TWA: 5 mg/m3 Form: Respirable fraction TWA: 15 mg/m3 Form: Total dust

Section 8. Exposure controls/personal protection

	NIOSH REL (United States, 10/2016). TWA: 0.05 mg/m³ 10 hours. Form: Respirable dust TWA: 5 mg/m3 Form: Respirable fraction TWA: 10 mg/m3 Form: Total dust **OSHA PEL (United States, 5/2018).** TWA: 50 µg/m³ 8 hours. Form: Respirable dust **ACGIH TLV (United States, 3/2020).** TWA: 0.025 mg/m³ 8 hours. Form: Respirable fraction **MSHA PEL** TWA 8/40 hours: 30 mg/m3/(%SiO2)+2 mg/m3 Form: Total dust 10 mg/m3/(%SiO2)+2 mg/m3 Form: Respirable dust

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Engineering controls may be required to control the primary or secondary risks associated with 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.

Individual protection measures

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.

Eye/face protection : 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, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : 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.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Section 8. Exposure controls/personal protection

Respiratory protection : Use a properly fitted, particulate filter 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. Wear an appropriate NIOSH approved respirator if concentration levels exceed the safe exposure limits.

Section 9. Physical and chemical properties and safety characteristics

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

Physical state : Solid. [Fine powder.]

Color : White.

Odor : Sweet, soil like odor.

Odor threshold : Not available.

pH : 12.45 [Sat. soln.] at 25°C

Melting point/freezing point : Not available.

Boiling point, initial boiling point, and boiling range : Not available.

Flash point : Not applicable.

Evaporation rate : Not available.

Flammability : Not available.

Lower and upper explosion limit/flammability limit : Not applicable.

Vapor pressure : Not available.

Relative vapor density : Not applicable.

Relative density : 2.2 to 2.6

Solubility in water : 0.1 g/100 g at 20°C

Partition coefficient: n-octanol/water : Not applicable.

Auto-ignition temperature : Not applicable.

Decomposition temperature : 345°C (653°F)

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Particle characteristics

Median particle size : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : None.

Section 10. Stability and reactivity

Conditions to avoid : Do not allow hydrated lime to come into contact with incompatible materials. e.g. acids, reactive fluoridated compounds, reactive brominated compounds. reactive powdered metals, organic acid anhydrides, nitro-organic compounds, reactive phosphorous compounds, interhalogenated compounds.

Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials and acids.

Hazardous decomposition products : None.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Calcium Hydroxide	LD50 Oral	Rat	7340 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Calcium Hydroxide	Eyes - Severe irritant	Rabbit	-	10 mg	-

Sensitization

There is no data available.

Mutagenicity

There is no data available.

Carcinogenicity

Classification

Product/ingredient name	OSHA	IARC	NTP
Crystalline silica, respirable powder	-	1	Known to be a human carcinogen.

Reproductive toxicity

There is no data available.

Teratogenicity

There is no data available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Calcium Hydroxide	Category 3	-	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Crystalline silica, respirable powder	Category 1	inhalation	respiratory tract

Aspiration hazard

There is no data available.

Section 11. Toxicological information

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : May cause respiratory irritation.

Skin contact : Causes skin irritation.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
burning sensation

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : Adverse symptoms may include the following:
burning sensation
abdominal cramps and pain
vomiting

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : No known significant effects or critical hazards.

Potential delayed effects : No known significant effects or critical hazards.

Long term exposure

Potential immediate effects : No known significant effects or critical hazards.

Potential delayed effects : No known significant effects or critical hazards.

Potential chronic health effects

General : Causes damage to organs through prolonged or repeated exposure.

Carcinogenicity : May cause cancer if inhaled. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Section 11. Toxicological information

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
Calcium Hydroxide	7340	N/A	N/A	N/A	N/A

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Calcium Hydroxide	Acute LC50 33884.4 µg/L Fresh water	Fish - Clarias gariepinus - Fingerling	96 hours

Persistence and degradability

There is no data available.

Bioaccumulative potential

There is no data available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

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

Section 13. Disposal considerations

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

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.

AERG : Not applicable

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

RCRA classification: Dolomitic Hydrated Lime is not listed or classified.
CWA-311: Dolomitic Hydrated Lime is not listed.
CERCLA: Dolomitic Hydrated Lime is not listed.
FDA: Not applicable

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Section 15. Regulatory information

Classification : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
CARCINOGENICITY - Category 1A
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

Composition/information on ingredients

Name	%	Classification
Calcium Hydroxide	≥50 - ≤75	SKIN CORROSION/IRRITATION - Category 2 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
Crystalline silica, respirable powder	0.0001 - 1	CARCINOGENICITY - Category 1A SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

State regulations

Massachusetts : The following components are listed: Calcium Hydroxide; Magnesium oxide; Crystalline silica, respirable powder

New York : None of the components are listed.

New Jersey : The following components are listed: Calcium Hydroxide; Magnesium oxide; Crystalline silica, respirable powder

Pennsylvania : The following components are listed: Calcium Hydroxide; Magnesium oxide; Crystalline silica, respirable powder

California Prop. 65

⚠ **WARNING**: This product can expose you to Crystalline silica, respirable powder, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
Crystalline silica, respirable powder	-	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

United States (TSCA 8b) : Dolomitic Hydrated Lime is subject to inventory update reporting (IUR).

Section 16. Other information

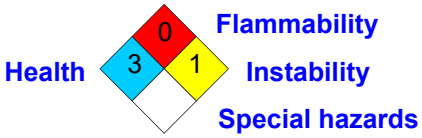
Hazardous Material Information System (U.S.A.)

Health	*	3
Flammability		0
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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



Procedure used to derive the classification

Classification	Justification
SKIN CORROSION/IRRITATION - Category 2	Expert judgment
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1	On basis of test data
CARCINOGENICITY - Category 1A	Expert judgment
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1	Calculation method

History

Date of issue/Date of revision : 08/15/2021

Date of previous issue : 06/15/2020

Version : 6

Prepared by : KMK Regulatory Services Inc.

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
SGG = Segregation Group
UN = United Nations

Section 16. Other information

Notice to reader

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

SAFETY DATA SHEET

Aqua Ammonia (5-19.9%)

Section 1. Identification

GHS product identifier : Aqua Ammonia (5-19.9%)

Other means of identification : Aqua Ammonia, Ammonium Hydroxide

Product type : Liquid.

Product use : Synthetic/Analytical chemistry.

Synonym : Aqua Ammonia, Ammonium Hydroxide

SDS # : 001196

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

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

Classification of the substance or mixture : SKIN CORROSION - Category 1B
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
AQUATIC HAZARD (ACUTE) - Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Causes severe skin burns and eye damage.
May cause respiratory irritation.
Very toxic to aquatic life.

Precautionary statements

General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Prevention : Wear protective gloves, protective clothing and eye or face protection. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Avoid breathing vapor. Wash thoroughly after handling.

Response : Collect spillage. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor. IF SWALLOWED: Immediately call a POISON CENTER or doctor. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Immediately call a POISON CENTER or doctor. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Storage : Store locked up. Store in a well-ventilated place. Keep container tightly closed.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Other means of identification : Aqua Ammonia, Ammonium Hydroxide

Product code : 001196

CAS number/other identifiers

CAS number : Not available.

Ingredient name	%	CAS number
ammonium hydroxide	100	1336-21-6

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

Inhalation : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : May cause respiratory irritation.

Skin contact : Causes severe burns.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Section 4. First aid measures

Eye contact : Adverse symptoms may include the following:, pain, watering, redness

Inhalation : Adverse symptoms may include the following:, respiratory tract irritation, coughing

Skin contact : Adverse symptoms may include the following:, pain or irritation, redness, blistering may occur

Ingestion : Adverse symptoms may include the following:, stomach pains

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst. This material is very toxic to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
nitrogen oxides

Special protective actions for fire-fighters : 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.

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.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Methods and materials for containment and cleaning up

Section 6. Accidental release measures

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

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

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Avoid release to the environment. Do not ingest. Empty containers retain product residue and can be hazardous. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Do not reuse container. Do not breathe vapor or mist.

Advice on general occupational hygiene : 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. See also Section 8 for additional information on hygiene measures.

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

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
ammonium hydroxide	None.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

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.

Individual protection measures

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.

Section 8. Exposure controls/personal protection

Eye/face protection : 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, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : 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.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Not available.

Odor : Not available.

Odor threshold : 5 ppm

pH : Not available.

Melting point : May start to solidify at the following temperature: -58°C (-72.4°F) This is based on data for the following ingredient: ammonia.

Boiling point : Lowest known value: 38°C (100.4°F) (ammonia).

Critical temperature : Not available.

Flash point : Not available.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Lower: 16%
Upper: 25%

Vapor pressure : Not available.

Vapor density : Highest known value: 0.6 to 1.2 (Air = 1) (ammonia).

Gas Density (lb/ft ^{3}) : 0.0481

Relative density : Specific gravitySpecific Gravity (S.G.): 0.9278 (19.5% @ 60 deg. F)

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : Not applicable.

Auto-ignition temperature : 651°C (1203.8°F)

Decomposition temperature : Not available.

Flow time (ISO 2431) : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

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

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

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

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
ammonium hydroxide	LD50 Oral	Rat	350 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
ammonium hydroxide	Eyes - Severe irritant Eyes - Severe irritant	Rabbit Rabbit	- -	250 ug 0.5 minutes 1 mg	- -

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
ammonium hydroxide	Category 3	-	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : May cause respiratory irritation.

Skin contact : Causes severe burns.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:, pain, watering, redness

Inhalation : Adverse symptoms may include the following:, respiratory tract irritation, coughing

Skin contact : Adverse symptoms may include the following:, pain or irritation, redness, blistering may occur

Ingestion : Adverse symptoms may include the following:, stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
ammonium hydroxide	Acute LC50 37 ppm Fresh water	Fish - Gambusia affinis - Adult	96 hours

Persistence and degradability

Not available.

Bioaccumulative potential

Section 12. Ecological information

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

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

Section 13. Disposal considerations

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

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN2672	UN2672	UN2672	UN2672	UN2672
UN proper shipping name	Ammonium Hydroxide or Ammonia solutions	Ammonium Hydroxide or Ammonia solutions	Ammonium Hydroxide or Ammonia solutions	Ammonium Hydroxide or Ammonia solutions	Ammonium Hydroxide or Ammonia solutions
Transport hazard class(es)	8 	8 	8 	8 	8 
Packing group	III	III	III	III	III
Environmental hazards	No.	Yes.	Yes. The environmentally hazardous substance mark is not required.	Yes.	Yes. The environmentally hazardous substance mark is not required.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Reportable quantity** 1000 lbs / 454 kg [2493.4 gal / 9438.7 L]. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.40-2.42 (Class 8), 2.7 (Marine pollutant mark).
The marine pollutant mark is not required when transported by road or rail.

