



EAGLE FOUNDRY COMPANY

May 16, 2022

Julia DeGagné
Air Toxics Project Manager
Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

Re: Submittal of Cleaner Air Oregon Emissions Inventory and Supplemental Materials

Dear Julia DeGagné:

By letter dated February 1, 2022, the Oregon Department of Environmental Quality (DEQ) provided written notice to Eagle Foundry Company (Eagle Foundry) that their facility located at 23123 SE Eagle Creek Rd, Eagle Creek, Oregon 97022 (the facility) was being called in to the Cleaner Air Oregon (CAO) permitting program. On April 15, 2022, Eagle Foundry requested an extension of the deadline to assess the Categorically Exempt Toxic Emission Units (CATEUs) as applicable. The DEQ approved a 14-day extension from the original submittal deadline to May 16, 2022.

Per Oregon Administrative Rule 340 245 0030(1)(a), the first step of the CAO permitting process is to submit an emissions inventory no later than 90 days after receiving the written notice from the DEQ. As requested, the CAO emissions inventory AQ520 form, containing estimates of each toxic air contaminant (TAC) emitted by the facility, is being provided electronically along with this letter. Eagle Foundry also prepared the following attached supporting materials to assist the DEQ during their review process:

- Attachment A—DEQ Forms AQ520 and AQ523
- Attachment B—Emissions Inventory
- Attachment C—Safety Data Sheets (SDSs)
- Attachment D—Process Flow Diagram
- Attachment E—Categorically Exempt Threshold Analysis

The comprehensive emissions inventory in Attachment B presents detailed emission estimate calculations to supplement the AQ520 form submittal.

Eagle Foundry received an email dated March 31, 2022 from the DEQ requesting a review of categorically insignificant activities no longer considered CATEUs per the November 2021 revision to the CAO rules. The DEQ provided a guidance document titled “Cleaner Air Oregon Exempt TEU Reporting” (the guidance document).

The following previously exempt categorically insignificant activities occur at Eagle Foundry:

- I. Maintenance and repair shops & Automotive repair shops or storage garages*
VIII. Natural gas, propane, and liquefied petroleum gas (LPG) storage tanks and transfer equipment
XI. Diesel combustion emergency generator.

Maintenance Shop

Eagle Foundry operates a small maintenance shop for periodic maintenance and repair of process equipment. Products include small amounts of various lubricants and cleaners. Three products used in the maintenance department are identified as containing TACs. A conservative annual usage was developed by assuming 1.5 times the annual purchasing records for 2021. Chemical content was determined by review of the product SDSs.

The usage analysis shows all TACs from product usage in the maintenance shop were below the reporting thresholds set in Appendix A of the guidance document and therefore, the maintenance shop is considered an exempt TEU. Product SDSs and usage threshold calculations are included in Attachment C and Attachment E, respectively.

Propane Tank

Eagle Foundry has a propane tank on property that stores fuel for the heat treat furnaces. Fuel usage for the heat treat furnaces is not considered "extensive use", and the propane tank should be considered an Exempt TEU.

Diesel Emergency Generator

Eagle Foundry operates a 120 horsepower diesel emergency generator. The generator usage and emissions calculations are included in form AQ520 and the emissions inventory included in Attachment A and Attachment B, respectively.

We look forward to working with the DEQ throughout the CAO permitting process. Please contact me at 503-637-3048 if you have any comments or require clarifying information.

Sincerely,
Eagle Foundry Company



Jack Scott
General Manager

Attachments: A. DEQ Form AQ523
B. Emissions Inventory
C. Safety Data Sheets
D. Process Flow Diagram
E. Categorically Exempt Threshold Analysis

cc: Geoffrey Tichenor, Stoel Rives LLP
Leslie Riley, MFA
J.R. Giska, DEQ

ATTACHMENT A

DEQ FORM AQ523



**CATEGORICALLY EXEMPT TOXICS EMISSIONS UNITS****ANSWER SHEET**

Facility name: _____ Permit Number: _____

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
<input type="checkbox"/>	<input type="checkbox"/>	Evaporative and tail pipe emissions from on-site motor vehicle operation.
<input type="checkbox"/>	<input type="checkbox"/>	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.
<input type="checkbox"/>	<input type="checkbox"/>	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.
<input type="checkbox"/>	<input type="checkbox"/>	Office activities.
<input type="checkbox"/>	<input type="checkbox"/>	Food service activities.
<input type="checkbox"/>	<input type="checkbox"/>	Janitorial activities.
<input type="checkbox"/>	<input type="checkbox"/>	Personal care activities.
<input type="checkbox"/>	<input type="checkbox"/>	Grounds keeping activities, including, but not limited to building painting and road and parking lot maintenance.
<input type="checkbox"/>	<input type="checkbox"/>	On-site laundry activities.
<input type="checkbox"/>	<input type="checkbox"/>	On-site recreation facilities.
<input type="checkbox"/>	<input type="checkbox"/>	Instrument calibration.
<input type="checkbox"/>	<input type="checkbox"/>	Automotive storage garages.

<input type="checkbox"/>	<input type="checkbox"/>	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.
<input type="checkbox"/>	<input type="checkbox"/>	Temporary construction activities.
<input type="checkbox"/>	<input type="checkbox"/>	Warehouse activities.
<input type="checkbox"/>	<input type="checkbox"/>	Accidental fires and fire suppression.
<input type="checkbox"/>	<input type="checkbox"/>	Air vents from compressors.
<input type="checkbox"/>	<input type="checkbox"/>	Air purification systems.
<input type="checkbox"/>	<input type="checkbox"/>	Continuous emissions monitoring lines.
<input type="checkbox"/>	<input type="checkbox"/>	Demineralized water tanks.
<input type="checkbox"/>	<input type="checkbox"/>	Pre-treatment of municipal water, including use of deionized water purification systems.
<input type="checkbox"/>	<input type="checkbox"/>	Electrical charging stations.
<input type="checkbox"/>	<input type="checkbox"/>	Fire brigade training.
<input type="checkbox"/>	<input type="checkbox"/>	Instrument air dryers and distribution.
<input type="checkbox"/>	<input type="checkbox"/>	Fully enclosed process raw water filtration systems.
<input type="checkbox"/>	<input type="checkbox"/>	Electric motors.
<input type="checkbox"/>	<input type="checkbox"/>	Pressurized tanks containing gaseous compounds that do not contain toxic air contaminants.
<input type="checkbox"/>	<input type="checkbox"/>	Vacuum sheet stacker vents.
<input type="checkbox"/>	<input type="checkbox"/>	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.
<input type="checkbox"/>	<input type="checkbox"/>	Log ponds.
<input type="checkbox"/>	<input type="checkbox"/>	Stormwater settling basins.
<input type="checkbox"/>	<input type="checkbox"/>	Paved roads and paved parking lots within an urban growth boundary.
<input type="checkbox"/>	<input type="checkbox"/>	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.
<input type="checkbox"/>	<input type="checkbox"/>	Health, safety, and emergency response activities.
<input type="checkbox"/>	<input type="checkbox"/>	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.
<input type="checkbox"/>	<input type="checkbox"/>	Non-contact steam vents and leaks and safety and relief valves for boiler steam distribution systems.
<input type="checkbox"/>	<input type="checkbox"/>	Non-contact steam condensate flash tanks.
<input type="checkbox"/>	<input type="checkbox"/>	Non-contact steam vents on condensate receivers, deaerators and similar equipment.
<input type="checkbox"/>	<input type="checkbox"/>	Boiler blowdown tanks.
<input type="checkbox"/>	<input type="checkbox"/>	Ash piles maintained in a wetted condition and associated handling systems and activities.

ATTACHMENT B

EMISSIONS INVENTORY



Table 1
Input Process Rates and Parameters
Eagle Foundry Company

Source	Production or Throughput Rate			
	2021		PTE	
	Maximum Daily	Annual	Maximum Daily	Annual
Facility				
Facility Hours of Operation	20.0 (hrs/day) ⁽¹⁾	6,240 (hrs/yr) ^(a)	24.0 (hrs/day) ⁽²⁾	8,760 (hrs/yr) ⁽²⁾
Foundry				
Total Metal Poured (metal poured)	62,000 (lb/day) ⁽³⁾	5,675 (ton/yr) ⁽¹⁾	62,000 (lb/day) ⁽³⁾	8,060 (ton/yr) ⁽¹⁾
Total Metal Processed (metal processed)	38,036 (lb/day) ^(b)	3,482 (ton/yr) ^(b)	38,036 (lb/day) ^(b)	4,945 (ton/yr) ^(b)
Total Hot Top	92.3 (lb/day) ^(c)	24,005 (lb/yr) ⁽¹⁾	131 (lb/day) ^(c)	34,093 (lb/yr) ^(a)
Heat Treat				
Total Propane Usage	584 (gal/day) ^(c)	151,830 (gal/yr) ⁽¹⁾	829 (gal/day) ^(c)	215,639 (gal/yr) ^(a)
Welding				
Percentage of Welding Wire to Waste	—	5 (%) ⁽¹⁾	—	5 (%) ⁽¹⁾
Total Wire - Excluding Waste	27.5 (lb/day) ^(e)	7,150 (lb/yr) ^(e)	39.1 (lb/day) ^(e)	10,154 (lb/yr) ^(e)
Lincore M WIRE HF LCM 1/16 25# SP	3.08 (lb/day) ^(c)	800 (lb/yr) ⁽¹⁾	4.37 (lb/day) ^(c)	1,136 (lb/yr) ^(a)
Sandvik WIRE 309LSI .035 X 33 LB	0.13 (lb/day) ^(c)	33.0 (lb/yr) ⁽¹⁾	0.18 (lb/day) ^(c)	46.9 (lb/yr) ^(a)
Avesta 2205 ELECTR SS E2209 1/8 10#	1.15 (lb/day) ^(c)	300 (lb/yr) ⁽¹⁾	1.64 (lb/day) ^(c)	426 (lb/yr) ^(a)
Prostar S-6 WIRE MS 70S6 035 33# SP PRS	3.09 (lb/day) ^(c)	803 (lb/yr) ⁽¹⁾	4.4 (lb/day) ^(c)	1,140 (lb/yr) ^(a)
Stoody WIRE HF 965-G 045 33# SP	3.43 (lb/day) ^(c)	891 (lb/yr) ⁽¹⁾	4.87 (lb/day) ^(c)	1,265 (lb/yr) ^(a)
Hobart WIRE EXCELARC 71 .045 X 33 LB	0.38 (lb/day) ^(c)	99.0 (lb/yr) ⁽¹⁾	0.54 (lb/day) ^(c)	141 (lb/yr) ^(a)
CARBONS 1/2X17 CTD DC JTD 100	17.7 (lb/day) ^(c)	4,600 (lb/yr) ⁽¹⁾	25.1 (lb/day) ^(c)	6,533 (lb/yr) ^(a)
Mold Production				
Velvaccoat St 803 - Mold Wash Z	45.4 (lb/day) ^(c)	11,800 (lb/yr) ⁽¹⁾	64.5 (lb/day) ^(c)	16,759 (lb/yr) ^(a)
Isomol - Mold Wash M	13.8 (lb/day) ^(c)	3,600 (lb/yr) ⁽¹⁾	19.7 (lb/day) ^(c)	5,113 (lb/yr) ^(a)
Urethane	0.23 (gal/day) ^(c)	60.0 (gal/yr) ⁽¹⁾	0.33 (gal/day) ^(c)	85.0 (gal/yr) ^(a)
Mar-Proof H/S Lacquer Sanding Sealer	0.020 (gal/day) ^(c)	5.00 (gal/yr) ⁽¹⁾	0.03 (gal/day) ^(c)	7.00 (gal/yr) ^(a)
Coated Cerabead	34.6 (lb/day) ^(c)	9,000 (lb/yr) ⁽¹⁾	49.2 (lb/day) ^(c)	12,782 (lb/yr) ^(a)
Finishing				
Grinding Controlled (Metal Processed)	12,052 (lb/day) ^(f)	1,567 (ton/yr) ^(h)	14,264 (lb/day) ^(f)	2,225 (ton/yr) ^(h)
Grinding Fugitive (Metal Processed)	14,730 (lb/day) ⁽⁵⁾	1,915 (ton/yr) ⁽⁵⁾	17,434 (lb/day) ⁽⁵⁾	2,720 (ton/yr) ⁽⁵⁾
Grinding Booths P1-P8 (Fugitive Portion)	12,052 (lb/day) ^(f)	1,567 (ton/yr) ^(f)	14,264 (lb/day) ^(f)	2,225 (ton/yr) ^(f)
Grinding Booths T1-T3 (Fugitive)	2,678 (lb/day) ^(f)	348 (ton/yr) ^(f)	3,170 (lb/day) ^(f)	494 (ton/yr) ^(f)
Abrasive Blasting				
Mesh Blast (Garnet Grit Blasting Material Used)	23.1 (lb/day) ^(c)	6,000 (lb/yr) ⁽¹⁾	27.7 (lb/day) ^(c)	7,200 (lb/yr) ⁽¹⁾
Shot Blast (Steel Shot Used)	30.8 (lb/day) ^(c)	8,000 (lb/yr) ⁽¹⁾	36.9 (lb/day) ^(c)	9,600 (lb/yr) ⁽¹⁾
Emergency Generator				
Hours of Operation	2.00 (hrs/day) ⁽¹⁾	65.0 (hrs/yr) ⁽¹⁾	2.00 (hrs/day) ⁽¹⁾	100 (hrs/yr) ⁽¹⁾
Diesel Usage	0.92 (gal/day) ^(k)	30.0 (gal/yr) ⁽¹⁾	0.92 (gal/day) ^(k)	46.2 (gal/yr) ^(k)
Baghouse				
Small Palmer Molding Line (dust collected)	66.5 (lb/day) ⁽¹⁾	10.4 (ton/yr) ^(f)	113 (lb/day) ^(f)	14.7 (ton/yr) ^(a)
Filter	Control Efficiency (%)			
Baghouse Control Efficiency for PM	99.0 ⁽¹⁾			