IMDG : The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.

IATA : The environmentally hazardous substance mark may appear if required by other transportation regulations.

Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Water Act (CWA) 311: ammonia

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	ammonia	1336-21-6	100
Supplier notification	ammonia	1336-21-6	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: AMMONIUM HYDROXIDE; HOUSEHOLD AMMONIA; AMMONIUM WATER

New York : The following components are listed: Ammonium hydroxide

New Jersey : The following components are listed: AMMONIUM HYDROXIDE

Pennsylvania : The following components are listed: AMMONIUM HYDROXIDE

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Section 15. Regulatory information

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

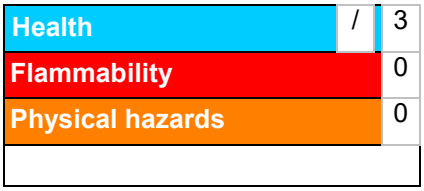
Not listed.

Inventory list

Australia	:	All components are listed or exempted.
Canada	:	All components are listed or exempted.
China	:	All components are listed or exempted.
Europe	:	All components are listed or exempted.
Japan	:	**Japan inventory (CSCL)**: All components are listed or exempted. **Japan inventory (ISHL)**: All components are listed or exempted.
New Zealand	:	All components are listed or exempted.
Philippines	:	All components are listed or exempted.
Republic of Korea	:	All components are listed or exempted.
Taiwan	:	All components are listed or exempted.
Thailand	:	All components are listed or exempted.
Turkey	:	All components are listed or exempted.
United States	:	All components are active or exempted.
Viet Nam	:	All components are listed or exempted.

Section 16. Other information

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



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The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
SKIN CORROSION - Category 1B SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 AQUATIC HAZARD (ACUTE) - Category 1	Expert judgment Calculation method Calculation method

History

Date of printing : 2/21/2022

Date of issue/Date of revision : 2/21/2022

Date of previous issue : 2/21/2022

Version : 0.03

Key to abbreviations : ATE = Acute Toxicity Estimate
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GHS = Globally Harmonized System of Classification and Labelling of Chemicals
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IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

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COVANA MARION'S WELDING OPERATIONS, BOTH WITHIN AND EXTERNAL TO THE BOILER UNITS, SHOULD BE CLASSIFIED BY CAO AS AN EXEMPT TEU AND CATEGORICALLY AS TRACE SINCE THE EMISSIONS FROM THE WELDING OPERATIONS INTERNAL TO THE BOILER ARE CONTROLLED THROUGH THE EXISTING AIR POLLUTION CONTROL EQUIPMENT AND ARE UNLIKELY TO EMIT TOXIC AIR CONTAMINANTS, EVEN IN TRACE AMOUNTS. WELDING ACTIVITIES OUTSIDE THE BOILER UNITS ARE NOT LIKELY TO EMIT TOXIC AIR CONTAMINANTS, NOT EVEN IN TRACE AMOUNTS, BASED ON MONITORING DURING WELDING OPERATIONS.

Covanta Marion's Title V Permit (24-5398-TV-01) contains a permit condition that limits any emissions from welding operations from entering, or being released to, the environment, as those welding operations are either controlled or insignificant, as follows:

Title V Permit conditions:

Insignificant Emissions Units

The Covanta Marion facility has insignificant emissions units (IEUs) that include categorically insignificant activities and aggregate insignificant emissions.

For the most part, the standards that apply to IEUs are for opacity (20% limit) and particulate matter (gr/dscf limits).

It is unlikely that IEUs could exceed an applicable emissions limit or standard because IEUs are generally equipment or activities that do not have any emission controls (e.g., small natural gas fired space heaters) and do not typically have visible emissions. Since there are no controls, no visible emissions, and the emissions are less than one ton per year, Covanta does not believe that monitoring, recordkeeping, or reporting is necessary for assuring compliance with the standards.

Welding operations during outages internal to the boiler units are controlled by the facility operating the induced draft (ID) fans such that any emissions from welding operations would be either condensed and deposited on the boiler internals (and ultimately managed with the ash residue) and/or would be collected on the fabric filter bags located in the baghouses downstream of the welding operations and upstream of the ID fan.

Welding operations occurring during outages and/or other routine maintenance activities that are external to the boiler systems, only emit ultra-trace, or non-detectable, quantities of welding rod metals. The emissions are detected only directly adjacent to the welding

operation, such as an employee welding on carbon steel, and the ultra-trace, or non-detectable, emissions have been determined by industrial hygiene monitoring of the welding operations performed by Covanta Marion employees. These welding operations typically occur approximately 15 hours a month and usually occur in the separate dedicated maintenance shop located inside the boiler building on the ground floor.

COVANTA MARION'S ASH HANDING AND STORAGE EQUIPEMENT AND ITS ASH STORAGE BUILDING SHOULD BE CLASSIFIED BY CAO AS AN EXEMPT TEU AND CATEGORICALLY AS TRACE SINCE THOSE ACTIVITIES AND THE ASH STORAGE BUILDING ARE UNLIKELY TO EMIT TOXIC AIR CONTAMINANTS IN GREATER THAN TRACE AMOUNTS

Covanta Marion's Title V Permit (24-5398-TV-01) has extensive permit conditions that limit any fugitive ash from entering, or being released to, the environment, as follows:

TV conditions (attached):

Fugitive Dust: Condition 4, especially Condition 4.c., but 4.a. and 4.b. also apply

Nuisance Conditions: Conditions 5 & 6

Visible Emissions: Table 2 and Condition 14

Fugitive Ash Testing: Condition 44

Covanta Marion has the most recent fugitive ash testing data from the 2021 TV Compliance testing on August 20, 2021 and the pertinent data sheets from the required EPA Method 22 are attached and show zero percent opacity (0%) for the required three (3) test runs.

Covanta Marion data for the 2021 monthly and annual ash handled is attached. Any ash data from prior years can be made available upon request.

Covanta Marion believes that any use of EPA AP-42 emission factors to attempt to characterize fugitive ash emissions from Covanta Marion's ash handling and storage equipment and its ash storage building would not be representative of actual fugitive emissions and will potentially overstate fugitive emissions. Covanta Marion has tested the general area of the ash storage building for eight (8) hours

and found all tested heavy metals to be non-detect using Industrial Hygiene sampling: Pb and As @ <0.5 ug/m3 and Cd @ <0.1 ug/m3.

Listed below are typical ash values from late 2021 at a similar Covanta facility (moisture values are for Covanta Marion):

Moisture: 15 to 25%

Metals (mg/kg as tested):

Cd: 22

Cu: 1300

Pb: 480

Ni: 64

Zn: 4675

Dioxins (pg/g dry)

PCDD: 1049

PCDF: 2739

Total PCDD/F: 3788

Covanta Marion, Inc.
Ash Generated
Year ending 2021

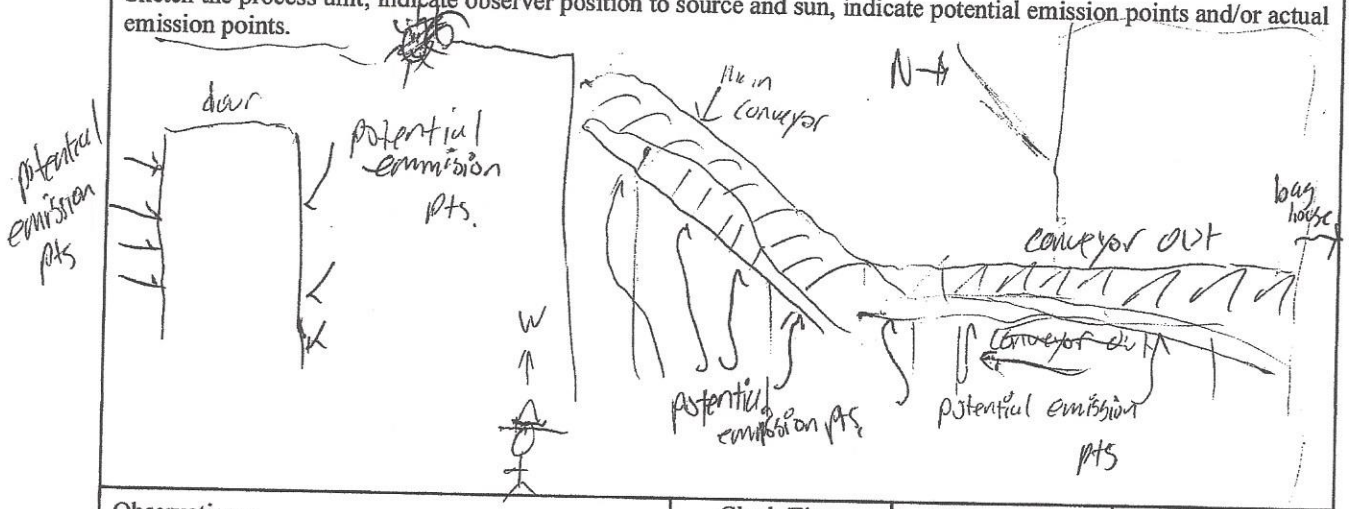
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Ash Generated	2,721	3,093	3,012	3,020	2,742	2,155	2,336	2,512	2,882	3,215	2,524	2,812	33,023

FUGITIVE EMISSION OR SMOKE EMISSION INSPECTION
OUTDOOR LOCATION

Client:	Covanta Marion	Date:	8/20/21
Plant:	Covanta Marion	Job No.:	15800
City/State:	Brooks, OR	Run No.:	ASH - M22-1
Sample Location:	Ash Handling System	Observer:	CKW
		Observer Affiliation:	AKI

Sky Conditions:	cloudy	Wind Direction:	~~S~~ SW
Precipitation:	None	Wind Speed:	3 MPH
Industry:	Waste Energy Recovery	Process Unit:	ASH HANDLING SYSTEM

Sketch the process unit; indicate observer position to source and sun, indicate potential emission points and/or actual emission points.



Observations:

*Observation time is the total time during which observation of process is conducted.

**Accumulated time is the total time that emissions are visible during the observation period.

***Percent visible is Total Accumulated Time/Total Observation Period x 100

	Clock Time 24 hr	*Observation Period min:sec	**Accumulated Time min:sec
Start	0945	0:00	0:00
Stop	1005	20:00	—
Start	1010		0:00
Stop	1030	40:00	—
Start	1035		0:00
Stop	1055	60:00	—
Start			
Stop			
Total Time		60:00	0:00
***Percent Visible	(%)		0%

Reviewer: COR

AirKinetics, Inc.

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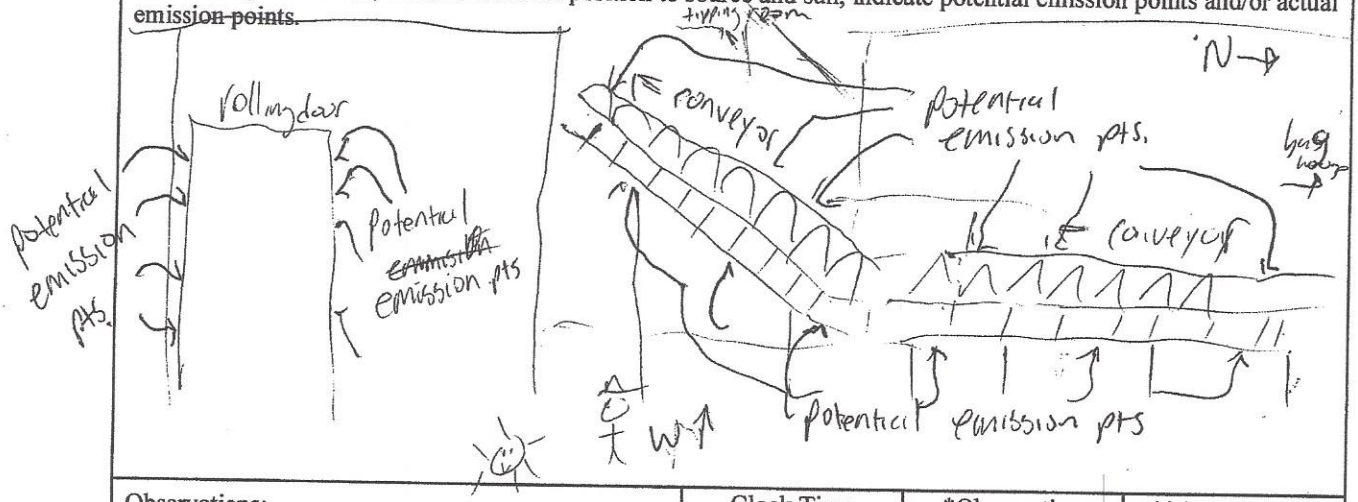
Rev. 11/99

FUGITIVE EMISSION OR SMOKE EMISSION INSPECTION
OUTDOOR LOCATION

Client:	Covanta Marion	Date:	8/20/21
Plant:	Covanta Marion	Job No.:	15800
City/State:	Brooks, OR	Run No.:	ASH-M22-2
Sample Location:	Ash Handling System	Observer:	CKW
		Observer Affiliation:	AKI

Sky Conditions:	cloudy	Wind Direction:	SW
Precipitation:	none	Wind Speed:	2 MPH
Industry:	waste energy recovery	Process Unit:	Ash Handling System

Sketch the process unit; indicate observer position to source and sun, indicate potential emission points and/or actual emission points.



Observations:		Clock Time 24 hr	*Observation Period min:sec	**Accumulated Time min:sec
*Observation time is the total time during which observation of process is conducted.	Start	1100	0:00	0:00
	Stop	1120	20:00	—
	Start	1125		0:00
	Stop	1145	10:00	—
**Accumulated time is the total time that emissions are visible during the observation period.	Start	1150		0:00
	Stop	1210	60:00	—
***Percent visible is Total Accumulated Time/Total Observation Period x 100	Start			
	Stop			
	Total Time		80:00	0:00
	***Percent Visible	(%)		0%

Reviewer: CDR

AirKinetics, Inc.

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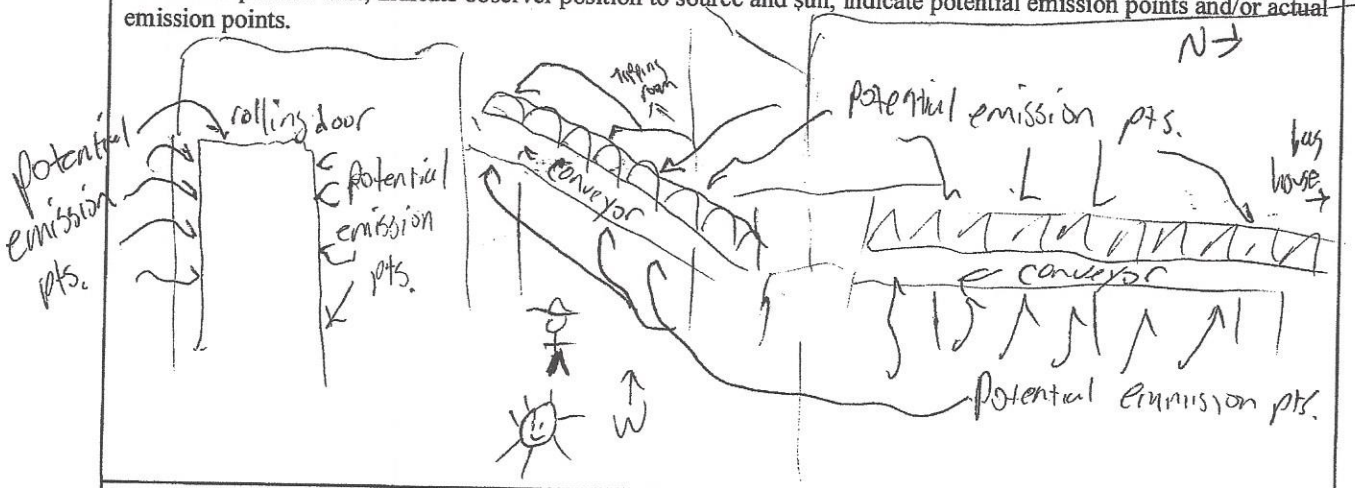
FUGITIVE EMISSION OR SMOKE EMISSION INSPECTION
OUTDOOR LOCATION

Client:	Covanta Marion	Date:	8/20/21
Plant:	Covanta Marion	Job No.:	15800
City/State:	Brooks, OR	Run No.:	ASH-MZZ-3
Sample Location:	Ash Handling System	Observer:	CKW
		Observer Affiliation:	AKI

Sky Conditions:	cloudy	Wind Direction:	SW
Precipitation:	none	Wind Speed:	2MPH
Industry:	Waste Energy Recovery	Process Unit:	Ash Handling System

Sketch the process unit; indicate observer position to source and sun, indicate potential emission points and/or actual emission points.



Observations:

*Observation time is the total time during which observation of process is conducted.

**Accumulated time is the total time that emissions are visible during the observation period.

***Percent visible is Total Accumulated Time/Total Observation Period x 100

	Clock Time 24 hr	*Observation Period min:sec	**Accumulated Time min:sec
Start	1215	0:00	0:00
Stop	1235	20:00	—
Start	1240		0:00
Stop	1300	40:00	—
Start	1305		0:00
Stop	1325	60:00	—
Start			
Stop			
Total Time		60:00	0:00
***Percent Visible	(%)		0%

Reviewer: CKW

AirKinetics, Inc.

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COVANTA MARION'S COOLING TOWER AND COOLING WATER CIRCULATING SYSTEM SHOULD BE CLASSIFIED BY CAO AS AN EXEMPT TEU AND CATEGORICALLY AS TRACE SINCE THE COOLING TOWER AND COOLING WATER CIRCULATING SYSTEM, AND ITS ASSOCIATED COOLING WATER EVAPORATION AND DRIFT, ARE UNLIKELY TO EMIT TOXIC AIR CONTAMINANTS IN OTHER THAN TRACE AMOUNTS, AND MAY IN FACT BE ABSENT OR NON-DETECTABLE.

Covanta Marion's Title V Permit (24-5398-TV-01) has extensive permit conditions that limit any fugitive emissions from entering, or being released to, the environment, as follows:

Title V permit conditions address categorically insignificant activities at the facility, including the following:

• Industrial cooling tower that does not use chromium-based water treatment chemicals

There are four (4) chemicals added to treat cooling water in the cooling tower basin. These chemicals are added periodically, and in small quantities, compared to the total amount of cooling water:

<u>Chemtreat</u>

CL5556

CL4075A

<u>Northstar</u>

Sulfuric Acid 93%

Sodium Hypochlorite 12.5%

Associated SDS's are attached. For the Northstar water treatment chemicals, only sulfuric acid and sodium hydroxide are listed TAC's by CAO and these chemicals would not be present in the cooling tower evaporation or drift since their acid and caustic properties are used to keep the cooling water at a constant pH of 7 to 8.

The cooling tower evaporation and drift will contain only ultra-trace amounts of the two Chemtreat cooling water treatment chemicals, if any at all, and, if present, these treatment chemicals will be in ultra-trace amounts in the drift, as follows:

Total amount of cooling water: over 55,000 gallons in the total cooling water system on a daily basis, with makeup water replacing cooling water evaporation and drift.

Total amounts of water treatment chemicals added:

<u>Chemtreat</u>

CL5556: 1,000 gallons per year

CL4075A: 250 gallons per year

SAFETY DATA SHEET

Section 1. Chemical Product and Company Identification

Product Name:	ChemTreat CL4075A
Product Use:	Cooling Water Treatment
Supplier's Name:	ChemTreat, Inc.
Emergency Telephone Number:	(800)424−9300 (Toll Free)
Address (Corporate Headquarters):	5640 Cox Road Glen Allen, VA 23060
Telephone Number for Information:	(800)648−4579
Date of SDS:	February 7, 2019
Revision Date:	February 7, 2019
Revision Number:	19020701AN

Section 2. Hazard(s) Identification

Signal Word: **DANGER**

GHS Classification(s):

Skin corrosion/irritation − Category 1b
Eye damage/irritation − Category 1
Acute Toxicity Dermal − Category 4
Acute Toxicity Inhalation − Category 4
Acute Toxicity Oral − Category 4

Hazard Statement(s):

H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H312 Harmful in contact with skin.
H332 Harmful if inhaled.
H302 Harmful if swallowed.

Precautionary Statement(s):

Prevention:

P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink, or smoke when using this product.
P271 Use only outdoors or in a well−ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P301 + 330 + 331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P363 Wash contaminated clothing before reuse.

Storage:

P405 Store locked up.

Disposal:

P501 Dispose of contents and container in accordance with applicable local, regional, national, and/or international regulations.

System of Classification Used:

Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Hazards Not Otherwise Classified:

None.

Section 3. Composition/Hazardous Ingredients

Component	CAS Registry #	Wt.%
1−Hydroxyethylidene−1,1−diphosphonic acid	2809−21−4	10 − 30

Comments

If chemical identity and/or exact percentage of composition has been withheld, this information is considered to be a trade secret.

Section 4. First Aid Measures

Inhalation:

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician.

Eyes:

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.

Skin:	Immediately remove/take off all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before re−use. Immediately call a poison center or doctor/physician.
Ingestion:	DO NOT INDUCE VOMITING. Rinse mouth. Call a POISON CENTER or doctor/physician.
Most Important Symptoms:	N/D
Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary:	N/A

Section 5. Fire Fighting Measures

Flammability of the Product:	Not flammable.
Suitable Extinguishing Media:	Use extinguishing media suitable to surrounding fire.
Specific Hazards Arising from the Chemical:	Use water spray to keep containers cool.
Protective Equipment:	If product is involved in a fire, wear full protective clothing including a positive−pressure, NIOSH approved, self−contained breathing apparatus.