NOTES:

- (a) Annual hours of operation (hrs/yr) = (daily hours of operation [hrs/day]) x (operational days per week [days/week]) x (operational weeks per year [weeks/yr])
Operational days per week (days/week) = 6.00 ⁽¹⁾
Operational weeks per year (weeks/yr) = 52.0 ⁽¹⁾
- (b) Total metal processed (ton metal processed) = (total metal poured [ton metal poured]) x (1 - [reject percentage (%)]/100)
x (1 - [percentage of metal poured for riser (%)]/100)
Reject percentage (%) = 1.05 ⁽¹⁾
Percentage of metal poured for riser (%) = 38.0 ⁽¹⁾
- (c) Daily usage (unit/day) = (annual usage [unit/yr]) / (operational days per week [days/week]) / (operational weeks per year [weeks/yr])
x (1 + [short-term variability factor (%)]/100)
Short-term variability factor (%) = 20.0 ⁽⁴⁾
- (d) Annual parameter, PTE (units/yr) = (total metal poured, PTE [tons metal poured/yr]) / (total metal poured, 2020 [tons metal poured/yr]) x (annual parameter, 2020 [units/yr])
- (e) Total welding wire - excluding waste (lb/day or lb/yr) = (total welding wire usage [lb/day or lb/yr]) x (1 - [percentage of welding wire waste (%)]/100)
- (f) Maximum daily parameter (lb/day) = (annual parameter [tons/yr]) x (2,000 lb/ton) / (operational days per week [days/week]) / (operational weeks per year [weeks/yr])
x (1 + [short-term variability factor (%)]/100)
Short-term variability factor (%) = 20.0 ⁽⁴⁾
- (g) Daily usage (unit/day) = (annual usage [unit/yr]) / (operational days per week [days/week]) / (operational weeks per year [weeks/yr])
- (h) Controlled from grinding booths P1 - P8 (ton metal processed/yr) = (total metal processed [ton metal processed/yr]) x (capture efficiency of fume extraction arms (%)/100)
x (percentage of grinding to P1 - P8 (%)/100)
Capture efficiency of fume extraction arms (%) = 50.0
Percentage of grinding to P1 - P8 (%) = 90.0
- (i) Fugitive from grinding booths P1 - P8 (ton metal processed/yr) = (total metal processed [ton metal processed/yr]) x (1 - [capture efficiency of fume extraction arms (%)]/100)
x (percentage of grinding to P1 - P8 (%)/100)
Capture efficiency of fume extraction arms (%) = 50.0
Percentage of grinding to P1 - P8 (%) = 90.0
- (j) Grinding booths T1 - T3 (ton metal processed/yr) = (total metal processed [ton metal processed/yr]) x (percentage of grinding to T1 - T3 (%)/100)
Percentage of grinding to T1 - T3 (%) = 10.0
- (k) Diesel usage (gal/day) = (diesel usage [gal/yr]) / (generator hours of operation [hrs/yr]) x (daily hours of operation [hrs/day])
- (l) Annual dust collected (tons/yr) = (daily dust collected [lb/day]) / (2,000 lb/ton) x (operational days per week [days/week]) x (operational weeks per year [weeks/yr])

REFERENCES:

- (1) Information provided by facility.
(2) Assumes continuous operation.
(3) Information provided by facility based on the maximum production possible in one day.
(4) Based on a 20% increase for short-term variability.
(5) Value represents the sum of the fugitive portion of grinding booths P1 - P8 and T1 - T3.

Table 2
PTE Foundry Melting TAC Emissions Estimate
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor	Uncontrolled Emissions Estimate		Controlled Emissions Estimate		Total Emissions Estimate ⁽¹⁾	
			Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)
PM	—	0.90 (lb PM/ton metal poured) ⁽²⁾	6.98 ^(a)	1,814 ^(b)	0.21 ^(c)	54.4 ^(d)	7.18	1,868
Aluminum and Compounds	7429-90-5	0.75 (% of PM emitted) ⁽⁵⁾	0.052 ^(e)	13.5 ^(f)	1.6E-03 ^(e)	0.41 ^(f)	0.054	13.9
Antimony and Compounds	7440-36-0	1.4E-04 (% of PM emitted) ⁽⁵⁾	9.8E-06 ^(e)	2.5E-03 ^(f)	2.9E-07 ^(e)	7.6E-05 ^(f)	1.0E-05	2.6E-03
Arsenic and Compounds	7440-38-2	8.6E-05 (% of PM emitted) ⁽⁵⁾	6.0E-06 ^(e)	1.6E-03 ^(f)	1.8E-07 ^(e)	4.7E-05 ^(f)	6.2E-06	1.6E-03
Barium and Compounds	7440-39-3	4.1E-03 (% of PM emitted) ⁽⁵⁾	2.9E-04 ^(e)	0.075 ^(f)	8.6E-06 ^(e)	2.2E-03 ^(f)	3.0E-04	0.077
Beryllium and compounds	7440-41-7	5.2E-06 (% of PM emitted) ⁽⁵⁾	3.6E-07 ^(e)	9.4E-05 ^(f)	1.1E-08 ^(e)	2.8E-06 ^(f)	3.7E-07	9.7E-05
Cadmium and Compounds	7440-43-9	5.2E-05 (% of PM emitted) ⁽⁵⁾	3.6E-06 ^(e)	9.4E-04 ^(f)	1.1E-07 ^(e)	2.8E-05 ^(f)	3.7E-06	9.7E-04
Chromium	7440-47-3	0.010 (% of PM emitted) ⁽⁵⁾	6.9E-04 ^(e)	0.18 ^(f)	2.1E-05 ^(e)	5.4E-03 ^(f)	7.1E-04	0.19
Chromium VI	18540-29-9	1.1E-05 (% of PM emitted) ⁽⁵⁾	7.6E-07 ^(e)	2.0E-04 ^(f)	2.3E-08 ^(e)	5.9E-06 ^(f)	7.8E-07	2.0E-04
Cobalt and Compounds	7440-48-4	1.4E-04 (% of PM emitted) ⁽⁵⁾	9.4E-06 ^(e)	2.4E-03 ^(f)	2.8E-07 ^(e)	7.3E-05 ^(f)	9.7E-06	2.5E-03
Copper and Compounds	7440-50-8	0.019 (% of PM emitted) ⁽⁵⁾	1.3E-03 ^(e)	0.35 ^(f)	4.0E-05 ^(e)	0.010 ^(f)	1.4E-03	0.36
Lead and Compounds	7439-92-1	2.5E-03 (% of PM emitted) ⁽⁵⁾	1.7E-04 ^(e)	0.045 ^(f)	5.2E-06 ^(e)	1.4E-03 ^(f)	1.8E-04	0.047
Manganese and Compounds	7439-96-5	0.065 (% of PM emitted) ⁽⁵⁾	4.5E-03 ^(e)	1.18 ^(f)	1.4E-04 ^(e)	0.035 ^(f)	4.7E-03	1.21
Nickel and Compounds	7440-02-0	3.0E-03 (% of PM emitted) ⁽⁵⁾	2.1E-04 ^(e)	0.055 ^(f)	6.3E-06 ^(e)	1.6E-03 ^(f)	2.2E-04	0.057
Phosphorus and Compounds	504	ND (% of PM emitted) ⁽⁵⁾	0	0	0	0	0	0
Selenium and Compounds	7782-49-2	2.6E-05 (% of PM emitted) ⁽⁵⁾	1.8E-06 ^(e)	4.7E-04 ^(f)	5.4E-08 ^(e)	1.4E-05 ^(f)	1.9E-06	4.8E-04
Silver and Compounds	7440-22-4	5.2E-05 (% of PM emitted) ⁽⁵⁾	3.6E-06 ^(e)	9.4E-04 ^(f)	1.1E-07 ^(e)	2.8E-05 ^(f)	3.7E-06	9.7E-04
Thallium	7440-28-0	5.2E-06 (% of PM emitted) ⁽⁵⁾	3.6E-07 ^(e)	9.4E-05 ^(f)	1.1E-08 ^(e)	2.8E-06 ^(f)	3.7E-07	9.7E-05
Vanadium (fume or dust)	7440-62-2	5.8E-04 (% of PM emitted) ⁽⁵⁾	4.0E-05 ^(e)	0.011 ^(f)	1.2E-06 ^(e)	3.2E-04 ^(f)	4.2E-05	0.011
Zinc and Compounds	7440-66-6	0.019 (% of PM emitted) ⁽⁵⁾	1.3E-03 ^(e)	0.34 ^(f)	3.9E-05 ^(e)	0.010 ^(f)	1.3E-03	0.35

NOTES:

ND = non-detect

TAC = toxic air contaminant

(a) Daily uncontrolled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (ton/2,000 lb) x (daily metal poured [lb/day]) x (1 - capture efficiency [%]/100)

Daily metal poured (lb/day) = 62,000 (3)

Capture efficiency (%) = 75.0 (4)

(b) Annual uncontrolled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (annual metal poured [ton/yr]) x (1 - capture efficiency [%]/100)

Annual metal poured (ton/yr) = 8,060 (3)

Capture efficiency (%) = 75.0 (4)

(c) Daily controlled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (ton/2,000 lb) x (daily metal poured [lb/day]) x (capture efficiency [%]/100) x {1 - [control efficiency of baghouse (%)]/100}

Daily metal poured (lb/day) = 62,000 (3)

Capture efficiency (%) = 75.0 (4)

Control efficiency of baghouse (%) = 99.0 (3)

(d) Annual controlled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (annual metal poured [ton/yr]) x (capture efficiency [%]/100) x {1 - [control efficiency of baghouse (%)]/100}

Annual metal poured (ton/yr) = 8,060 (3)

Capture efficiency (%) = 75.0 (4)

Control efficiency of baghouse (%) = 99.0 (3)

(e) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(f) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

REFERENCES:

(1) Value represents the sum of uncontrolled and controlled emission estimates.

(2) AP-42, Chapter 12.10, Table 12.10-3 "Particulate Emission Factors for Iron Furnaces". Uncontrolled particulate emission factor for melting in an electric induction furnace.

(3) See Table 1, Input Process Rates and Parameters.

(4) Information from Standard ACDP 03-2631 based in a 1998 industrial ventilation study of the foundry. Capture efficiency in the main bay was measured to be 95%. DEQ set the overall capture efficiency at 75%.

(5) Based on baghouse dust analysis conducted by Apex Laboratories, March 2021.