Section 6. Accidental Release Measures

Personal Precautions:	Use appropriate Personal Protective Equipment (PPE).
Environmental Precautions:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers.
Methods for Cleaning up:	Contain and recover liquid when possible. Flush spill area with water spray.
Other Statements:	None.

Section 7. Handling and Storage

Handling: Wear appropriate Personal Protective Equipment (PPE) when handling this product. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Do not ingest. Avoid breathing vapors, mist or dust.

Storage: Store away from incompatible materials (see Section 10). Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For Industrial use only.
Store above Freeze Point.

Section 8. Exposure Controls/Personal Protection

Exposure Limits

Component	Source	Exposure Limits
1−Hydroxyethylidene−1,1−diphosphonic acid	N/E	N/E

Engineering Controls: Use only with adequate ventilation. The use of local ventilation is recommended to control emission near the source.

Personal Protection

Eyes: Wear chemical splash goggles or safety glasses with full−face shield. Maintain eyewash fountain in work area.

Skin: Maintain quick−drench facilities in work area.
Wear butyl rubber or neoprene gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact.

Respiratory: If misting occurs, use NIOSH approved organic vapor/acid gas dual cartridge respirator with a dust/mist prefilter in accordance with 29 CFR 1910.134.

Section 9. Physical and Chemical Properties

Physical State and Appearance:	Liquid, Colorless, Clear
Specific Gravity:	1.157 @ 20°C
pH:	0.5 @ 20°C, 100.0%
Freezing Point:	30°F
Flash Point:	N/D
Odor:	Mild
Melting Point:	N/A
Initial Boiling Point and Boiling Range:	212°F
Solubility in Water:	Soluble
Evaporation Rate:	<1
Vapor Density:	N/D
Molecular Weight:	N/D
Viscosity:	N/A
Flammability (solid, gas):	N/D
Flammable Limits:	N/A
Autoignition Temperature:	N/A
Density:	9.65 LB/GA
Vapor Pressure:	<17.5
% VOC:	N/D
Odor Threshold	N/D
n−octanol Partition Coefficient	N/D
Decomposition Temperature	N/D

Section 10. Stability and Reactivity

Chemical Stability:	Stable at normal temperatures and pressures.
Incompatibility with Various Substances:	Strong oxidizers, Bases.
Hazardous Decomposition Products:	Oxides of carbon, Oxides of phosphorus.
Possibility of Hazardous Reactions:	None known.
Reactivity:	N/D
Conditions To Avoid:	N/D

Section 11. Toxicological Information

Acute Toxicity

Chemical Name	Exposure	Type of Effect	Concentration	Species
1−Hydroxyethylidene−1,1−diphosphonic acid	Oral	LD50	2400 MG/KG	Rat
	Dermal	LD50	7940 MG/KG	Rabbit

Carcinogenicity Category

Component	Source	Code	Brief Description
1−Hydroxyethylidene−1,1−diphosphonic acid	N/E	N/E	N/E

Likely Routes of Exposure: N/D

Symptoms

Inhalation: N/D

Eye Contact: N/D

Skin Contact: N/D

Ingestion: N/D

Skin Corrosion/Irritation: N/D

Serious Eye Damage/Eye Irritation: N/D

Sensitization: N/D

Germ Cell Mutagenicity: N/D

Reproductive/Developmental Toxicity: N/D

Specific Target Organ Toxicity

Single Exposure: N/D

Repeated Exposure: N/D

Aspiration Hazard: N/D

Comments: None.

Section 12. Ecological Information

Ecotoxicity

Species	Duration	Type of Effect	Test Results
Daphnia magna	48h	EC50	1265 mg/l
Rainbow Trout	96h	LC50	>883 mg/l

Persistence and Biodegradability: N/D

Bioaccumulative Potential: N/D

Mobility In Soil: N/D

Other Adverse Effects: N/D

Comments: None.

Section 13. Disposal Considerations

Dispose of in accordance with local, state and federal regulations.
EPA corrosivity characteristic hazardous waste D002 when disposed of in the original product form.

Section 14. Transport Information

Controlling Regulation	UN/NA#:	Proper Shipping Name:	Technical Name:	Hazard Class:	Packing Group:
DOT	UN3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	(1−HYDROXYETHYLIDENE−1, 1−DIPHOSPHONIC ACID)	8	PGIII

Note: N/A

Section 15. Regulatory Information

Inventory Status

United States (TSCA): All ingredients listed.
Canada (DSL/NDSL): All ingredients listed.

Federal Regulations

SARA Title III Rules

Sections 311/312 Hazard Classes

Fire Hazard: No
Reactive Hazard: No
Release of Pressure: No
Acute Health Hazard: Yes
Chronic Health Hazard: No

Other Sections

Component	Section 313 Toxic Chemical	Section 302 EHS TPQ	CERCLA RQ
1−Hydroxyethylidene−1,1−diphosphonic acid	N/A	N/A	N/A

Comments: None.

State Regulations

California Proposition 65: None known.

Special Regulations

Component	States
1−Hydroxyethylidene−1,1−diphosphonic acid	None.

Compliance Information

NSF: N/A

Food Regulations: N/A

KOSHER: This product has not been evaluated for Kosher approval.

Halal: This product has not been evaluated for Halal approval.

FIFRA: N/A

Other: None

Comments: None.

Section 16. Other Information

HMIS Hazard Rating

Health: 2
Flammability: 0
Physical Hazard: 1
PPE: X

Notes: The PPE rating depends on circumstances of use. See Section 8 for recommended PPE.
The Hazardous Material Information System (HMIS) is a voluntary, subjective alpha−numeric symbolic system for recommending hazard risk and personal protection equipment information. It is a subjective rating system based on the evaluator's understanding of the chemical associated risks. The end−user must determine if the code is appropriate for their use.

Abbreviations

Abbreviation	Definition
<	Less Than
>	Greater Than
ACGIH	American Conference of Governmental Industrial Hygienists
EHS	Environmental Health and Safety Dept
N/A	Not Applicable
N/D	Not Determined
N/E	Not Established
OSHA	Occupational Health and Safety Dept
PEL	Personal Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value

Abbreviation	Definition
TWA	Time Weight Average
UNK	Unknown

Prepared by: Product Compliance Department; ProductCompliance@chemtreat.com

Revision Date: February 7, 2019

Disclaimer

Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. No representation or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature are made hereunder with respect to information or the product to which information refers.

SAFETY DATA SHEET

Section 1. Chemical Product and Company Identification

Product Name:	ChemTreat CL5556
Product Use:	Cooling Water Treatment
Supplier's Name:	ChemTreat, Inc.
Emergency Telephone Number:	(800)424−9300 (Toll Free)
Address (Corporate Headquarters):	5640 Cox Road Glen Allen, VA 23060
Telephone Number for Information:	(800)648−4579
Date of SDS:	February 7, 2019
Revision Date:	February 7, 2019
Revision Number:	19020701AN

Section 2. Hazard(s) Identification

Signal Word: **WARNING**

GHS Classification(s):

Skin corrosion/irritation − Category 3
Eye damage/irritation − Category 2b
Eye damage/irritation − Category 1
Acute Toxicity Dermal − Category 4
Acute Toxicity Inhalation − Category 4
Acute Toxicity Oral − Category 4

Hazard Statement(s):

H312 Harmful in contact with skin.
H332 Harmful if inhaled.
H302 Harmful if swallowed.
H320 Causes eye irritation.
H316 Causes mild skin irritation.

Precautionary Statement(s):

Prevention:

P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink, or smoke when using this product.
P271 Use only outdoors or in a well−ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P301 + 330 + 331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P363 Wash contaminated clothing before reuse.

Storage:

None.

Disposal:

P501 Dispose of contents and container in accordance with applicable local, regional, national, and/or international regulations.

System of Classification Used:

Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Hazards Not Otherwise Classified:

None.

Section 3. Composition/Hazardous Ingredients

Component	CAS Registry #	Wt.%
2−Phosphono−1,2,4−butane tricarboxylic acid	37971−36−1	3 − 7
Sulfuric acid	7664−93−9	1 − 5
Benzotriazole	95−14−7	1 − 5

Comments

If chemical identity and/or exact percentage of composition has been withheld, this information is considered to be a trade secret.

Section 4. First Aid Measures

Inhalation:	Remove to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Eyes:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.
Skin:	Remove contaminated clothing. Wash exposed area with large amounts of soap and water. If skin irritation develops or persists, get medical advice/attention.
Ingestion:	DO NOT INDUCE VOMITING. Rinse mouth. Call a POISON CENTER or doctor/physician.
Most Important Symptoms:	N/D
Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary:	N/A

Section 5. Fire Fighting Measures

Flammability of the Product:	Not flammable.
Suitable Extinguishing Media:	Use extinguishing media suitable to surrounding fire.
Specific Hazards Arising from the Chemical:	None known.
Protective Equipment:	If product is involved in a fire, wear full protective clothing including a positive−pressure, NIOSH approved, self−contained breathing apparatus.

Section 6. Accidental Release Measures

Personal Precautions: Use appropriate Personal Protective Equipment (PPE).

Environmental Precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers.

Methods for Cleaning up: Contain and recover liquid when possible. Flush spill area with water spray.

Other Statements: If RQ (Reportable Quantity) is exceeded, report to National Spill Response Office at 1−800−424−8802.

Section 7. Handling and Storage

Handling: Wear appropriate Personal Protective Equipment (PPE) when handling this product. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Do not ingest. Avoid breathing vapors, mist or dust.

Storage: Store away from incompatible materials (see Section 10). Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For Industrial use only.
Store above Freeze Point.

Section 8. Exposure Controls/Personal Protection

Exposure Limits

Component	Source	Exposure Limits
2−Phosphono−1,2,4−butane tricarboxylic acid	N/E	N/E
Sulfuric acid	ACGIH TLV	0.2 ppm TWA
	OSHA PEL	1 mg/m³ TWA; Aerosol
Benzotriazole	N/E	N/E

Engineering Controls: Use only with adequate ventilation. The use of local ventilation is recommended to control emission near the source.

Personal Protection

Eyes:	Wear chemical splash goggles or safety glasses with full−face shield. Maintain eyewash fountain in work area.
Skin:	Maintain quick−drench facilities in work area. Wear butyl rubber or neoprene gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact.
Respiratory:	If misting occurs, use NIOSH approved organic vapor/acid gas dual cartridge respirator with a dust/mist prefilter in accordance with 29 CFR 1910.134.

Section 9. Physical and Chemical Properties

Physical State and Appearance:	Liquid, Straw, Clear
Specific Gravity:	1.157 @ 20°C
pH:	1.8 @ 20°C, 100.0%
Freezing Point:	32°F
Flash Point:	N/D
Odor:	Mild
Melting Point:	N/A
Initial Boiling Point and Boiling Range:	N/D
Solubility in Water:	Complete
Evaporation Rate:	N/D
Vapor Density:	N/D
Molecular Weight:	N/D
Viscosity:	<100 CPS @ 20°C
Flammability (solid, gas):	N/D
Flammable Limits:	N/A
Autoignition Temperature:	N/A
Density:	9.65 LB/GA
Vapor Pressure:	N/D
% VOC:	N/D
Odor Threshold	N/D
n−octanol Partition Coefficient	N/D
Decomposition Temperature	N/D

Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperatures and pressures.

Incompatibility with Various Substances: Strong oxidizers, Strong bases.

Hazardous Decomposition Products: Oxides of nitrogen, Oxides of phosphorus, Oxides of carbon.

Possibility of Hazardous Reactions: None known.

Reactivity: N/D

Conditions To Avoid: N/D

Section 11. Toxicological Information

Acute Toxicity

Chemical Name	Exposure	Type of Effect	Concentration	Species
2−Phosphono−1,2,4−butane tricarboxylic acid	Oral	LD50	>6500 MG/KG	Rat
Sulfuric acid	Oral	LD50	2140 MG/KG	Rat
	Inhalation	LD50	375 MG/L	Rat
Benzotriazole	Oral	LD50	560 MG/KG	Rat
	Dermal	LD50	>2000 MG/KG	Rabbit

Carcinogenicity Category

Component	Source	Code	Brief Description
2−Phosphono−1,2,4−butane tricarboxylic acid	N/E	N/E	N/E
Sulfuric acid	NTP	NTP−K	Known to be a human carcinogen
Benzotriazole	N/E	N/E	N/E

Likely Routes of Exposure: N/D

Symptoms

Inhalation: N/D

Eye Contact: N/D

Skin Contact: N/D

Ingestion: N/D

Skin Corrosion/Irritation: N/D

Serious Eye Damage/Eye Irritation: N/D

Sensitization: N/D

Germ Cell Mutagenicity: N/D

Reproductive/Developmental Toxicity: N/D

Specific Target Organ Toxicity

Single Exposure: N/D

Repeated Exposure: N/D

Aspiration Hazard: N/D

Comments: None.

Section 12. Ecological Information

Ecotoxicity

Species	Duration	Type of Effect	Test Results
Ceriodaphnia dubia	48h	LC50	947 mg/l
	7d	NOEC	313 mg/l
	7d	LOEC	625 mg/l
	7d	IC25	205 mg/l
Fathead Minnow	96h	LC50	2500 mg/l
	7d	NOEC	1250 mg/l
	7d	LOEC	2500 mg/l
	7d	IC25	1037 mg/l

Persistence and Biodegradability: N/D

Bioaccumulative Potential: N/D

Mobility In Soil: N/D

Other Adverse Effects: N/D

Comments: None.

Section 13. Disposal Considerations

Dispose of in accordance with local, state and federal regulations.
EPA corrosivity characteristic hazardous waste D002 when disposed of in the original product form.

Section 14. Transport Information

Controlling Regulation	UN/NA#:	Proper Shipping Name:	Technical Name:	Hazard Class:	Packing Group:
DOT	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
IMDG	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
TDG	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
ICAO	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
SCT	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A

Note: N/A

Section 15. Regulatory Information

Inventory Status

United States (TSCA): All ingredients listed.
Canada (DSL/NDSL): All ingredients listed.

Federal Regulations

SARA Title III Rules

Sections 311/312 Hazard Classes

Fire Hazard:	No
Reactive Hazard:	No
Release of Pressure:	No
Acute Health Hazard:	Yes
Chronic Health Hazard:	No

Other Sections

Component	Section 313 Toxic Chemical	Section 302 EHS TPQ	CERCLA RQ
2−Phosphono−1,2,4−butane tricarboxylic acid	N/A	N/A	N/A
Sulfuric acid	N/A	1000	1000
Benzotriazole	N/A	N/A	N/A

Comments: None.

State Regulations

California Proposition 65: None known.

Special Regulations

Component	States
2−Phosphono−1,2,4−butane tricarboxylic acid	None.
Sulfuric acid	MA, MN, NJ, NY, PA, WA
Benzotriazole	None.

Compliance Information

NSF: N/A

Food Regulations: N/A

KOSHER: This product is certified by the Orthodox Union as Kosher for Passover and year−round use.
Only when prepared by the following ChemTreat facilities: Ashland, VA; Eldridge, IA; Nederland, TX.

Halal: This product has not been evaluated for Halal approval.

FIFRA: N/A

Other: None

Comments: None.

Section 16. Other Information

HMIS Hazard Rating

Health:	3
Flammability:	0
Physical Hazard:	1
PPE:	X

Notes: The PPE rating depends on circumstances of use. See Section 8 for recommended PPE.
The Hazardous Material Information System (HMIS) is a voluntary, subjective alpha−numeric symbolic system for recommending hazard risk and personal protection equipment information. It is a subjective rating system based on the evaluator's understanding of the chemical associated risks. The end−user must determine if the code is appropriate for their use.

Abbreviations

Abbreviation	Definition
<	Less Than
>	Greater Than
ACGIH	American Conference of Governmental Industrial Hygienists
EHS	Environmental Health and Safety Dept
N/A	Not Applicable
N/D	Not Determined
N/E	Not Established
OSHA	Occupational Health and Safety Dept
PEL	Personal Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weight Average
UNK	Unknown

Prepared by: Product Compliance Department; ProductCompliance@chemtreat.com

Revision Date: February 7, 2019

Disclaimer

Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. No representation or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature are made hereunder with respect to information or the product to which information refers.

Univar
3075 Highland Pkwy STE 200
Downers Grove, IL 60515
425-889-3400

SAFETY DATA SHEET

1. Identification

Product identifier: SODIUM HYPOCHLORITE 10-16%

Other means of identification

Synonyms:	Liquichlor, Bleach
CAS NUMBERS:	7681-52-9
SDS number:	000100001054

Recommended use and restriction on use

Recommended use: Reserved for industrial and professional use.

Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor Information

Univar

3075 Highland Pkwy STE 200

Downers Grove, IL 60515

425-889-3400

Emergency telephone number:For emergency assistance Involving chemicals

call CHEMTREC day or night at: 1-800-424-9300. CHEMTREC INTERNATIONAL Tel# 703-527-3887

2. Hazard(s) identification

Hazard Classification

Physical Hazards

Corrosive to metal	Category 1

Health Hazards

Acute toxicity (Oral)	Category 5
Skin Corrosion/Irritation	Category 1
Serious Eye Damage/Eye Irritation	Category 1
Environmental Hazards Acute hazards to the aquatic environment	Category 1
Chronic hazards to the aquatic environment	Category 1

Label Elements

Hazard Symbol

Signal Word	Danger
Hazard Statement	May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. May be harmful if swallowed. Very toxic to aquatic life with long lasting effects. Very toxic to aquatic life.
Precautionary Statements	
Prevention	Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe dust or mists. Wear protective gloves/protective clothing/eye protection/face protection.
Response	IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. Immediately call a POISON CENTER/doctor. Wash contaminated clothing before reuse.

Storage	Store locked up.
Disposal	Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.
Other hazards which do not result in GHS classification	None.

3. Composition/information on ingredients

Substances

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
Sodium hypochlorite		7681-52-9	10 - 16%
Sodium hydroxide		1310-73-2	0.3 - 5%
Water		7732-18-5	80 - 89.7%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information:	Get medical advice/attention.
Ingestion:	Do NOT induce vomiting. Never give liquid to an unconscious person. Get medical attention immediately.
Inhalation:	Call a physician or poison control center immediately. If breathing stops, provide artificial respiration. Move to fresh air. If breathing is difficult, give oxygen.
Skin Contact:	Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Eye contact:	If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.

Most important symptoms/effects, acute and delayed

Symptoms: No data available.

Indication of immediate medical attention and special treatment needed

Treatment:	Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards:	No unusual fire or explosion hazards noted.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:	Use: Foam. Carbon dioxide or dry powder.
Unsuitable extinguishing media:	No data available.
Specific hazards arising from the chemical:	During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Special fire fighting procedures:	No data available.
Special protective equipment for fire-fighters:	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep unauthorized personnel away.
Methods and material for containment and cleaning up:	Absorb spillage with non-combustible, absorbent material.
Notification Procedures:	Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk.
Environmental Precautions:	Do not contaminate water sources or sewer. Avoid release to the environment.

7. Handling and storage

Precautions for safe handling:	Use personal protective equipment as required. Do not taste or swallow. Wash hands thoroughly after handling. Do not get in eyes, on skin, on clothing.
Conditions for safe storage, including any incompatibilities:	Store locked up.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	Type	Exposure Limit Values	Source
Sodium hydroxide	Ceiling	2 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
Sodium hydroxide - Particulate.	ST ESL	20 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	AN ESL	2 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
Sodium hydroxide	Ceiling	2 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)
	Ceiling	2 mg/m3	US. ACGIH Threshold Limit Values (03 2016)
	Ceil_Time	2 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	2 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (03 2016)
	Ceiling	2 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)

Appropriate Engineering Controls Adequate ventilation should be provided so that exposure limits are not exceeded.

Individual protection measures, such as personal protective equipment

General information: Provide easy access to water supply and eye wash facilities. Use personal protective equipment as required. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

Eye/face protection: Wear a full-face respirator, if needed. Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection

Hand Protection: Chemical resistant gloves

Other: Chemical resistant clothing

Respiratory Protection:	In case of inadequate ventilation use suitable respirator.
Hygiene measures:	Do not eat, drink or smoke when using the product. Wash hands after handling. Do not get in eyes. Observe good industrial hygiene practices. Wash contaminated clothing before reuse. Do not get this material in contact with skin. Wash hands before breaks and immediately after handling the product.

9. Physical and chemical properties

Physical state:	liquid
Form:	liquid
Color:	Pale yellow-green, Clear
Odor:	Odor of chlorine
Odor threshold:	No data available.
pH:	10 - 12
Melting point/freezing point:	-20 °C
Initial boiling point and boiling range:	> 107 °C
Flash Point:	No data available.
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Relative density:	1.224
Solubility(ies)	
Solubility in water:	Soluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.

Viscosity: No data available.

10. Stability and reactivity

Reactivity: No data available.
Chemical Stability: Material is stable under normal conditions.
Possibility of hazardous reactions: Stable
Conditions to avoid: Avoid heat or contamination.
Incompatible Materials: Oxidizers, acids Ammonia. Amines.
Hazardous Decomposition Products: By heating and fire, toxic vapors/gases may be formed.