Table 3
PTE Foundry Pouring/Cooling TAC Emissions Estimate
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor	Uncontrolled Emissions Estimate		Controlled Emissions Estimate		Total Emissions Estimate ⁽¹⁾	
			Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)
PM	--	4.20 (lb PM/ton metal poured) ⁽²⁾	32.6 ^(a)	8,463 ^(b)	0.98 ^(c)	254 ^(d)	33.5	8,717
Aluminum and Compounds	7429-90-5	0.75 (% of PM emitted) ⁽⁵⁾	0.24 ^(e)	63.1 ^(f)	7.3E-03 ^(e)	1.89 ^(f)	0.25	65.0
Antimony and Compounds	7440-36-0	1.4E-04 (% of PM emitted) ⁽⁵⁾	4.6E-05 ^(e)	0.012 ^(f)	1.4E-06 ^(e)	3.6E-04 ^(f)	4.7E-05	0.012
Arsenic and Compounds	7440-38-2	8.6E-05 (% of PM emitted) ⁽⁵⁾	2.8E-05 ^(e)	7.3E-03 ^(f)	8.4E-07 ^(e)	2.2E-04 ^(f)	2.9E-05	7.5E-03
Barium and Compounds	7440-39-3	4.1E-03 (% of PM emitted) ⁽⁵⁾	1.3E-03 ^(e)	0.35 ^(f)	4.0E-05 ^(e)	0.010 ^(f)	1.4E-03	0.36
Beryllium and compounds	7440-41-7	5.2E-06 (% of PM emitted) ⁽⁵⁾	1.7E-06 ^(e)	4.4E-04 ^(f)	5.1E-08 ^(e)	1.3E-05 ^(f)	1.7E-06	4.5E-04
Cadmium and Compounds	7440-43-9	5.2E-05 (% of PM emitted) ⁽⁵⁾	1.7E-05 ^(e)	4.4E-03 ^(f)	5.1E-07 ^(e)	1.3E-04 ^(f)	1.7E-05	4.5E-03
Chromium	7440-47-3	0.010 (% of PM emitted) ⁽⁵⁾	3.2E-03 ^(e)	0.84 ^(f)	9.7E-05 ^(e)	0.025 ^(f)	3.3E-03	0.87
Chromium VI	18540-29-9	1.1E-05 (% of PM emitted) ⁽⁵⁾	3.5E-06 ^(e)	9.2E-04 ^(f)	1.1E-07 ^(e)	2.8E-05 ^(f)	3.6E-06	9.5E-04
Cobalt and Compounds	7440-48-4	1.4E-04 (% of PM emitted) ⁽⁵⁾	4.4E-05 ^(e)	0.011 ^(f)	1.3E-06 ^(e)	3.4E-04 ^(f)	4.5E-05	0.012
Copper and Compounds	7440-50-8	0.019 (% of PM emitted) ⁽⁵⁾	6.2E-03 ^(e)	1.62 ^(f)	1.9E-04 ^(e)	0.048 ^(f)	6.4E-03	1.66
Lead and Compounds	7439-92-1	2.5E-03 (% of PM emitted) ⁽⁵⁾	8.1E-04 ^(e)	0.21 ^(f)	2.4E-05 ^(e)	6.3E-03 ^(f)	8.4E-04	0.22
Manganese and Compounds	7439-96-5	0.065 (% of PM emitted) ⁽⁵⁾	0.021 ^(e)	5.48 ^(f)	6.3E-04 ^(e)	0.16 ^(f)	0.022	5.65
Nickel and Compounds	7440-02-0	3.0E-03 (% of PM emitted) ⁽⁵⁾	9.9E-04 ^(e)	0.26 ^(f)	3.0E-05 ^(e)	7.7E-03 ^(f)	1.0E-03	0.26
Phosphorus and Compounds	504	ND (% of PM emitted) ⁽⁵⁾	0	0	0	0	0	0
Selenium and Compounds	7782-49-2	2.6E-05 (% of PM emitted) ⁽⁵⁾	8.4E-06 ^(e)	2.2E-03 ^(f)	2.5E-07 ^(e)	6.6E-05 ^(f)	8.7E-06	2.3E-03
Silver and Compounds	7440-22-4	5.2E-05 (% of PM emitted) ⁽⁵⁾	1.7E-05 ^(e)	4.4E-03 ^(f)	5.1E-07 ^(e)	1.3E-04 ^(f)	1.7E-05	4.5E-03
Thallium	7440-28-0	5.2E-06 (% of PM emitted) ⁽⁵⁾	1.7E-06 ^(e)	4.4E-04 ^(f)	5.1E-08 ^(e)	1.3E-05 ^(f)	1.7E-06	4.5E-04
Vanadium (fume or dust)	7440-62-2	5.8E-04 (% of PM emitted) ⁽⁵⁾	1.9E-04 ^(e)	0.049 ^(f)	5.7E-06 ^(e)	1.5E-03 ^(f)	1.9E-04	0.051
Zinc and Compounds	7440-66-6	0.019 (% of PM emitted) ⁽⁵⁾	6.0E-03 ^(e)	1.57 ^(f)	1.8E-04 ^(e)	0.047 ^(f)	6.2E-03	1.61

NOTES:

ND = non-detect

TAC = toxic air contaminant

(a) Daily uncontrolled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (ton/2,000 lb) * (daily metal poured [lb/day]) x (1 - capture efficiency [%]/100)

Daily metal poured (lb/day) = 62,000 (3)

Capture efficiency (%) = 75.0 (4)

(b) Annual uncontrolled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (annual metal poured [ton/yr]) x (1 - capture efficiency [%]/100)

Annual metal poured (ton/yr) = 8,060 (3)

Capture efficiency (%) = 75.0 (4)

(c) Daily controlled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (ton/2,000 lb) x (daily metal poured [lb/day]) x (capture efficiency [%]/100)

x (1 - [control efficiency of baghouse (%)]/100)

Daily metal poured (lb/day) = 62,000 (3)

Capture efficiency (%) = 75.0 (4)

Control efficiency of baghouse (%) = 99.0 (3)

(d) Annual controlled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (annual metal poured [ton/yr]) x (capture efficiency [%]/100) x (1 - [control efficiency of baghouse (%)]/100)

Annual metal poured (ton/yr) = 8,060 (3)

Capture efficiency (%) = 75.0 (4)

Control efficiency of baghouse (%) = 99.0 (3)

(e) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted])/100

(f) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted])/100

REFERENCES:

(1) Value represents the sum of uncontrolled and controlled emission estimates.

(2) AP-42, Chapter 12.10, Table 12.10-7 "Particulate Emission Factors for Ancillary Operations and Fugitive Sources at Gray Iron Foundries".

Uncontrolled particulate emission factor for pouring and cooling in an electric induction furnace.

(3) See Table 1, Input Process Rates and Parameters.

(4) Information from Standard ACDP 03-2631 based in a 1998 industrial ventilation study of the foundry. Capture efficiency in the main bay was measured to be 95%. DEQ set the overall capture efficiency at 75%.

(5) Based on baghouse dust analysis conducted by Apex Laboratories, March 2021.

Table 4
PTE Hot Top TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS	Emission Factor ^(a) (lb/lb hot top used)	Uncontrolled Emissions Estimate		Controlled Emissions Estimate		Total Emissions Estimate ⁽¹⁾	
			Maximum Daily ^(b) (lb/day)	Annual ^(c) (lb/yr)	Maximum Daily ^(d) (lb/day)	Annual ^(e) (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)
Aluminum	7429-90-5	2.0E-03	0.066	17.0	2.0E-03	0.51	0.067	17.6
Alumina	1344-28-1	4.5E-03	0.15	38.4	4.4E-03	1.15	0.15	39.5

NOTES:

TAC = toxic air contaminant

(a) Emission factor (lb/lb hot top used) = (percentage of aluminum [%]/100) x (percentage airborne [%]/100)

Percentage of aluminum (%) = 20.0 (2)

Percentage of alumina (%) = 45.0 (2)

Percentage of product airborne (%) = 1.00 (3)

(b) Maximum uncontrolled daily emissions estimate (lb/day) = (emission factor [lb/lb hot top used]) x (maximum daily hot top usage [lb hot top used/day])
x (1 - capture efficiency [%]/100)

Maximum daily hot top usage (lb hot top used/day) = 131 (4)

Capture efficiency (%) = 75.0 (5)

(c) Annual uncontrolled emissions estimate (lb/yr) = (emission factor [lb/lb hot top used]) x (annual hot top usage [lb hot top used/yr]) x (1 - capture efficiency [%]/100)

Annual hot top usage (lb hot top used/yr) = 34,093 (4)

Capture efficiency (%) = 75.0 (5)

(d) Maximum controlled daily emissions estimate (lb/day) = (emission factor [lb/lb hot top used]) x (maximum daily hot top usage [lb hot top used/day]) x (capture efficiency [%]/100)
x (1 - baghouse control efficiency [%]/100)

Maximum daily hot top usage (lb hot top used/day) = 131 (4)

Control efficiency of baghouse (%) = 99.0 (4)

(e) Annual controlled emissions estimate (lb/yr) = (emission factor [lb/lb hot top used]) x (annual hot top usage [lb hot top used/yr]) x (capture efficiency [%]/100)
x (1 - baghouse control efficiency [%]/100)

Annual hot top usage (lb hot top used/yr) = 34,093 (4)

Control efficiency of baghouse (%) = 99.0 (4)

REFERENCES:

(1) Value represents the sum of uncontrolled and controlled emission estimates.

(2) Information from product SDS.

(3) Based on engineering estimate.

(4) See Table 1, Input Process Rates and Parameters.

(5) Information from Standard ACDP 03-2631 based in a 1998 industrial ventilation study of the foundry. Capture efficiency in the main bay was measured to be 95%.

DEQ set the overall capture efficiency at 75%.

Table 5
PTE Reclamation TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor	Uncontrolled Emissions Estimate		Controlled Emissions Estimate		Total Emissions Estimate ⁽¹⁾	
			Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)
PM	--	3.20 (lb PM/ton metal poured) ⁽²⁾	9.92 ^(a)	2,579 ^(b)	0.89 ^(c)	232 ^(d)	10.8	2,811
Aluminum and Compounds	7429-90-5	1.52 (% of PM emitted) ⁽⁵⁾	0.15 ^(e)	39.2 ^(f)	0.014 ^(e)	3.53 ^(f)	0.16	42.7
Antimony and Compounds	7440-36-0	3.7E-04 (% of PM emitted) ⁽⁵⁾	3.7E-05 ^(e)	9.6E-03 ^(f)	3.3E-06 ^(e)	8.6E-04 ^(f)	4.0E-05	0.010
Arsenic and Compounds	7440-38-2	2.4E-04 (% of PM emitted) ⁽⁵⁾	2.4E-05 ^(e)	6.2E-03 ^(f)	2.2E-06 ^(e)	5.6E-04 ^(f)	2.6E-05	6.8E-03
Barium and Compounds	7440-39-3	9.5E-03 (% of PM emitted) ⁽⁵⁾	9.4E-04 ^(e)	0.24 ^(f)	8.4E-05 ^(e)	0.022 ^(f)	1.0E-03	0.27
Beryllium and compounds	7440-41-7	2.6E-05 (% of PM emitted) ⁽⁵⁾	2.6E-06 ^(e)	6.8E-04 ^(f)	2.3E-07 ^(e)	6.1E-05 ^(f)	2.8E-06	7.4E-04
Cadmium and Compounds	7440-43-9	1.4E-04 (% of PM emitted) ⁽⁵⁾	1.4E-05 ^(e)	3.7E-03 ^(f)	1.3E-06 ^(e)	3.3E-04 ^(f)	1.5E-05	4.0E-03
Chromium	7440-47-3	0.0454 (% of PM emitted) ⁽⁵⁾	4.5E-03 ^(e)	1.17 ^(f)	4.1E-04 ^(e)	0.11 ^(f)	4.9E-03	1.28
Chromium VI	18540-29-9	2.7E-04 (% of PM emitted) ⁽⁵⁾	2.7E-05 ^(e)	7.1E-03 ^(f)	2.4E-06 ^(e)	6.4E-04 ^(f)	3.0E-05	7.7E-03
Cobalt and Compounds	7440-48-4	3.6E-04 (% of PM emitted) ⁽⁵⁾	3.6E-05 ^(e)	9.4E-03 ^(f)	3.2E-06 ^(e)	8.4E-04 ^(f)	3.9E-05	0.010
Copper and Compounds	7440-50-8	0.031 (% of PM emitted) ⁽⁵⁾	3.0E-03 ^(e)	0.79 ^(f)	2.7E-04 ^(e)	0.071 ^(f)	3.3E-03	0.86
Lead and Compounds	7439-92-1	0.011 (% of PM emitted) ⁽⁵⁾	1.1E-03 ^(e)	0.29 ^(f)	1.0E-04 ^(e)	0.026 ^(f)	1.2E-03	0.32
Manganese and Compounds	7439-96-5	0.27 (% of PM emitted) ⁽⁵⁾	0.026 ^(e)	6.89 ^(f)	2.4E-03 ^(e)	0.62 ^(f)	0.029	7.51
Nickel and Compounds	7440-02-0	5.8E-03 (% of PM emitted) ⁽⁵⁾	5.7E-04 ^(e)	0.15 ^(f)	5.1E-05 ^(e)	0.013 ^(f)	6.2E-04	0.16
Phosphorus and Compounds	504	ND (% of PM emitted) ⁽⁵⁾	0 ^(e)	0 ^(f)	0 ^(e)	0 ^(f)	0	0
Selenium and Compounds	7782-49-2	2.3E-04 (% of PM emitted) ⁽⁵⁾	2.3E-05 ^(e)	6.0E-03 ^(f)	2.1E-06 ^(e)	5.4E-04 ^(f)	2.5E-05	6.5E-03
Silver and Compounds	7440-22-4	2.5E-04 (% of PM emitted) ⁽⁵⁾	2.5E-05 ^(e)	6.5E-03 ^(f)	2.3E-06 ^(e)	5.9E-04 ^(f)	2.7E-05	7.1E-03
Thallium	7440-28-0	1.5E-05 (% of PM emitted) ⁽⁵⁾	1.5E-06 ^(e)	3.9E-04 ^(f)	1.4E-07 ^(e)	3.5E-05 ^(f)	1.6E-06	4.3E-04
Vanadium (fume or dust)	7440-62-2	1.5E-03 (% of PM emitted) ⁽⁵⁾	1.4E-04 ^(e)	0.037 ^(f)	1.3E-05 ^(e)	3.4E-03 ^(f)	1.6E-04	0.041
Zinc and Compounds	7440-66-6	5.9E-03 (% of PM emitted) ⁽⁵⁾	5.9E-04 ^(e)	0.15 ^(f)	5.3E-05 ^(e)	0.014 ^(f)	6.4E-04	0.17

NOTES:

ND = non-detect

TAC = toxic air contaminant

(a) Daily uncontrolled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (ton/2,000 lb) x (daily metal poured [lb/day]) x (1 - capture efficiency [%]/100)

Daily metal poured (lb/day) = 62,000 (3)

Capture efficiency (%) = 90.0 (4)

(b) Annual uncontrolled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (annual metal poured [ton/yr]) x (1 - capture efficiency [%]/100)

Annual metal poured (ton/yr) = 8,060 (3)

Capture efficiency (%) = 90.0 (4)

(c) Daily controlled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (ton/2,000 lb) x (daily metal poured [lb/day]) x (capture efficiency [%]/100) x (1 - [control efficiency of baghouse [%]]/100)

Daily metal poured (lb/day) = 62,000 (3)

Capture efficiency (%) = 90.0 (4)

Control efficiency of baghouse (%) = 99.0 (3)

(d) Annual controlled emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (annual metal poured [ton/yr]) x (capture efficiency [%]/100) x (1 - [control efficiency of baghouse [%]]/100)

Annual metal poured (ton/yr) = 8,060 (3)

Capture efficiency (%) = 90.0 (4)

Control efficiency of baghouse (%) = 99.0 (3)

(e) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(f) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

REFERENCES:

(1) Value represents the sum of uncontrolled and controlled emission estimates.

(2) AP-42, Chapter 12.10, Table 12.10-7 "Particulate Emission Factors for Ancillary Operations and Fugitive Sources at Gray Iron Foundries". Uncontrolled particulate emission factor for shakeout.

(3) See Table 1, Input Process Rates and Parameters.

(4) Capture efficiency based on equipment configuration of enclosed, rotary shakeout.

(5) Based on baghouse dust analysis conducted by Apex Laboratories, March 2021.

Table 6
PTE Torch Cutting TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor		Emissions Estimate	
		Daily	Annual	Maximum Daily (lb/day)	Annual (lb/yr)
PM	--	0.032 (lb/ton metal produced) ⁽¹⁾	0.032 (lb/ton metal produced) ⁽¹⁾	6.1E-03 ^(a)	1.58 ^(b)
Chromium	7440-47-3	3.20 (% of PM emitted) ⁽³⁾	1.00 (% of PM emitted) ⁽⁵⁾	1.9E-04 ^(c)	0.016 ^(d)
Chromium VI	18540-29-9	1.1E-05 (% of PM emitted) ⁽⁴⁾	1.1E-05 (% of PM emitted) ⁽⁴⁾	6.7E-10 ^(c)	1.7E-07 ^(d)
Copper and Compounds	7440-50-8	0.50 (% of PM emitted) ⁽³⁾	0.50 (% of PM emitted) ⁽⁵⁾	3.0E-05 ^(c)	7.9E-03 ^(d)
Manganese and Compounds	7439-96-5	14.0 (% of PM emitted) ⁽³⁾	5.23 (% of PM emitted) ⁽⁵⁾	8.5E-04 ^(c)	0.083 ^(d)
Nickel and Compounds	7440-02-0	2.00 (% of PM emitted) ⁽³⁾	0.98 (% of PM emitted) ⁽⁵⁾	1.2E-04 ^(c)	0.015 ^(d)
Phosphorus and Compounds	504	0.070 (% of PM emitted) ⁽³⁾	0.055 (% of PM emitted) ⁽⁵⁾	4.3E-06 ^(c)	8.7E-04 ^(d)
Vanadium (fume or dust)	7440-62-2	0.050 (% of PM emitted) ⁽³⁾	0.050 (% of PM emitted) ⁽⁵⁾	3.0E-06 ^(c)	7.9E-04 ^(d)

NOTES:

TAC = toxic air contaminant

(a) Daily emissions estimate (lb/day) = (emission factor [lb/ton metal produced]) x (maximum daily metal produced [lb/day]) x (ton/2,000 lb) x (1 - [baghouse control efficiency {%}]/100)

Maximum daily metal produced (lb/day) = 38,036 (2)

Baghouse control efficiency (%) = 99.0 (2)

(b) Annual emissions estimate (lb/yr) = (emission factor [lb/ton metal produced]) x (annual metal produced [tons/yr]) x (1-[baghouse control efficiency {%}]/100)

Annual metal produced (tons/yr) = 4,945 (2)

Baghouse control efficiency (%) = 99.0 (2)

(c) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted])/100

(d) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted])/100

REFERENCES:

(1) AP-42 Chapter 12 (April 2009), Table 12.5.1-1, "Filterable PM Emission Factors for Minimills." Assumes uncontrolled emission factor for billet cutting torches, natural gas-fired. Facility activity is oxy-torch cutting.

(2) See Table 1, Input Process Rates and Parameters.

(3) Information provided by facility. Based on alloy composition data for manganese and low alloy steel. Value represents the maximum content for torch cut metals.

(4) Based on a dust analysis conducted by Apex Laboratories, March 2021. Value from finishing baghouse speciation.

(5) Information provided by facility. Based on alloy composition data for manganese and low alloy steel. Value represents the average content for torch cut metals.

Table 7
PTE Welding TAC Emission Estimates
Eagle Foundry Company

Product	Toxic Air Contaminant ⁽¹⁾	CAS/DEQ ID	Weight Percentage (%)	Usage		Total Emissions Estimate	
				Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)
Total By Toxic Air Contaminant							
Total	Aluminum	7429-90-5	1.00 ⁽¹⁾	39.1 ⁽²⁾	(3)	2.1E-03 ^(a)	7.8E-03 ⁽³⁾
	Arsenic	7440-38-2	3.0E-03 ⁽¹⁾			6.4E-06 ^(a)	1.9E-04 ⁽³⁾
	Chromium	7440-47-3	20.0 ⁽¹⁾			0.041 ^(b)	1.24 ⁽³⁾
	Chromium VI	18540-29-9	-- ⁽¹⁾			2.1E-03 ^(b)	0.065 ⁽³⁾
	Cobalt	7440-48-4	0.30 ⁽¹⁾			6.4E-04 ^(a)	7.0E-03 ⁽³⁾
	Copper	7440-50-8	20.0 ⁽¹⁾			0.043 ^(a)	7.16 ⁽³⁾
	Manganese	7439-96-5	13.0 ⁽¹⁾			0.028 ^(a)	1.06 ⁽³⁾
	Nickel	7440-02-0	18.0 ⁽¹⁾			0.038 ^(a)	0.31 ⁽³⁾
	Phosphorus	504	9.0E-03 ⁽¹⁾			1.9E-05 ^(a)	5.6E-04 ⁽³⁾
	Vanadium	7440-62-2	3.0E-03 ⁽¹⁾			6.4E-06 ^(a)	1.9E-04 ⁽³⁾
Individual Products							
Sandvik WIRE 309LSI .035 X 33 LB	Chromium	7440-47-3	17.5 ⁽⁷⁾	(8)	46.9 ⁽⁹⁾	(8)	0.043 ^(c)
	Chromium VI	18540-29-9	--			(8)	2.2E-03 ^(c)
	Copper	7440-50-8	2.00 ⁽⁷⁾			(8)	5.1E-03 ^(d)
	Manganese	7439-96-5	5.50 ⁽⁷⁾			(8)	0.014 ^(d)
	Nickel	7440-02-0	18.0 ⁽⁷⁾			(8)	0.046 ^(d)
Lincore M WIRE HF LCM 1/16 25# SP	Manganese	7439-96-5	13.0 ⁽⁷⁾	(8)	1,136 ⁽⁴⁾	(8)	0.81 ^(d)
	Chromium	7440-47-3	4.90 ⁽⁷⁾			(8)	0.29 ^(c)
	Chromium VI	18540-29-9	--			(8)	0.015 ^(c)
	Nickel	7440-02-0	0.50 ⁽⁷⁾			(8)	0.031 ^(d)
Avesta 2205 ELECTR SS E2209 1/8 10#	Manganese	7439-96-5	1.70 ⁽⁷⁾	(8)	426 ⁽⁴⁾	(8)	0.040 ^(d)
	Chromium	7440-47-3	20.0 ⁽⁷⁾			(8)	0.44 ^(c)
	Chromium VI	18540-29-9	--			(8)	0.023 ^(c)
	Copper	7440-50-8	0.30 ⁽⁷⁾			(8)	7.0E-03 ^(d)
	Nickel	7440-02-0	10.0 ⁽⁷⁾			(8)	0.23 ^(d)
	Cobalt	7440-48-4	0.30 ⁽⁷⁾			(8)	7.0E-03 ^(d)
CARBONS 1/2X17 CTD DC JTD 100	Copper	7440-50-8	20.0 ⁽⁷⁾	(8)	6,533 ⁽⁹⁾	(8)	7.14 ^(d)
Stoody WIRE HF 965-G 045 33# SP	Manganese	7439-96-5	1.10 ⁽⁷⁾	(8)	1,265 ⁽⁹⁾	(8)	0.076 ^(d)
	Chromium	7440-47-3	7.00 ⁽⁷⁾			(8)	0.46 ^(c)
	Chromium VI	18540-29-9	--			(8)	0.024 ^(c)
Hobart WIRE EXCELARC 71 .045 X 33 LB	Aluminum	7429-90-5	1.00 ⁽⁷⁾	(8)	141 ⁽⁹⁾	(8)	7.7E-03 ^(d)
	Manganese	7439-96-5	2.50 ⁽⁷⁾			(8)	0.019 ^(d)
Prostar S-6 WIRE MS 70S6 035 33# SP PRS	Phosphorus	504	9.0E-03 ⁽⁷⁾	(8)	1,140 ⁽⁹⁾	(8)	5.6E-04 ^(d)
	Aluminum	7429-90-5	2.0E-03 ⁽⁷⁾			(8)	1.2E-04 ^(c)
	Chromium	7440-47-3	0.027 ⁽⁷⁾			(8)	1.6E-03 ^(c)
	Chromium VI	18540-29-9	--			(8)	8.4E-05 ^(c)
	Copper	7440-50-8	0.14 ⁽⁷⁾			(8)	8.9E-03 ^(d)
	Manganese	7439-96-5	1.63 ⁽⁷⁾			(8)	0.10 ^(d)
	Nickel	7440-02-0	0.031 ⁽⁷⁾			(8)	1.9E-03 ^(d)
	Vanadium	7440-62-2	3.0E-03 ⁽⁷⁾			(8)	1.9E-04 ^(d)
	Arsenic	7440-38-2	3.0E-03 ⁽⁷⁾			(8)	1.9E-04 ^(d)
						(8)	

NOTES:

(a) Maximum daily emissions estimate (lb/day) = (fume generation rate [lb fume/lb wire]) x (fume correction factor) x (weight percentage [%]/100) x (maximum daily usage [lb/day])

Fume generation rate (lb fume/lb wire) = 0.010 (4)

Fume correction factor = 0.5464 (5)

(b) Maximum daily emissions estimate (lb/day) = (fume generation rate [lb fume/lb wire]) x (fume correction factor) x (chromium weight percentage [%]/100) x (maximum daily usage [lb/day]) x (conversion rate [%]/100)

Fume generation rate (lb fume/lb wire) = 0.010 (4)

Fume correction factor = 0.5464 (5)

Chromium conversion rate (%) = 95.0 (6)

Hexavalent chromium conversion rate (%) = 5.00 (6)

(c) Annual emissions estimate (lb/yr) = (fume generation rate [lb fume/lb wire]) x (fume correction factor) x (chromium weight percentage [%]/100) x (annual usage [lb/yr]) x (conversion rate [%]/100)

Fume generation rate (lb fume/lb wire) = 0.010 (4)

Fume correction factor = 0.5464 (5)

Chromium conversion rate (%) = 95.0 (6)

Hexavalent chromium conversion rate (%) = 5.00 (6)

(d) Annual emissions estimate (lb/yr) = (fume generation rate [lb fume/lb wire]) x (fume correction factor) x (weight percentage [%]/100) x (annual usage [lb/yr])

Fume generation rate (lb fume/lb wire) = 0.010 (4)

Fume correction factor = 0.5464 (5)

REFERENCES:

- (1) Information from product safety data sheets. Value represents maximum percentage in all wires used at Eagle Foundry.
- (2) See Table 1, Input Process Rates and Parameters. Value represents total product usage excluding waste.
- (3) Total annual emission estimates are the sum of individual product annual emission estimates (see below).
- (4) San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998. Based on American Welding Society information and the National Steel and Shipbuilding Company (NASSCO) research. Assumes tungsten inert gas (TIG) welding fume generation rate.
- (5) San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998. Based on American Welding Society information and the National Steel and Shipbuilding Company (NASSCO) research.
- (6) San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998. Based on American Welding Society information and the National Steel and Shipbuilding Company (NASSCO) research. Hexavalent chromium accounts for 5 % of total chromium emissions.
- (7) Information from product safety data sheets.
- (8) Maximum daily emissions calculated based on the maximum alloy content of all products used, and the total product usage.
- (9) See Table 1, Input Process Rates and Parameters.