11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Ingestion: No data available.
Inhalation: No data available.
Skin Contact: No data available.
Eye contact: No data available.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product: LD 50 (Rat): 3 - 5 g/kg

Dermal

Product: LD 50 (Rabbit): > 2 g/kg

Inhalation

Product: May be harmful if inhaled.

Repeated dose toxicity

Product: No data available.

Skin Corrosion/Irritation

Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation

Product: Causes serious eye damage.

Respiratory or Skin Sensitization

Product: Not a skin sensitizer.

Carcinogenicity

Product: No data available.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity
In vitro
Product: No data available.
In vivo
Product: No data available.
Reproductive toxicity
Product: No data available.
Specific Target Organ Toxicity - Single Exposure
Product: No data available.
Specific Target Organ Toxicity - Repeated Exposure
Product: No data available.
Aspiration Hazard
Product: No data available.
Other effects: No data available.

12. Ecological information

Ecotoxicity:
Acute hazards to the aquatic environment:
Fish
Product: LC 50 (Shiner perch (Cymatogaster aggregata), 96 h): 0.033 - 0.097 mg/l LC 50 (Bluegill (Lepomis macrochirus), 48 h): 0.6 mg/l
Aquatic Invertebrates
Product: LC 50 (Aquatic crustacea): 1 mg/l LC 50 (Daphnia magna, 96 h): 2.1 mg/l
Chronic hazards to the aquatic environment:
Fish
Product: No data available.
Aquatic Invertebrates
Product: No data available.
Toxicity to Aquatic Plants
Product: EC 50 (Green algae (Dunaliella bioculata), 24 h): 0.6 mg/l
Persistence and Degradability
Biodegradation

Product:	The product solely consists of inorganic compounds which are not biodegradable.

BOD/COD Ratio

Product:	No data available.

Bioaccumulative potential

Bioconcentration Factor (BCF)

Product:	The product is not bioaccumulating.

Partition Coefficient n-octanol / water (log Kow)

Product:	No data available.
Mobility in soil:	No data available.

Known or predicted distribution to environmental compartments

Sodium hypochlorite	No data available.
Sodium hydroxide	No data available.
Water	No data available.

Known or predicted distribution to environmental compartments

Water	No data available.

13. Disposal considerations

Disposal instructions:	Discharge, treatment, or disposal may be subject to national, state, or local laws.
Contaminated Packaging:	Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN Number:	UN 1791
UN Proper Shipping Name:	Hypochlorite solutions(Sodium hypochlorite)
Transport Hazard Class(es)	
Class:	8
Label(s):	8
Packing Group:	III
Marine Pollutant:	Marine Pollutant

Special precautions for user: –

IMDG

UN Number: UN 1791
UN Proper Shipping Name: HYPOCHLORITE SOLUTION(Sodium hypochlorite)
Transport Hazard Class(es)
Class: 8
Label(s): 8
EmS No.: F-A, S-B
Packing Group: III
Marine Pollutant: Marine Pollutant
Special precautions for user: –

15. Regulatory information

US Federal RegulationsUS. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Sodium hypochlorite Reportable quantity: 100 lbs.
Sodium hydroxide Reportable quantity: 1000 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

[X] Acute (Immediate) [ ] Chronic (Delayed) [ ] Fire [ ] Reactive [ ] Pressure Generating

SARA 302 Extremely Hazardous Substance

None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

Chemical Identity	RQ
Sodium hypochlorite	100 lbs.
Sodium hydroxide	1000 lbs.

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
Sodium hypochlorite	500 lbs
Sodium hydroxide	500 lbs

SARA 313 (TRI Reporting)

None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

Sodium hypochlorite Reportable quantity: 100 lbs.
Sodium hydroxide Reportable quantity: 1000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65

No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

Sodium hypochlorite	Listed
Sodium hydroxide	Listed

US. Massachusetts RTK - Substance List

Sodium hypochlorite	Listed
Sodium hydroxide	Listed

US. Pennsylvania RTK - Hazardous Substances

Sodium hypochlorite	Listed
Sodium hydroxide	Listed

US. Rhode Island RTK

Sodium hypochlorite	Listed
Sodium hydroxide	Listed

Inventory Status: Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EU EINECS List:	On or in compliance with the inventory
EU ELINCS List:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
EU No Longer Polymers List:	Not in compliance with the inventory.
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.
US TSCA Inventory:	On or in compliance with the inventory

16.Other information, including date of preparation or last revision

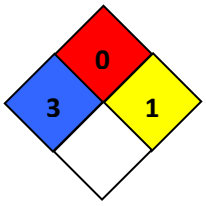
HMIS Hazard ID

Health	3
Flammability	0
Physical Hazards	1
PERSONAL PROTECTION	B

B - Safety Glasses & Gloves

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

NFPA Hazard ID



Flammability
Health
Reactivity
Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	08/08/2019
Revision Date:	No data available.
Version #:	1.9
Further Information:	No data available.

SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

Northstar Chemical

Northstar Chemical, Inc.

SULFURIC ACID 93%

SDS No: 30393 Revision Date: 3-24-2020 Prepared Date: December 29, 2014

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

TRADE NAME (AS LABELED):	**NORTHSTAR SULFURIC ACID (93 – 98%)**
CHEMICAL NAME/CLASS:	Sulfuric Acid Solution
PRODUCT USE:	Neutralization, battery acid
SUPPLIER/MANUFACTURER'S NAME:	**Northstar Chemical, Inc.**
ADDRESS:	**Corporate Office** 14200 S.W. Tualatin-Sherwood Rd. Sherwood, OR 97140
BUSINESS PHONE:	888-793-9476
EMERGENCY PHONE:	**CHEMTREC**: 800-424-9300
DATE OF PREPARATION:	December 29, 2014

Si usted no entiende las Hojas de Informacion de Seguridad sobre Materials, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the Safety Data Sheet, find someone to explain it to you in detail.)

2. HAZARD IDENTIFICATION

Physical hazards	May be corrosive to metals Reacts violently with water	Category 1
Health hazards	Skin corrosion/irritation	Category 1
	Serious eye damage/irritation	Category 1
	Acute toxicity, Inhalation	Category 2
	Specific target organ toxicity, single exposure	Category 3
	Chronic Exposure	Category 2
Environmental hazards	Hazardous to the aquatic environment, acute short term hazard	Category 3

LABEL ELEMENTS:

Signal Word: **DANGER!**

Hazard Statement: Causes severe skin burns and serious eye damage. May cause respiratory irritation. May cause damage to teeth through prolonged and repeated exposure to sulfuric acid mists. Fatal if inhaled. May be corrosive to metals. Harmful to aquatic life.

Precautionary Statement:

Prevention: Wear protective gloves, protective clothing, and eye and face protection. Wash exposed skin thoroughly after handling. Store and use only in a well-ventilated area. Keep containers tightly closed. In case of inadequate ventilation, wear respiratory protection. Do not breathe mist. Avoid release to the environment. Absorb spillage.

Response: IF IN EYES: Rinse continuously with water for several minutes. Continue rinsing and immediately call a poison center/doctor. Specific treatment is urgent. IF ON SKIN: Take off immediately all contaminated clothing. Rinse skin with water or shower. For large area burns, immediately call a poison center/doctor. Wash contaminated clothing before reuse.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF SWALLOWED: Rinse mouth. DO NOT induce vomiting. Get medical attention if you feel unwell. Store in corrosion resistant container with a resistant inner liner.

Storage: Store in a well-ventilated place and away from water. Keep container tightly closed.

Disposal: Dispose of contents/container in accordance with local/regional/national/international regulations.

Emergency Overview: A strong mineral acid present as a colorless and odorless oily liquid when pure but may appear yellow to dark brown when impure. Extremely corrosive to all body tissues, causing rapid tissue destruction and serious chemical burns. Skin or eye contact requires immediate first aid. Can decompose at high temperatures, forming toxic gases such as Sulphur oxides. Non-flammable but reacts violently with water, generating large amounts of heat with potential for spattering of the acid. Can react with combustible materials to generate heat and ignition. Reacts with most metals, particularly when diluted with water, to form flammable hydrogen gas which may create an explosion hazard. It is highly toxic to aquatic organisms and plant life.

Potential Health Effects: Sulfuric acid is not very volatile and workplace exposures are therefore primarily due to accidental splashes or to processes or actions that generate an acid mist. It is extremely corrosive to all body tissues, causing rapid tissue destruction and serious chemical burns on contact with the skin or eyes. Skin or eye contact requires immediate first aid. Inhalation of sulfuric acid mist or fumes may produce irritation of the nose, throat and respiratory tract. High levels of acid mist are also irritating to the skin and eyes. Chronic inhalation of acid mist may cause pitting and erosion of tooth enamel. Sulfuric acid, per se, is not listed as a carcinogen by OSHA, NTP, IARC, or the ACGIH. However, IARC, the ACGIH and the NTP have concluded there is sufficient evidence that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic or potentially carcinogenic to humans (see Toxicological Information, Section 11).

Potential Environmental Effects: Sulfuric acid is highly toxic to aquatic organisms and terrestrial plant life; however, it does not bio accumulate or bio concentrate through the food chain (see Ecological Information, Section 12).

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration
Sulfuric Acid	7664-93-9	93%

4. FIRST-AID MEASURES

Eye Contact: *Symptoms:* Burning, pain, blurring. Avoid direct contact. Wear chemical protective gloves, if necessary. Quickly and gently blot excess acid off face. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water, for at least 30 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens. Neutral saline solution may be used as soon as it is available. **DO NOT INTERRUPT FLUSHING**. If necessary, continue flushing during transport to emergency care facility. Take care not to rinse contaminated water into the unaffected eye or onto the face. Quickly transport victim to an emergency care facility.

Skin Contact: *Symptoms:* Burning, pain, ulceration. Avoid direct contact. Wear chemical protective clothing if necessary. As quickly as possible, remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts), under shower if possible. Flush with lukewarm, gently flowing water for at least 30 minutes. **DO NOT INTERRUPT FLUSHING.** For acid splashes over large areas of the body transport quickly to an emergency

care facility. If necessary, and if it can be done safely, continue flushing during transport to emergency care facility. Completely decontaminate clothing, shoes and leather goods before reuse or discard.

Inhalation: *Symptoms:* Nose throat and lung irritation, coughing, wheezing. Take precautions to ensure your own safety before attempting rescue (e.g., wear appropriate protective equipment, use the buddy system). Remove source of exposure or move person from exposure area to fresh air and keep comfortable for breathing. Call a Poison Centre/doctor or seek medical attention if you feel unwell.

Ingestion: *Symptoms:* Burning pain in mouth and throat. Have victim rinse mouth thoroughly with water. **DO NOT INDUCE VOMITING.** If vomiting occurs naturally, have person lie on their side in the recovery position. Have victim rinse mouth with water again. Quickly transport victim to an emergency care facility and bring a copy of this SDS.