Table 8
PTE Grinding TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor	Controlled Emissions Estimate		Fugitive Emissions Estimate		Total Emissions Estimate ⁽¹⁾	
			Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily (lb/day)	Annual (lb/yr)
PM	--	0.10 (lb/ton metal processed) ⁽²⁾	7.1E-03 ^(a)	2.23 ^(b)	0.87 ^(c)	272 ^(d)	0.88	274
Aluminum and Compounds	7429-90-5	0.48 (% of PM emitted) ⁽⁴⁾	3.4E-05 ^(e)	0.011 ^(f)	4.2E-03 ^(e)	1.30 ^(f)	4.2E-03	1.31
Antimony and Compounds	7440-36-0	2.6E-04 (% of PM emitted) ⁽⁴⁾	1.9E-08 ^(e)	5.8E-06 ^(f)	2.3E-06 ^(e)	7.1E-04 ^(f)	2.3E-06	7.1E-04
Arsenic and Compounds	7440-38-2	1.6E-03 (% of PM emitted) ⁽⁴⁾	1.1E-07 ^(e)	3.5E-05 ^(f)	1.4E-05 ^(e)	4.3E-03 ^(f)	1.4E-05	4.3E-03
Barium and Compounds	7440-39-3	0.014 (% of PM emitted) ⁽⁴⁾	1.0E-06 ^(e)	3.1E-04 ^(f)	1.2E-04 ^(e)	0.038 ^(f)	1.2E-04	0.038
Beryllium and compounds	7440-41-7	5.2E-05 (% of PM emitted) ⁽⁴⁾	3.7E-09 ^(e)	1.2E-06 ^(f)	4.5E-07 ^(e)	1.4E-04 ^(f)	4.6E-07	1.4E-04
Cadmium and Compounds	7440-43-9	4.1E-04 (% of PM emitted) ⁽⁴⁾	2.9E-08 ^(e)	9.0E-06 ^(f)	3.5E-06 ^(e)	1.1E-03 ^(f)	3.6E-06	1.1E-03
Chromium	7440-47-3	1.58 (% of PM emitted) ⁽⁴⁾	1.1E-04 ^(e)	0.035 ^(f)	0.014 ^(e)	4.30 ^(f)	0.014	4.33
Chromium VI	18540-29-9	1.1E-05 (% of PM emitted) ⁽⁴⁾	7.9E-10 ^(e)	2.5E-07 ^(f)	9.6E-08 ^(e)	3.0E-05 ^(f)	9.7E-08	3.0E-05
Cobalt and Compounds	7440-48-4	7.6E-03 (% of PM emitted) ⁽⁴⁾	5.4E-07 ^(e)	1.7E-04 ^(f)	6.6E-05 ^(e)	0.021 ^(f)	6.7E-05	0.021
Copper and Compounds	7440-50-8	0.075 (% of PM emitted) ⁽⁴⁾	5.4E-06 ^(e)	1.7E-03 ^(f)	6.6E-04 ^(e)	0.20 ^(f)	6.6E-04	0.21
Lead and Compounds	7439-92-1	4.5E-04 (% of PM emitted) ⁽⁴⁾	3.2E-08 ^(e)	1.0E-05 ^(f)	3.9E-06 ^(e)	1.2E-03 ^(f)	4.0E-06	1.2E-03
Manganese and Compounds	7439-96-5	0.72 (% of PM emitted) ⁽⁴⁾	5.2E-05 ^(e)	0.016 ^(f)	6.3E-03 ^(e)	1.97 ^(f)	6.4E-03	1.99
Nickel and Compounds	7440-02-0	0.15 (% of PM emitted) ⁽⁴⁾	1.1E-05 ^(e)	3.3E-03 ^(f)	1.3E-03 ^(e)	0.41 ^(f)	1.3E-03	0.41
Phosphorus and Compounds	504	ND (% of PM emitted) ⁽⁴⁾	--	--	--	--	--	--
Selenium and Compounds	7782-49-2	2.6E-04 (% of PM emitted) ⁽⁴⁾	1.9E-08 ^(e)	5.8E-06 ^(f)	2.3E-06 ^(e)	7.1E-04 ^(f)	2.3E-06	7.1E-04
Silver and Compounds	7440-22-4	5.2E-05 (% of PM emitted) ⁽⁴⁾	3.7E-09 ^(e)	1.2E-06 ^(f)	4.5E-07 ^(e)	1.4E-04 ^(f)	4.6E-07	1.4E-04
Thallium	7440-28-0	5.2E-05 (% of PM emitted) ⁽⁴⁾	3.7E-09 ^(e)	1.2E-06 ^(f)	4.5E-07 ^(e)	1.4E-04 ^(f)	4.6E-07	1.4E-04
Vanadium (fume or dust)	7440-62-2	6.0E-03 (% of PM emitted) ⁽⁴⁾	4.3E-07 ^(e)	1.3E-04 ^(f)	5.2E-05 ^(e)	0.016 ^(f)	5.3E-05	0.017
Zinc and Compounds	7440-66-6	3.4E-03 (% of PM emitted) ⁽⁴⁾	2.4E-07 ^(e)	7.5E-05 ^(f)	2.9E-05 ^(e)	9.1E-03 ^(f)	2.9E-05	9.2E-03

NOTES:

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Maximum daily controlled emissions estimate (lb/day) = (emission factor [lb/ton metal processed]) x (maximum daily metal processed for grinding - controlled [lb/day]) x (1 - [control efficiency of baghouse (%)]/100) / (2,000 lb/ton)

Maximum daily metal processed for grinding - fugitive (lb/day) = 14,264 (3)

Control efficiency of baghouse (%) = 99.0 (3)

(b) Annual controlled emissions estimate (lb/yr) = (emission factor [lb/ton metal processed]) x (annual metal processed for grinding - controlled [tons/yr]) x (1 - [control efficiency of baghouse (%)]/100)

Annual metal processed for grinding - controlled (tons/yr) = 2,225 (3)

Control efficiency of baghouse (%) = 99.0 (3)

(c) Maximum daily uncontrolled emissions estimate (lb/day) = (emission factor [lb/ton metal processed]) x (maximum daily metal processed for grinding - uncontrolled [lb/day]) / (2,000 lb/ton)

Maximum daily metal processed for grinding - uncontrolled (lb/day) = 17,434 (3)

(d) Annual uncontrolled emissions estimate (lb/yr) = (emission factor [lb/ton metal processed]) x (annual metal processed for grinding - uncontrolled [tons/yr])

Annual metal processed for grinding - uncontrolled (tons/yr) = 2,720 (3)

(e) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(f) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

REFERENCES:

(1) Value represents the sum of uncontrolled and controlled emission estimates.

(2) Information from Standard ACDP 03-2631.

(3) See Table 1, Input Process Rates and Parameters.

(4) Based on a dust analysis conducted by Apex Laboratories, March 2021. The finishing baghouse is assumed to be representative of grinding speciation.

Table 9
PTE Mesh Blast TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor	Total Emissions Estimate	
			Maximum Daily (lb/day)	Annual (lb/yr)
PM	--	0.69 (lb PM/1,000 lb blast material) ⁽¹⁾	0.019 ^(a)	4.97 ^(b)
Aluminum and Compounds	7429-90-5	0.064 (% of PM emitted) ⁽³⁾	1.2E-05 ^(c)	3.2E-03 ^(d)
Antimony and Compounds	7440-36-0	1.6E-03 (% of PM emitted) ⁽³⁾	3.1E-07 ^(c)	7.9E-05 ^(d)
Arsenic and Compounds	7440-38-2	4.9E-03 (% of PM emitted) ⁽³⁾	9.3E-07 ^(c)	2.4E-04 ^(d)
Barium and Compounds	7440-39-3	5.1E-04 (% of PM emitted) ⁽³⁾	9.7E-08 ^(c)	2.5E-05 ^(d)
Beryllium and compounds	7440-41-7	1.0E-04 (% of PM emitted) ⁽³⁾	2.0E-08 ^(c)	5.1E-06 ^(d)
Cadmium and Compounds	7440-43-9	1.0E-04 (% of PM emitted) ⁽³⁾	2.0E-08 ^(c)	5.1E-06 ^(d)
Chromium	7440-47-3	0.24 (% of PM emitted) ⁽³⁾	4.7E-05 ^(c)	0.012 ^(d)
Chromium VI	18540-29-9	2.8E-05 (% of PM emitted) ⁽³⁾	5.4E-09 ^(c)	1.4E-06 ^(d)
Cobalt and Compounds	7440-48-4	7.0E-03 (% of PM emitted) ⁽³⁾	1.3E-06 ^(c)	3.5E-04 ^(d)
Copper and Compounds	7440-50-8	0.27 (% of PM emitted) ⁽³⁾	5.1E-05 ^(c)	0.013 ^(d)
Lead and Compounds	7439-92-1	7.9E-04 (% of PM emitted) ⁽³⁾	1.5E-07 ^(c)	3.9E-05 ^(d)
Manganese and Compounds	7439-96-5	0.65 (% of PM emitted) ⁽³⁾	1.2E-04 ^(c)	0.032 ^(d)
Nickel and Compounds	7440-02-0	0.10 (% of PM emitted) ⁽³⁾	1.9E-05 ^(c)	5.1E-03 ^(d)
Phosphorus and Compounds	504	ND (% of PM emitted) ⁽³⁾	-- ^(c)	-- ^(d)
Selenium and Compounds	7782-49-2	5.1E-05 (% of PM emitted) ⁽³⁾	9.7E-09 ^(c)	2.5E-06 ^(d)
Silver and Compounds	7440-22-4	1.0E-04 (% of PM emitted) ⁽³⁾	2.0E-08 ^(c)	5.1E-06 ^(d)
Thallium	7440-28-0	1.0E-04 (% of PM emitted) ⁽³⁾	2.0E-08 ^(c)	5.1E-06 ^(d)
Vanadium (fume or dust)	7440-62-2	9.1E-03 (% of PM emitted) ⁽³⁾	1.7E-06 ^(c)	4.5E-04 ^(d)
Zinc and Compounds	7440-66-6	8.9E-03 (% of PM emitted) ⁽³⁾	1.7E-06 ^(c)	4.4E-04 ^(d)

NOTES:

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Daily emissions estimate (lb/day) = (emission factor [lb PM/1,000 lb blast material used]) x (daily blast material used [lb/day]) / 1,000

Daily blast material used (lb/day) = 27.7 (2)

(b) Annual emissions estimate (lb/yr) = (emission factor [lb PM/1,000 lb blast material used]) x (annual blast material used [lb/yr]) / 1,000

Annual blast material used (lb/yr) = 7,200 (2)

(c) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted])/100

(d) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted])/100

REFERENCES:

(1) AP-42 Chapter 13.2.6, Table 13.2.6-1, Particulate Emission factors for Abrasive Blasting. Value represents abrasive blasting with garnet blast media controlled with a fabric filter.

(2) See Table 1, Input Process Rates and Parameters.

(3) Based on dust analysis conducted by Apex Laboratories, March 2021.