General Information: Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take a copy of label and SDS to health professional with victim.

5. FIRE-FIGHTING MEASURES

Fire and Explosion Hazards: Sulfuric acid is not flammable or combustible. However, fires may result from the heat generated by contact of concentrated sulfuric acid with combustible materials. Sulfuric acid reacts with most metals, especially when diluted with water, to produce hydrogen gas, which can accumulate to explosive concentrations inside confined spaces. It reacts violently with water and organic materials evolving a considerable amount of heat and is very hazardous when in contact with carbides, cyanides, and sulfides.

Extinguishing Media: Use dry chemical or carbon dioxide extinguishers to extinguish small fires in surrounding combustible materials. Use water spray or fog to cool fire-exposed containers and to knock down large fires. Use water streams only if absolutely necessary and DO NOT USE WATER DIRECTLY ON ACID as a violent reaction may occur resulting in spattering of the acid. Do not release runoff from fire control methods to sewers or waterways.

Fire Fighting: Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask. For fires, close to a spill or where vapors are present, use acid-resistant personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of release if possible to do so safely. Contain spill, isolate hazard area, and deny entry to unauthorized personnel. Prevent from entering sewage or drainage systems and bodies of water. Dike area around spill and pump uncontaminated acid back to process if possible. Neutralize spilled material with alkali such as sodium carbonate or sodium bicarbonate, soda ash, lime or limestone granules. If neutralized with lime rock or soda ash, good ventilation is required during neutralization because of the release of carbon dioxide gas. Allow to stand for 1-2 hours to complete neutralization, then absorb any liquid in solid absorbent such as vermiculite or clay absorbents. Place spilled material in suitable (corrosion resistant) labeled containers for final disposal. Treat or dispose of waste spilled material and/or contaminated absorbent material in accordance with all local, regional and national regulations.

Personal Precautions: Acid resistant protective clothing and gloves. Sleeves and pant legs should be worn outside, not tucked into gloves and rubber boots. Use close-fitting safety goggles or a combination of safety goggles and a face shield where splashing is a possibility. Respiratory protection equipment should be worn where exposure to hazardous levels of mist or fume is possible.

Environmental Precautions: This product has the potential to pose ecological risks to organisms in both aquatic and terrestrial environments. Discharge of the product to soil and water should be prevented. Prevent spillage from entering sewers or natural watercourses.

7. HANDLING and STORAGE

Precautions for Safe Handling: Keep in tightly closed containers which are appropriately labeled. Do not allow contact with water. Avoid all direct contact with the acid.

Conditions for Safe Storage: Store in a dry, cool, well-ventilated area away from incompatible substances, particularly alkaline materials, cyanides and/or sulphides.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

Occupational Exposure Guidelines:

Component	ACGIH TLV	OSHA PEL	NIOSH REL
Sulfuric Acid	0.2 mg/m^3 Thoracic fraction	1 mg/m^3	1 mg/m^3

NOTE: OEGs for individual jurisdictions may differ from those given above. Check with local authorities for the applicable OEGs in your jurisdiction.
ACGIH - American Conference of Governmental Industrial Hygienists; OSHA - Occupational Safety and Health Administration; NIOSH - National Institute for Occupational Safety and Health. TLV . Threshold Limit Value, PEL . Permissible Exposure Limit, REL . Recommended Exposure Limit.

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Ventilation: Use adequate local or general ventilation to maintain the concentration of sulfuric acid aerosol mists below recommended occupational exposure limits.

Protective Clothing: Appropriate protective clothing and gloves should be worn where any possibility exists that skin contact can occur. Use close-fitting safety goggles or a combination of safety goggles and a face shield where any possibility exists that eye contact can occur. An eyewash and quick drench shower should be provided near the work area. Workers should wash immediately whenever skin becomes contaminated.

Respirators: Where sulfuric acid mists are generated and cannot be controlled to within acceptable levels, use appropriate NIOSH-approved respiratory protection equipment (a combination of a 42CFR84 Class N, R or P-100 particulate filter and an acid gas cartridge). Note: sulfuric acid mist also causes eye irritation at high concentrations and a full face respirator or supplied airrespirator may be necessary in some cases.

General Hygiene Considerations: Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking.

9. PHYSICAL and CHEMICAL PROPERTIES

Appearance: Clear, colourless, oily liquid (may turn yellowish to amber upon aging)
Odour: Odourless when cold; acrid odour upon heating
Odour Threshold: > 1 mg/m^3 (Acid mist will irritate the nose and may be sensed as a pungent odour)
pH: Concentration dependent <0.1 (93% Sol.n), 0.3 (5% or 1N Sol.n)
Vapour Pressure: <0.04 kPa (<0.3 mm Hg) @ 25ºC
Vapour Density: 3.4 (air = 1)
Freezing Point/Range: -35°C
Boiling Point/Range: 280°C
Relative Density: 1.84 (93% H_2SO_4)
Evaporation Rate: Not Applicable
Coefficient of Water/Oil Distribution: No Data Available
Solubility: Completely soluble with generation of significant heat.
Flammability: Non-flammable liquid
Flammable Limits: Not Applicable
Auto-ignition Temperature: None
Decomposition Temperature: 340°C

10. STABILITY and REACTIVITY

Stability & Reactivity: Sulfuric acid is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur. Decomposes at 340ºC into sulphur trioxide and water. Extremely reactive with metals, alkalis, reducing agents and many other organic and inorganic chemicals. Hazardous gases such as hydrogen cyanide, hydrogen sulfide and acetylene are evolved on contact with chemicals such as cyanides, sulfides and carbides respectively. Contact with combustible organic matter may cause fire or explosion. Dilution with water generates excessive heat and spattering or boiling may occur. Always add acid to water, NEVER ADD WATER TO ACID. Corrosive to most metals including mild steel, copper, aluminum, zinc, etc., especially when diluted to below 90%.

Incompatibilities: Combustible materials, organic materials, reducing agents, amines, bases, water, excess heat, and metals.

Hazardous Decomposition Products: Sulphur dioxide, sulphur trioxide and sulfuric acid fumes.

11. TOXICOLOGICAL INFORMATION

General: Concentrated sulfuric acid is a direct acting toxicant, producing local effects at the site(s) of contact but no systemic effect. It exerts a strong corrosive action on all tissues due to its severe dehydration action (removing water from tissues). The severity of the chemical burn produced by the concentrated acid is proportional to the strength of the acid and the duration of contact. Burns are deep but typically not severely painful.

Acute:
Skin/Eye: Splashes can cause severe eye burns and may cause irreversible eye injury and possible blindness. Skin contact results in severe burns and may result in permanent scarring. High levels of sulfuric acid mists and aerosols are also irritating to the eyes and skin.

Inhalation: Inhalation may cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath, laryngeal spasm and delayed lung edema. These symptoms may be aggravated by physical exertion. Asthmatics may be more sensitive to inhaling sulfuric acid mists and asthma may be aggravated by exposure to sulfuric acid.

Ingestion: Ingestion is unlikely in industrial use but would result in severe burns to the mouth, throat, esophagus and stomach which could lead to permanent damage to the digestive tract. Small amounts of acid can also enter the lungs during ingestion or subsequent vomiting and cause serious lung injury.

Chronic: Prolonged exposure to dilute solutions or mists may result in eye irritation (chronic conjunctivitis) and produce skin dermatitis. Exposure to high concentrations of acid mist has caused erosion and discolouration of the anterior teeth. Inhalation of sulfuric acid mist may decrease the ability of the respiratory tract to remove other small particles which may be inhaled. Sulfuric acid, per se, is not listed as a carcinogen by OSHA, the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), or the ACGIH. IARC has concluded that there is sufficient evidence that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to humans, resulting in an increased incidence of primarily laryngeal cancers. The ACGIH lists strong inorganic acid mists containing sulfuric acid as a suspected human carcinogen (A2) and the NTP have classified strong inorganic acid mists containing sulfuric acid as a known human carcinogen. OSHA does not list sulfuric acid mist as a carcinogen.

Animal Toxicity:

Hazardous Ingredient:	Acute Oral Toxicity:	Acute Dermal Toxicity:	Acute Inhalation Toxicity:
Sulfuric	Acid 2140 mg/kg. LD_{50}, Rat, Oral, .	Not relevant	0.255 mg/L. LC_{50}, Rat, Inhalation, 4 hour

12. ECOLOGICAL INFORMATION

Sulfuric acid is highly toxic to aquatic organisms and terrestrial plant life; however, it does not bio accumulate or bio concentrate through the food chain.

13. DISPOSAL CONSIDERATIONS

Do not wash down drain or allow to reach natural watercourses. Dispose of neutralized waste consistent with regulatory requirements. If neutralized with lime rock or soda ash, good ventilation is required during neutralization because of the release of carbon dioxide gas.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME TRANSPORT CANADA..... Sulfuric Acid
PROPER SHIPPING NAME U.S. DOT..... Sulfuric Acid
TRANSPORT CANADA CLASSIFICATION..... Class 8 Packing Group II
U.S. DOT CLASSIFICATION..... Class 8 Packing Group II (RQ) . 1,000 lbs.
PRODUCT IDENTIFICATION NUMBER UN1830
MARINE POLLUTANT..... No
IMO CLASSIFICATION..... Class 8

15. REGULATORY INFORMATION

U.S.
INGREDIENTS LISTED ON TSCA INVENTORY ..... Yes

HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD..... Yes

CERCLA SECTION 103 HAZARDOUS SUBSTANCES..... Sulfuric Acid.....Yes ... RQ: 1000 lbs. (454 kg.)

EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE..... Yes.....RQ: 1000 lbs. (454 kg.)
Threshold Planning Quantity: 1000 lbs.

EPCRA SECTION 311/312 HAZARD CATEGORIES..... Immediate (Acute) Health Hazard - Corrosive
Immediate (Acute) Health Hazard - Highly Toxic

EPCRA SECTION 313 TOXIC RELEASE INVENTORY:..... Sulfuric Acid ..... CAS NO. 7664-93-9
Percent by Weight: 93%

16. OTHER INFORMATION

The information in this Safety Data Sheet is based on the following references:
- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, Seventh Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2018, Guide to Occupational Exposure Values.
- American Conference of Governmental Industrial Hygienists, 2018, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- Bretherick.s Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urben, Ed.) 1995.
- Canadian Centre for Occupational Health & Safety CHEMINFO Record No. 122 - Sulfuric Acid, 2009-04.
- Commission de la santé et la sécurité du travail, Service du Répertoire toxicologique, Acide Sulfurique, 2006-02-08.
- Industry Canada, SOR/2015-17, 11 February 2015 - Hazardous Products Regulations.
- International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 . present, (multi-volume work), World Health Organization, Geneva.
- International Chemical Safety Cards (WHO/IPCS/ILO), ICSC:0362 . Sulfuric Acid (Revised Oct 2008).
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Industrial Chemicals Notification and Assessment Scheme (NICNAS), Sydney, Australia . Existing Chemicals Information Sheet . Sulfuric Acid, 30 June 2003.
- OECD Screening Information Data Base (SIDS) Initial Assessment Report . Sulfuric Acid, January 2001.
- Patty's Toxicology, Fifth Edition, 2001: E. Bingham, B. Cohrssen & C.H. Powell, Ed.
- Toxicology of the Eye, 2nd Ed. W. Morton Grant, MD, Charles C. Thomas, Publishers; Springfield. IL (1974).
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health. NIOSH Pocket Guide to Chemical Hazards. CD-ROM Edition September 2005.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances (RTECS) CCOHS Web Access subscription.
- U.S. Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Sulfur Trioxide and Sulfuric Acid, December 1998.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.1000 and 1910.1200.