Table 10
PTE Shot Blast TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor	Total Emissions Estimate	
			Maximum Daily (lb/day)	Annual (lb/yr)
PM	--	5.77 (lb PM/1,000 lb blast material) ^(a)	2.1E-03 ^(b)	0.55 ^(c)
Aluminum and Compounds	7429-90-5	0.48 (% of PM emitted) ⁽⁴⁾	1.0E-05 ^(d)	2.6E-03 ^(e)
Antimony and Compounds	7440-36-0	2.6E-04 (% of PM emitted) ⁽⁴⁾	5.5E-09 ^(d)	1.4E-06 ^(e)
Arsenic and Compounds	7440-38-2	1.6E-03 (% of PM emitted) ⁽⁴⁾	3.3E-08 ^(d)	8.7E-06 ^(e)
Barium and Compounds	7440-39-3	0.014 (% of PM emitted) ⁽⁴⁾	3.0E-07 ^(d)	7.8E-05 ^(e)
Beryllium and compounds	7440-41-7	5.2E-05 (% of PM emitted) ⁽⁴⁾	1.1E-09 ^(d)	2.9E-07 ^(e)
Cadmium and Compounds	7440-43-9	4.1E-04 (% of PM emitted) ⁽⁴⁾	8.6E-09 ^(d)	2.2E-06 ^(e)
Chromium	7440-47-3	1.58 (% of PM emitted) ⁽⁴⁾	3.4E-05 ^(d)	8.8E-03 ^(e)
Chromium VI	18540-29-9	1.1E-05 (% of PM emitted) ⁽⁴⁾	2.4E-10 ^(d)	6.1E-08 ^(e)
Cobalt and Compounds	7440-48-4	7.6E-03 (% of PM emitted) ⁽⁴⁾	1.6E-07 ^(d)	4.2E-05 ^(e)
Copper and Compounds	7440-50-8	0.075 (% of PM emitted) ⁽⁴⁾	1.6E-06 ^(d)	4.2E-04 ^(e)
Lead and Compounds	7439-92-1	4.5E-04 (% of PM emitted) ⁽⁴⁾	9.6E-09 ^(d)	2.5E-06 ^(e)
Manganese and Compounds	7439-96-5	0.72 (% of PM emitted) ⁽⁴⁾	1.5E-05 ^(d)	4.0E-03 ^(e)
Nickel and Compounds	7440-02-0	0.15 (% of PM emitted) ⁽⁴⁾	3.2E-06 ^(d)	8.3E-04 ^(e)
Phosphorus and Compounds	504	ND (% of PM emitted) ⁽⁴⁾	-- ^(d)	-- ^(e)
Selenium and Compounds	7782-49-2	2.6E-04 (% of PM emitted) ⁽⁴⁾	5.5E-09 ^(d)	1.4E-06 ^(e)
Silver and Compounds	7440-22-4	5.2E-05 (% of PM emitted) ⁽⁴⁾	1.1E-09 ^(d)	2.9E-07 ^(e)
Thallium	7440-28-0	5.2E-05 (% of PM emitted) ⁽⁴⁾	1.1E-09 ^(d)	2.9E-07 ^(e)
Vanadium (fume or dust)	7440-62-2	6.0E-03 (% of PM emitted) ⁽⁴⁾	1.3E-07 ^(d)	3.3E-05 ^(e)
Zinc and Compounds	7440-66-6	3.4E-03 (% of PM emitted) ⁽⁴⁾	7.1E-08 ^(d)	1.9E-05 ^(e)

NOTES:

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

- (a) Emission factor (lb/1,000 lb blast material) = (emission factor [lb/1,000 lb sand]) x (0.10) ⁽¹⁾
Emission factor (lb/1,000 lb sand) = 57.7 ⁽²⁾
- (b) Daily emissions estimate (lb/day) = (emission factor [lb PM/1,000 lb blast material used]) x (daily blast material used [lb/day]) / 1,000
x (1 - [control efficiency of baghouse (%)]/100)
Daily blast material used (lb/day) = 36.9 ⁽³⁾
Control efficiency of baghouse (%) = 99.0 ⁽³⁾
- (c) Annual emissions estimate (lb/yr) = (emission factor [lb PM/1,000 lb blast material used]) x (annual blast material used [lb/yr]) / 1,000
x (1 - [control efficiency of baghouse (%)]/100)
Annual blast material used (lb/yr) = 9,600 ⁽³⁾
Control efficiency of baghouse (%) = 99.0 ⁽³⁾
- (d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)
- (e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

REFERENCES:

- (1) AP-42 Chapter 13.2.6, Section 13.2.6.3, Emissions and Controls. Total PM emissions from abrasive blasting using shot are about 10 percent of total PM emissions from abrasive blasting using sand.
- (2) AP-42 Chapter 13.2.6, Table 13.2.6-1, Particulate Emission factors for Abrasive Blasting. Represents average value for uncontrolled sand blasting.
- (3) See Table 1, Input Process Rates and Parameters.
- (4) Based on a dust analysis conducted by Apex Laboratories, March 2021. The finishing baghouse is assumed to be representative of shotblast speciation.

Table 11
PTE Small Palmer TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor ⁽¹⁾ (lb/ton PM generated)	Total Emissions Estimate	
			Maximum Daily ^(a) (lb/day)	Annual ^(b) (lb/yr)
Aluminum and Compounds	7429-90-5	10.3	5.9E-03	1.54
Antimony and Compounds	7440-36-0	1.5E-03	8.3E-07	2.2E-04
Arsenic and Compounds	7440-38-2	1.2E-03	6.9E-07	1.8E-04
Barium and Compounds	7440-39-3	0.060	3.5E-05	9.0E-03
Beryllium and compounds	7440-41-7	9.9E-05	5.7E-08	1.5E-05
Cadmium and Compounds	7440-43-9	2.3E-04	1.3E-07	3.4E-05
Chromium	7440-47-3	0.098	5.6E-05	0.015
Chromium VI	18540-29-9	2.0E-03	1.1E-06	2.9E-04
Cobalt and Compounds	7440-48-4	1.7E-03	9.5E-07	2.5E-04
Copper and Compounds	7440-50-8	0.26	1.5E-04	0.039
Lead and Compounds	7439-92-1	0.031	1.8E-05	4.6E-03
Manganese and Compounds	7439-96-5	0.78	4.5E-04	0.12
Nickel and Compounds	7440-02-0	0.037	2.1E-05	5.5E-03
Phosphorus and Compounds	504	ND	--	--
Selenium and Compounds	7782-49-2	4.9E-04	2.8E-07	7.3E-05
Silver and Compounds	7440-22-4	6.2E-04	3.5E-07	9.2E-05
Thallium	7440-28-0	9.9E-05	5.7E-08	1.5E-05
Vanadium (fume or dust)	7440-62-2	6.7E-03	3.8E-06	1.0E-03
Zinc and Compounds	7440-66-6	0.17	9.6E-05	0.025

NOTES:

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Maximum daily emissions estimate (lb/day) = (maximum daily PM generated [lb/day]) x (emission factor [lb/ton PM generated]) x (ton/2,000 lb)
x (1 - [baghouse control efficiency (%)]/100)

Maximum daily PM generated (lb PM generated/day) = 114 (1)

Baghouse control efficiency (%) = 99.0 (2)

(b) Annual emissions estimate (lb/yr) = (annual PM generated [ton/yr]) x (emission factor [lb/ton PM generated])
x (1 - [baghouse control efficiency (%)]/100)

Annual PM generated (tons PM generated/yr) = 14.9 (1)

Baghouse control efficiency (%) = 99.0 (2)

REFERENCES:

(1) See Table D2, Baghouse Emission Factors - PTE. Based on a dust analysis conducted by Apex Laboratories, March 2021.

(2) See Table 1, Input Process Rates and Parameters.

Table 12
PTE Mixing Station TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor	Total Emissions Estimate	
			Maximum Daily (lb/day)	Annual (lb/yr)
PM	--	0.40 (lb PM/ton metal poured) ⁽¹⁾	12.4 ^(a)	3,224 ^(b)
Aluminum and Compounds	7429-90-5	0.50 (% of PM emitted) ⁽³⁾	0.062 ^(c)	16.1 ^(d)
Antimony and Compounds	7440-36-0	7.0E-05 (% of PM emitted) ⁽³⁾	8.7E-06 ^(c)	2.3E-03 ^(d)
Arsenic and Compounds	7440-38-2	2.7E-05 (% of PM emitted) ⁽³⁾	3.3E-06 ^(c)	8.6E-04 ^(d)
Barium and Compounds	7440-39-3	2.4E-03 (% of PM emitted) ⁽³⁾	3.0E-04 ^(c)	0.079 ^(d)
Beryllium and compounds	7440-41-7	5.3E-06 (% of PM emitted) ⁽³⁾	6.6E-07 ^(c)	1.7E-04 ^(d)
Cadmium and Compounds	7440-43-9	5.3E-06 (% of PM emitted) ⁽³⁾	6.6E-07 ^(c)	1.7E-04 ^(d)
Chromium	7440-47-3	5.8E-03 (% of PM emitted) ⁽³⁾	7.2E-04 ^(c)	0.19 ^(d)
Chromium VI	18540-29-9	4.0E-05 (% of PM emitted) ⁽³⁾	5.0E-06 ^(c)	1.3E-03 ^(d)
Cobalt and Compounds	7440-48-4	9.2E-05 (% of PM emitted) ⁽³⁾	1.1E-05 ^(c)	3.0E-03 ^(d)
Copper and Compounds	7440-50-8	0.017 (% of PM emitted) ⁽³⁾	2.2E-03 ^(c)	0.56 ^(d)
Lead and Compounds	7439-92-1	1.2E-03 (% of PM emitted) ⁽³⁾	1.5E-04 ^(c)	0.039 ^(d)
Manganese and Compounds	7439-96-5	0.046 (% of PM emitted) ⁽³⁾	5.8E-03 ^(c)	1.50 ^(d)
Nickel and Compounds	7440-02-0	3.0E-03 (% of PM emitted) ⁽³⁾	3.7E-04 ^(c)	0.096 ^(d)
Phosphorus and Compounds	504	ND (% of PM emitted) ⁽³⁾	0 ^(c)	0 ^(d)
Selenium and Compounds	7782-49-2	2.7E-05 (% of PM emitted) ⁽³⁾	3.3E-06 ^(c)	8.6E-04 ^(d)
Silver and Compounds	7440-22-4	3.1E-05 (% of PM emitted) ⁽³⁾	3.8E-06 ^(c)	9.9E-04 ^(d)
Thallium	7440-28-0	5.3E-06 (% of PM emitted) ⁽³⁾	6.6E-07 ^(c)	1.7E-04 ^(d)
Vanadium (fume or dust)	7440-62-2	2.8E-04 (% of PM emitted) ⁽³⁾	3.5E-05 ^(c)	9.0E-03 ^(d)
Zinc and Compounds	7440-66-6	5.7E-03 (% of PM emitted) ⁽³⁾	7.1E-04 ^(c)	0.18 ^(d)

NOTES:

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Daily emissions estimate (lb/day) = (emission factor [lb/ton metal poured]) x (daily metal poured [lb/day]) x (ton/2,000 lb)

Daily metal poured (lb metal poured/day) = 62,000 (2)

(b) Annual emissions estimate (lb/yr) = (emission factor [lb/ton metal poured]) x (annual dust collected [ton dust collected/yr])

Annual metal poured (ton/yr) = 8,060 (2)

(c) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(d) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

REFERENCES:

(1) Standard ACDP 03-2631-ST-01 dated June 11, 2020.

(2) See Table 1, Input Process Rates and Parameters.

(3) Based on a dust analysis conducted by Apex Laboratories, March 2021.

Table 13
PTE Mass Balance - Pattern TAC Emission Estimates
Eagle Foundry Company

Product	Toxic Air Contaminant ⁽¹⁾	CAS	Weight Percentage (%)	Specific Gravity	Product Density (lb/gal)	Product Usage ⁽²⁾		Total Emissions Estimate	
						Maximum Daily (gal/day)	Annual (gal/yr)	Maximum Daily ^(a) (lb/day)	Annual ^(b) (lb/yr)
Urethane	Toluene	108-88-3	5.50 ⁽³⁾	0.907 ⁽¹⁾	7.56 ^(c)	0.33	85.0	0.14	35.3
Mar-Proof H/S Lacquer Sanding Sealer	Methyl Ethyl Ketone	78-93-3	17.5 ⁽³⁾	--	7.56 ⁽¹⁾	0.030	7.00	0.040	9.26
	Toluene	108-88-3	17.5 ⁽³⁾					0.040	9.26
	Isopropanol	67-63-0	5.00 ⁽³⁾					0.011	2.65
	n-Butyl Alcohol	71-36-3	5.00 ⁽³⁾					0.011	2.65

NOTES:

TAC = toxic air contaminant

(a) Maximum daily emissions estimate (lb/day) = (weight percentage [%]/100) x (product density [lb/gal]) x (maximum daily product usage [gal/day])

(b) Annual emissions estimate (lb/yr) = (weight percentage [%]/100) x (product density [lb/gal]) x (maximum annual product usage [gal/yr])

(c) Product density (lb/gal) = (specific gravity) x (density of water [lb/gal])

Density of water (lb/gal) = 8.331 (4)

REFERENCES:

(1) Information from product SDS.

(2) See Table 1, Input Process Rates and Parameters.

(3) Information from product SDS. Value is midpoint of the range.

(4) Density of water at 20 degrees Celsius.

Table 14
PTE Mass Balance - Mold TAC Emission Estimates
Eagle Foundry Company

Product	Toxic Air Contaminant ⁽¹⁾	CAS	Weight Percentage (%)	Product Usage ⁽²⁾		Total Emissions Estimate	
				Maximum Daily (lb/day)	Annual (lb/yr)	Maximum Daily ^(a) (lb/day)	Annual ^(b) (lb/yr)
Velvacoat ST 803	Isopropanol	67-63-0	25.0 ⁽³⁾	64.5	16,759	16.1	4,190
Isomol 780	Isopropanol	67-63-0	27.5 ⁽³⁾	19.7	5,113	5.42	1,406
Coated Cerabead	Phenol	108-95-2	0.010 ⁽³⁾	49.2	12,782	4.9E-03	1.28

NOTES:

TAC = toxic air contaminant

(a) Maximum daily emissions estimate (lb/day) = (weight percentage [%]/100) x (maximum daily product usage [lb/day])

(b) Annual emissions estimate (lb/yr) = (weight percentage [%]/100) x (maximum annual product usage [lb/yr])

REFERENCES:

(1) Information from product SDS.

(2) See Table 1, Input Process Rates and Parameters.

(3) Information from product SDS. Value is midpoint of the range.

Table 15
PTE Propane Combustion TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS	Emission Factor ⁽¹⁾ (lb/Mgal)	Total Emissions Estimate	
			Maximum Daily ^(a) (lb/day)	Annual ^(b) (lb/yr)
Benzene	71-43-2	7.1E-04	5.9E-04	0.15
Formaldehyde	50-00-0	1.5E-03	1.3E-03	0.33
PAHs (excluding Naphthalene)	401	1.0E-05	8.3E-06	2.2E-03
Naphthalene	91-20-3	3.0E-05	2.5E-05	6.5E-03
Acetaldehyde	75-07-0	3.8E-04	3.2E-04	0.082
Acrolein	107-02-8	2.4E-04	2.0E-04	0.052
Ammonia	7664-41-7	0.30	0.25	64.7
Ethylbenzene	100-41-4	8.4E-04	7.0E-04	0.18
Hexane	110-54-3	5.6E-04	4.6E-04	0.12
Toluene	108-88-3	3.3E-03	2.7E-03	0.70
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	2.4E-03	2.0E-03	0.52

NOTES:

Mgal = thousand gallons.

TAC = toxic air contaminant

(a) Daily emissions estimate (lb/day) = (emission factor [lb/Mgal]) x (maximum daily propane usage [gal/day]) x (Mgal/1,000 gal)

Maximum daily propane usage (gal/day) = 829 (2)

(b) Annual emissions estimate (lb/yr) = (emission factor [lb/Mgal]) x (annual propane usage [gal/yr]) x (Mgal/1,000 gal)

Annual propane usage (gal/yr) = 215,639 (2)

REFERENCES:

(1) Emission factors provided by Oregon Department of Environmental Quality for Propane External Combustion Sources.

Emission factors for sources <10 MMBtu/hr were used.

(2) See Table 1, Input Process Rates and Parameters.

Table 16
PTE Diesel Emergency Generator TAC Emission Estimates
Eagle Foundry Company

TAC	CAS	Emission Factor (lb/Mgal)	Emissions Estimates	
			Daily ^(a) (lb/day)	Annual ^(b) (lb/yr)
Arsenic	7440-38-2	1.6E-03 ⁽³⁾	1.1E-06	5.5E-05
Cadmium	7440-43-9	1.5E-03 ⁽³⁾	1.0E-06	5.1E-05
Chromium VI	18540-29-9	1.0E-04 ⁽³⁾	6.8E-08	3.4E-06
Copper	7440-50-8	4.1E-03 ⁽³⁾	2.8E-06	1.4E-04
Lead	7439-92-1	8.3E-03 ⁽³⁾	5.7E-06	2.8E-04
Manganese	7439-96-5	3.1E-03 ⁽³⁾	2.1E-06	1.1E-04
Mercury	7439-97-6	2.0E-03 ⁽³⁾	1.4E-06	6.8E-05
Nickel	7440-02-0	3.9E-03 ⁽³⁾	2.7E-06	1.3E-04
Selenium	7782-49-2	2.2E-03 ⁽³⁾	1.5E-06	7.5E-05
Acetaldehyde	75-07-0	0.78 ⁽³⁾	5.3E-04	0.027
Acrolein	107-02-8	0.034 ⁽³⁾	2.3E-05	1.2E-03
Benzene	71-43-2	0.19 ⁽³⁾	1.3E-04	6.4E-03
1,3-Butadiene	106-99-0	0.22 ⁽³⁾	1.5E-04	7.4E-03
Ethylbenzene	100-41-4	0.011 ⁽³⁾	7.4E-06	3.7E-04
Formaldehyde	50-00-0	1.73 ⁽³⁾	1.2E-03	0.059
Hexane	110-54-3	0.027 ⁽³⁾	1.8E-05	9.2E-04
Toluene	108-88-3	0.11 ⁽³⁾	7.2E-05	3.6E-03
Xylenes (mixed isomers)	1330-20-7	0.042 ⁽³⁾	2.9E-05	1.4E-03
Ammonia	7664-41-7	0.80 ⁽⁴⁾	5.4E-04	0.027
Hydrochloric Acid	7647-01-0	0.19 ⁽³⁾	1.3E-04	6.4E-03
PAHs	401	0.036 ⁽³⁾	2.5E-05	1.2E-03
Benzo(a)pyrene	50-32-8	3.6E-05 ⁽³⁾	2.4E-08	1.2E-06
Naphthalene	91-20-3	0.020 ⁽³⁾	1.3E-05	6.7E-04
DPM	200	33.5 ⁽³⁾	0.023	1.14

NOTES:

DPM = Diesel particulate matter

Mgal = thousand gallons.

TAC = toxic air contaminant.

(a) Daily emissions estimate (lb/day) = (emission factor [lb/Mgal]) x (Mgal/1,000 gal) x (daily fuel consumption [gal/day]) x (load factor)

Daily fuel consumption (gal/day) = 0.92 (1)

Load factor = 0.74 (2)

(b) Annual emissions estimate (lb/yr) = (emission factor [lb/Mgal]) x (Mgal/1,000 gal) x (annual fuel consumption [gal/yr]) x (load factor)

Annual fuel consumption (gal/yr) = 46.2 (1)

Load factor = 0.74 (2)

REFERENCES:

(1) See Table 1, Input Process Rates and Parameters.

(2) California Emissions Estimator Model, Appendix D, Default Data Tables.

(3) DEQ approved diesel combustion emission factors for stationary and portable internal combustion engines.

(4) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Appendix B, Table B-2 "Default EF for Diesel/Distillate Oil Fuel Combustion (lb/1000 gal)" for stationary and portable internal combustion engines (ICE). Assumes no control.

Table 17
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	HAP? (Yes/No)	RBC? (Yes/No)	Emissions Estimate																																					
				Foundry Melt		Foundry Pour/Cool		Hot Top		Reclamation		Torch Cut		Welding		Grinding (Controlled)		Grinding (Uncontrolled)		Mesh Blast		Shotblast		Small Palmer Mold Station		Screening Station		Mass Balance Pattern		Mass Balance Core		Emergency Generator		Propane		Facility Total					
				(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)				
ORGANIC COMPOUNDS																																									
Acetaldehyde	75-07-0	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.3E-04	0.027	3.2E-04	0.082	8.5E-04	0.11				
Acrolein	107-02-8	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3E-05	1.2E-03	2.0E-04	0.052	2.2E-04	0.053				
Benzene	71-43-2	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3E-04	6.4E-03	5.9E-04	0.15	7.2E-04	0.16				
1,3-Butadiene	106-99-0	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5E-04	7.4E-03	--	--	1.5E-04	7.4E-03				
Ethylbenzene	100-41-4	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.4E-06	3.7E-04	7.0E-04	0.18	7.0E-04	0.18				
Formaldehyde	50-00-0	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2E-03	0.059	1.3E-03	0.33	2.4E-03	0.38				
Hexane	110-54-3	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.8E-05	9.2E-04	4.6E-04	0.12	4.8E-04	0.12				
Isopropanol	67-63-0	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.011	2.65	21.5	5.596	--	--	--	--	--	21.6	5.598				
Methyl Ethyl Ketone	78-93-3	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.040	9.26	--	--	--	--	--	--	--	0.040	9.26				
n-Butyl Alcohol	71-36-3	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.011	2.65	--	--	--	--	--	--	--	0.011	2.65				
Phenol	108-95-2	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.9E-03	1.28	--	--	--	--	--	4.9E-03	1.28				
Toluene	108-88-3	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.18	44.6	--	--	7.2E-05	3.6E-03	2.7E-03	0.70	0.18	45.3					
Xylene (mixed)	1330-20-7	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.9E-05	1.4E-03	2.0E-03	0.52	2.0E-03	0.52				
INORGANIC COMPOUNDS																																									
Ammonia	7664-41-7	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.4E-04	0.027	0.25	64.7	0.25	64.7				
Hydrochloric Acid	7647-01-0	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3E-04	6.4E-03	--	--	1.3E-04	6.4E-03				
Silicon dioxide (amorphous)	7631-86-9	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0				
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)																																									
Benzo(a)pyrene	50-32-8	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.4E-08	1.2E-06	--	--	2.4E-08	1.2E-06				
Naphthalene	91-20-3	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3E-05	6.7E-04	2.5E-05	6.5E-03	3.8E-05	7.1E-03				
PAHs (excluding Naphthalene)*	401	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.5E-05	1.2E-03	8.3E-06	2.2E-03	3.3E-05	3.4E-03				
METALS																																									
Aluminum and Compounds	7429-90-5	No	Yes	0.054	13.9	0.25	65.0	0.067	17.6	0.16	42.7	--	--	2.1E-03	7.8E-03	3.4E-05	0.011	4.2E-03	1.30	1.2E-05	3.2E-03	1.0E-05	2.6E-03	5.9E-03	1.54	0.062	16.1	--	--	--	--	--	--	--	--	0.61	158				
Alumina	1344-28-1	No	No	--	--	--	--	0.15	39.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.15	39.5			
Antimony and Compounds	7440-36-0	Yes	Yes	1.0E-05	2.6E-03	4.7E-05	0.012	--	--	4.0E-05	0.010	--	--	--	--	1.9E-08	5.8E-06	2.3E-06	7.1E-04	3.1E-07	7.9E-05	5.5E-09	1.4E-06	8.3E-07	2.2E-04	8.7E-06	2.3E-03	--	--	--	--	--	--	--	--	1.1E-04	0.029				
Arsenic and Compounds	7440-38-2	Yes	Yes	6.2E-06	1.6E-03	2.9E-05	7.5E-03	--	--	2.6E-05	6.8E-03	--	--	6.4E-06	1.9E-04	1.1E-07	3.5E-05	1.4E-05	4.3E-03	9.3E-07	2.4E-04	3.3E-08	8.7E-06	6.9E-07	1.8E-04	3.3E-06	8.6E-04	--	--	1.1E-06	5.5E-05	--	--	--	--	8.7E-05	0.022				
Barium and Compounds	7440-39-3	No	No	3.0E-04	0.077	1.4E-03	0.36	--	--	1.0E-03	0.27	--	--	--	--	1.0E-06	3.1E-04	1.2E-04	0.038	9.7E-08	2.5E-05	3.0E-07	7.8E-05	3.5E-05	9.0E-03	3.0E-04	0.079	--	--	--	--	--	--	--	--	3.2E-03	0.83				
Beryllium and compounds	7440-41-7	Yes	Yes	3.7E-07	9.7E-05	1.7E-06	4.5E-04	--	--	2.8E-06	7.4E-04	--	--	--	--	3.7E-09	1.2E-06	4.5E-07	1.4E-04	2.0E-08	5.1E-06	1.1E-09	2.9E-07	5.7E-08	1.5E-05	6.6E-07	1.7E-04	--	--	--	--	--	--	--	--	6.1E-06	1.6E-03				
Cadmium and Compounds	7440-43-9	Yes	Yes	3.7E-06	9.7E-04	1.7E-05	4.5E-03	--	--	1.5E-05	4.0E-03	--	--	--	--	2.9E-08	9.0E-06	3.5E-06	1.1E-03	2.0E-08	5.1E-06	8.6E-09	2.2E-06	1.3E-07	3.4E-05	6.6E-07	1.7E-04	--	--	--	--	1.0E-06	5.1E-05	--	--	4.2E-05	0.011				
Chromium	7440-47-3	Yes	No	7.1E-04	0.19	3.3E-03	0.87	--	--	4.9E-03	1.28	1.9E-04	0.016	0.041	1.24	1.1E-04	0.035	0.014	4.30	4.7E-05	0.012	3.4E-05	8.8E-03	5.6E-05	0.015	7.2E-04	0.19	--	--	--	--	--	--	--	--	0.064	8.14				
Chromium VI	18540-29-9	Yes	Yes	7.8E-07	2.0E-04	3.6E-06	9.5E-04	--	--	3.0E-05	7.7E-03	6.7E-10	1.7E-07	2.1E-03	0.065	7.9E-10	2.5E-07	9.6E-08	3.0E-05	5.4E-09	1.4E-06	2.4E-10	6.1E-08	1.1E-06	2.9E-04	5.0E-06	1.3E-03	--	--	--	--	6.8E-08	3.4E-06	--	--	2.2E-03	0.075				
Cobalt and Compounds	7440-48-4	Yes	Yes	9.7E-06	2.5E-03	4.5E-05	0.012	--	--	3.9E-05	0.010	--	--	6.4E-04	7.0E-03	5.4E-07	1.7E-04	6.6E-05	0.021	1.3E-06	3.5E-04	1.6E-07	4.2E-05	9.5E-07	2.5E-04	1.1E-05	3.0E-03	--	--	--	--	--	--	--	--	8.2E-04	0.056				
Copper and Compounds	7440-50-8	No	Yes	1.4E-03	0.36	6.4E-03	1.66	--	--	3.3E-03	0.86	3.0E-05	7.9E-03	0.043	7.16	5.4E-06	1.7E-03	6.6E-04	0.20	5.1E-05	0.013	1.6E-06	4.2E-04	1.5E-04	0.039	2.2E-03	0.56	--	--	--	--	2.8E-06	1.4E-04	--	--	0.057	10.9				
Lead and Compounds	7439-92-1	Yes	Yes	1.8E-04	0.047	8.4E-04	0.22	--	--	1.2E-03	0.32	--	--	--	--	3.2E-08	1.0E-05	3.9E-06	1.2E-03	1.5E-07	3.9E-05	9.6E-09	2.5E-06	1.8E-05	4.6E-03	1.5E-04	0.039	--	--	--	--	5.7E-06	2.8E-04	--	--	2.4E-03	0.63				
Manganese and Compounds	7439-96-5	Yes	Yes	4.7E-03	1.21	0.022	5.65	--	--	0.029	7.51	8.5E-04	0.083	0.028	1.06	5.2E-05	0.016	6.3E-03	1.97	1.2E-04	0.032	1.5E-05	4.0E-03	4.5E-04	0.12	5.8E-03	1.50	--	--	--	--	2.1E-06	1.1E-04	--	--	0.097	19.1				
Mercury	7439-97-6	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.4E-06	6.8E-05	--	--	1.4E-06	6.8E-05				
Nickel and Compounds	7440-02-0	Yes	Yes	2.2E-04	0.057	1.0E-03	0.26	--	--	6.2E-04	0.16	1.2E-04	0.015	0.038	0.31	1.1E-05	3.3E-03	1.3E-03	0.41	1.9E-05	5.1E-03	3.2E-06	8.3E-04	2.1E-05	5.5E-03	3.7E-04	0.096	--	--	--	--	2.7E-06	1.3E-04	--	--	0.042	1.33				
Phosphorus and Compounds	504	Yes	No	--	--	--	--	--	--	--	--	--	--	--	--	4.3E-06	8.7E-04	1.9E-05	5.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3E-05	1.4E-03				
Selenium and Compounds	7782-49-2	Yes	Yes	1.9E-06	4.8E-04	8.7E-06	2.3E-03	--	--	2.5E-05	6.5E-03	--	--	--	--	1.9E-08	5.8E-06	2.3E-06	7.1E-04	9.7E-09	2.5E-06	5.5E-09	1.4E-06	2.8E-07	7.3E-05	3.3E-06	8.6E-04	--	--	--	--	1.5E-06	7.5E-05	--	--	4.3E-05	0.011				
Silver and Compounds	7440-22-4	No	No	3.7E-06	9.7E-04	1.7E-05	4.5E-03	--	--	2.7E-05	7.1E-03	--	--	--	--	3.7E-09	1.2E-06	4.5E-07	1.4E-04	2.0E-08	5.1E-06	1.1E-09	2.9E-07	3.5E-07	9.2E-05	3.8E-06	9.9E-04	--	--	--	--	--	--	--	--	5.3E-05	0.014				
Thallium	7440-28-0	No	No	3.7E-07	9.7E-05	1.7E-06	4.5E-04	--	--	1.6E-06	4.3E-04	--	--	--	--	3.7E-09	1.2E-06	4.5E-07	1.4E-04	2.0E-08	5.1E-06	1.1E-09	2.9E-07	3.5E-07	1.5E-05	6.6E-07	1.7E-04	--	--	--	--	--	--	--	--	5.0E-06	1.3E-03				
Vanadium (fume or dust)	7440-62-2	No	Yes	4.2E-05	0.011	1.9E-04	0.051	--	--	1.6E-04	0.041	3.0E-06	7.9E-04	6.4E-06	1.9E-04	4.3E-07	1.3E-04	5.2E-05	0.016	1.7E-06	4.5E-04	1.3E-07	3.3E-05	3.8E-06	1.0E-03	3.5E-05	9.0E-03	--	--	--	--	--	--	--	--	5.0E-04	0.13				
Zinc and Compounds	7440-66-6	No	No	1.3E-03	0.35	6.2E-03	1.61	--	--	6.4E-04																															