Acronyms not spelled out elsewhere in the SDS:
CAS: Chemical Abstracts Service
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

DOT: Department of Transport
EPCRA: Emergency Planning and Community Right-to-Know Act
IMO: International Maritime Organization
LD50 LC50: Lethal Dose 50%, Lethal Concentration 50%
TSCA: Toxic Substances Control Act
Wt.: Weight

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Attachment 6

Categorically Exempt TEU Form AQ523

Form AQ523

CATEGORICALLY EXEMPT TOXICS EMISSIONS UNITS **ANSWER SHEET**

Facility name: COVANTA MARION, INC Permit Number: 24-5398-TV-01

Indicate which of the following categorically exempt activities occur at this facility by checking the appropriate columns below. Submit this form electronically with your Cleaner Air Oregon (CAO) Emissions Inventory AQ520 form to meet the reporting requirements in OAR 340-245-0040(4)(a)(A) for categorically exempt Toxics Emissions Units (TEUs). This form is the complete list of categorically exempt TEUs, which can be found in the division 245 rules under OAR 340-245-0060(3)(b).

Yes	No	Categorically Exempt TEU Activities
☑	☐	Evaporative and tail pipe emissions from on-site motor vehicle operation.
☑	☐	Distillate oil, kerosene, gasoline, natural gas or propane burning equipment, provided the aggregate expected actual emissions of the equipment identified does not exceed the de minimis level for any regulated pollutant, based on the expected maximum annual operation of the equipment. If a source's expected emissions from all such equipment exceed the de minimis levels, then the source may identify a subgroup of such equipment as categorically exempt with the remainder not designated as an exempt TEU. The following equipment may never be included as part of the exempt TEU: A. Any individual distillate oil, kerosene or gasoline burning equipment with a rating greater than 0.4 million Btu/hour; and B. Any individual natural gas or propane burning equipment with a rating greater than 2.0 million Btu/hour.
☐	☑	Distillate oil, kerosene, gasoline, natural gas or propane burning equipment brought on site for six months or less for maintenance, construction or similar purposes, such as but not limited to generators, pumps, hot water pressure washers and space heaters, provided that any such equipment that performs the same function as the permanent equipment, must be operated within the source's existing PSEL.
☑	☐	Office activities.
☐	☑	Food service activities.
☑	☐	Janitorial activities.
☑	☐	Personal care activities.
☑	☐	Grounds keeping activities, including, but not limited to building painting and road and parking lot maintenance.
☑	☐	On-site laundry activities.
☐	☑	On-site recreation facilities.
☑	☐	Instrument calibration.
☐	☑	Automotive storage garages.

☑	☐	Refrigeration systems with less than 50 pounds of charge of ozone depleting substances regulated under Title VI, including pressure tanks used in refrigeration systems but excluding any combustion equipment associated with such systems.
☑	☐	Temporary construction activities.
☑	☐	Warehouse activities.
☑	☐	Accidental fires and fire suppression.
☑	☐	Air vents from compressors.
☑	☐	Air purification systems.
☑	☐	Continuous emissions monitoring lines.
☑	☐	Demineralized water tanks.
☑	☐	Pre-treatment of municipal water, including use of deionized water purification systems.
☑	☐	Electrical charging stations.
☐	☑	Fire brigade training.
☑	☐	Instrument air dryers and distribution.
☑	☐	Fully enclosed process raw water filtration systems.
☑	☐	Electric motors.
☑	☐	Pressurized tanks containing gaseous compounds that do not contain toxic air contaminants.
☐	☑	Vacuum sheet stacker vents.
☐	☑	Emissions from wastewater discharges to publicly owned treatment works (POTW) provided the source is authorized to discharge to the POTW, not including on-site wastewater treatment and/or holding facilities.
☐	☑	Log ponds.
☑	☐	Stormwater settling basins.
☐	☑	Paved roads and paved parking lots within an urban growth boundary.
☐	☑	Hazardous air pollutant emissions in fugitive dust from paved and unpaved roads except for those sources that have processes or activities that contribute to the deposition and entrainment of hazardous air pollutants from surface soils.
☑	☐	Health, safety, and emergency response activities.
☐	☑	Non-diesel, compression ignition emergency generators* and pumps used only during loss of primary equipment or utility service due to circumstances beyond the

		reasonable control of the owner or operator, or to address a power emergency, provided that the aggregate horsepower rating of all stationary emergency generator and pump engines is not more than 3,000 horsepower. If the aggregate horsepower rating of all the stationary emergency generator and pump engines is more than 3,000 horsepower, then no emergency generators and pumps at the source may be considered categorically exempt. ***All spark ignition engines remain exempt.**
☑	☐	Non-contact steam vents and leaks and safety and relief valves for boiler steam distribution systems.
☑	☐	Non-contact steam condensate flash tanks.
☑	☐	Non-contact steam vents on condensate receivers, deaerators and similar equipment.
☑	☐	Boiler blowdown tanks.
☑	☐	Ash piles maintained in a wetted condition and associated handling systems and activities.

Attachment 7

Safety Data Sheets

Due the file size, a separate secure link will be provided to Oregon DEQ to download these files.

Attachment 8

Emission Inventory Form AQ520

This file is being provided electronically via email to Oregon DEQ.

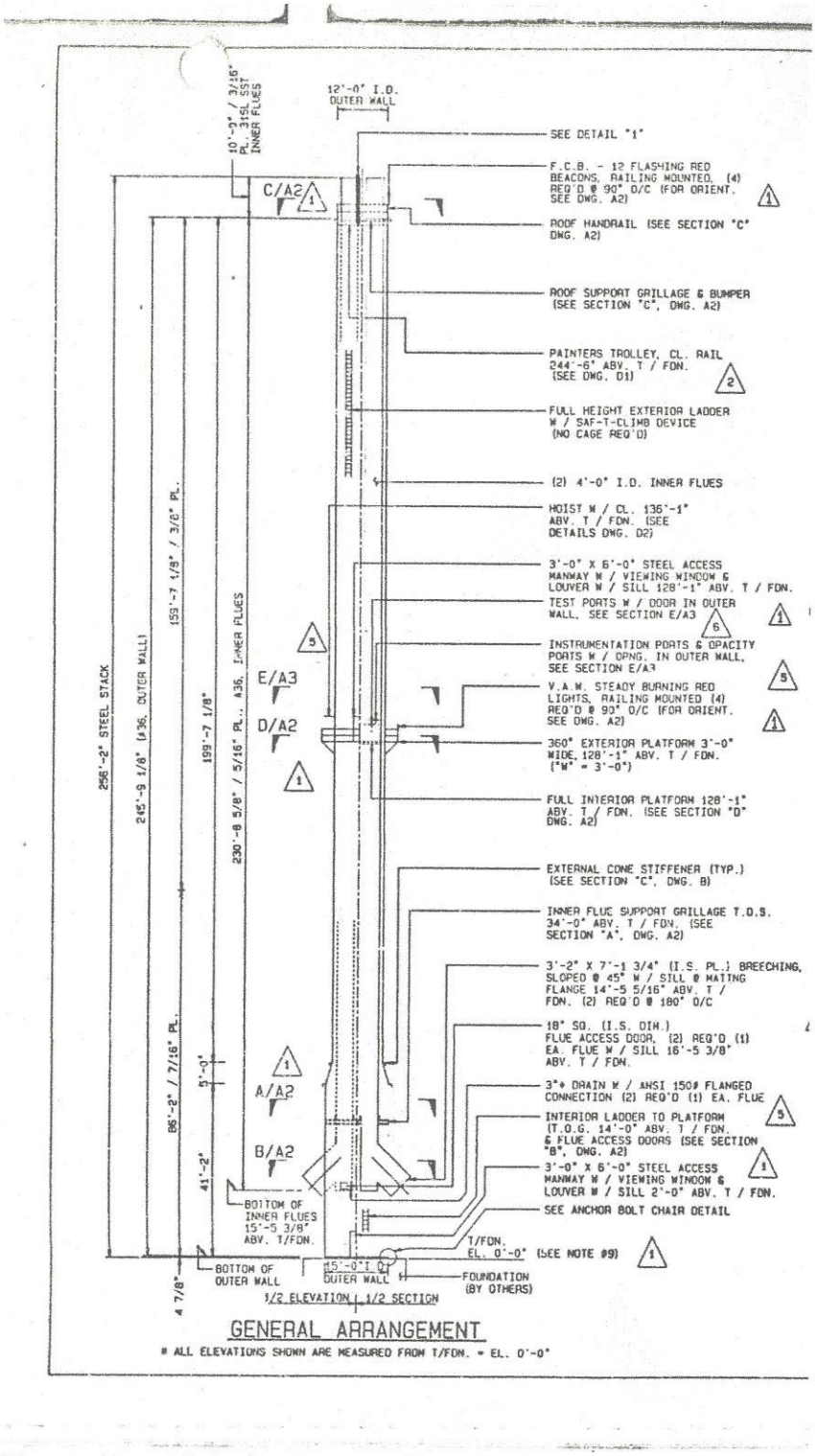
Attachment 9

MSW Unit Stack Configuration and Stack Heights

5.0 SAMPLING AREA DESCRIPTIONS

The outlet sampling area at Covanta Marion, Inc. (CMI) is located on a platform 128 feet above the ground outside of the steel stack (see Figure 1). The stack is equipped with a rope and pulley to facilitate hauling equipment up and down. The ladder is equipped with a Saf-T-Climb® climbing device. Each stack has two 4 inch diameter test ports at 90° and one 4 inch single port available.

	Sampling Area Parameters
Testing platform elevation above ground:	128 ft.
Test ports elevation:	131 ft.
Test ports flange size:	4 in.
Flue diameter:	4 ft.
Nearest downstream disturbance:	120 ft.
Nearest upstream disturbance:	100 ft.



Figures 2 and 3 depict the sampling point determinations.