Table D-1
Baghouse Dust Results
Eagle Foundry

Pollutant	CAS/ DEQ ID	Sample (mg/kg) ⁽¹⁾					
		Foundry	Reclaim	Small Palmer	Finishing	Mesh Blast	Screening
		FND	REC	SP	FIN	MESH	SCR
Aluminum	7429-90-5	7,460	15,200	5,170	4,780	641	4,980
Antimony	7440-36-0	1.40	3.72	0.729	ND (5.21)	16.0	0.699
Arsenic	7440-38-2	0.860	2.42	0.600	15.7	48.8	ND (0.532)
Barium	7440-39-3	41.2	94.5	30.2	140	ND (10.2)	24.4
Beryllium	7440-41-7	ND (0.104)	0.262	ND (0.0988)	ND (1.04)	ND (2.05)	ND (0.106)
Cadmium	7440-43-9	ND (1.04)	1.42	0.114	4.05	ND (2.05)	ND (0.106)
Chromium	7440-47-3	99.5	454	48.9	15,800	2,440	58.1
Chromium VI	18540-29-9	ND (0.217)	2.74	0.985	ND (0.221)	0.281	0.401
Cobalt	7440-48-4	1.35	3.63	0.828	76.0	70.3	0.920
Copper	7440-50-8	191	306	130	753	2,660	174
Lead	7439-92-1	25.0	114	15.6	4.51	7.86	12.0
Manganese	7439-96-5	648	2,670	389	7,240	6,520	464
Mercury	7439-97-6	ND (0.0415)	ND (0.0430)	ND (0.0395)	ND (0.417)	ND (0.820)	ND (0.0426)
Molybdenum	7439-98-7	16.6	11.0	7.84	980	373	11.1
Nickel	7440-02-0	30.3	57.6	18.6	1,490	1,020	29.7
Phosphorus	504	ND (51.9)	ND (53.8)	ND (49.4)	ND (52.1)	ND (102)	ND (53.2)
Selenium	7782-49-2	ND (0.519)	2.31	ND (0.494)	ND (5.21)	ND (1.02)	ND (0.532)
Silver	7440-22-4	ND (1.04)	2.53	0.309	ND (1.04)	ND (2.05)	0.306
Thallium	7440-28-0	ND (0.104)	0.152	ND (0.0988)	ND (1.04)	ND (2.05)	ND (0.106)
Vanadium	7440-62-2	5.80	14.5	3.36	60.2	90.9	2.79
Zinc	7440-66-6	185	59.4	83.9	33.5	89.4	57.0

Pollutant	CAS/ DEQ ID	Sample (% of PM) ⁽²⁾					
		Foundry	Reclaim	Small Palmer	Finishing	Mesh Blast	Screening
		FND	REC	SP	FIN	MESH	SCR
Aluminum	7429-90-5	0.746	1.52	0.517	0.478	0.0641	0.498
Antimony	7440-36-0	1.40E-04	3.72E-04	7.29E-05	2.61E-04	1.60E-03	6.99E-05
Arsenic	7440-38-2	8.60E-05	2.42E-04	6.00E-05	1.57E-03	4.88E-03	2.66E-05
Barium	7440-39-3	4.12E-03	9.45E-03	3.02E-03	0.014	5.10E-04	2.44E-03
Beryllium	7440-41-7	5.20E-06	2.62E-05	4.94E-06	5.20E-05	1.03E-04	5.30E-06
Cadmium	7440-43-9	5.20E-05	1.42E-04	1.14E-05	4.05E-04	1.03E-04	5.30E-06
Chromium	7440-47-3	9.95E-03	0.0454	4.89E-03	1.58	0.244	5.81E-03
Chromium VI	18540-29-9	1.09E-05	2.74E-04	9.85E-05	1.11E-05	2.81E-05	4.01E-05
Cobalt	7440-48-4	1.35E-04	3.63E-04	8.28E-05	7.60E-03	7.03E-03	9.20E-05
Copper	7440-50-8	0.0191	0.0306	0.013	0.0753	0.266	0.0174
Lead	7439-92-1	2.50E-03	0.0114	1.56E-03	4.51E-04	7.86E-04	1.20E-03
Manganese	7439-96-5	0.0648	0.267	0.0389	0.724	0.652	0.0464
Mercury	7439-97-6	ND	ND	ND	ND	ND	ND
Molybdenum	7439-98-7	1.66E-03	1.10E-03	7.84E-04	0.098	0.0373	1.11E-03
Nickel	7440-02-0	3.03E-03	5.76E-03	1.86E-03	0.149	0.102	2.97E-03
Phosphorus	504	ND	ND	ND	ND	ND	ND
Selenium	7782-49-2	2.60E-05	2.31E-04	2.47E-05	2.61E-04	5.10E-05	2.66E-05
Silver	7440-22-4	5.20E-05	2.53E-04	3.09E-05	5.20E-05	1.03E-04	3.06E-05
Thallium	7440-28-0	5.20E-06	1.52E-05	4.94E-06	5.20E-05	1.03E-04	5.30E-06
Vanadium	7440-62-2	5.80E-04	1.45E-03	3.36E-04	6.02E-03	9.09E-03	2.79E-04
Zinc	7440-66-6	0.0185	5.94E-03	8.39E-03	3.35E-03	8.94E-03	5.70E-03
Total % of PM		0.871	1.90	0.590	3.14	1.40	0.582
Hex/Chromium		ND	6.04E-03	0.0201	ND	1.15E-04	6.90E-03

REFERENCES:

- (1) Based on a dust analysis conducted by Apex Laboratories, March 2021.
- (2) Half the detection limit is used for non-detect values for individual samples. If all samples are non-detect for the pollutant, it is assumed the pollutant is not present.

Table D2
Baghouse Emission Factors - PTE
Eagle Foundry Company

TAC		Dust Analysis (units)				Emission Factor ^(a) (lb/ton PM generated)	
		Daily		Annual		Daily	Annual
Small Palmer EF-BH-SPM							
Small Palmer - Dust Collected		113	(lb PM collected/day) ⁽¹⁾	14.7	(tons PM collected/yr) ⁽¹⁾	--	--
PM		114	(lb PM generated/day) ^(b)	14.9	(tons PM generated/yr) ^(c)	--	--
Aluminum	7429-90-5	0.52	(% of PM) ⁽²⁾	0.52	(% of PM) ⁽²⁾	10.3	10.3
Antimony	7440-36-0	7.3E-05	(% of PM) ⁽²⁾	7.3E-05	(% of PM) ⁽²⁾	1.5E-03	1.5E-03
Arsenic	7440-38-2	6.0E-05	(% of PM) ⁽²⁾	6.0E-05	(% of PM) ⁽²⁾	1.2E-03	1.2E-03
Barium	7440-39-3	3.0E-03	(% of PM) ⁽²⁾	3.0E-03	(% of PM) ⁽²⁾	0.060	0.060
Beryllium	7440-41-7	4.9E-06	(% of PM) ⁽²⁾	4.9E-06	(% of PM) ⁽²⁾	9.9E-05	9.9E-05
Cadmium	7440-43-9	1.1E-05	(% of PM) ⁽²⁾	1.1E-05	(% of PM) ⁽²⁾	2.3E-04	2.3E-04
Chromium	7440-47-3	4.9E-03	(% of PM) ⁽²⁾	4.9E-03	(% of PM) ⁽²⁾	0.098	0.098
Chromium VI	18540-29-9	9.9E-05	(% of PM) ⁽²⁾	9.9E-05	(% of PM) ⁽²⁾	2.0E-03	2.0E-03
Cobalt	7440-48-4	8.3E-05	(% of PM) ⁽²⁾	8.3E-05	(% of PM) ⁽²⁾	1.7E-03	1.7E-03
Copper	7440-50-8	0.013	(% of PM) ⁽²⁾	0.013	(% of PM) ⁽²⁾	0.26	0.26
Lead	7439-92-1	1.6E-03	(% of PM) ⁽²⁾	1.6E-03	(% of PM) ⁽²⁾	0.031	0.031
Manganese	7439-96-5	0.039	(% of PM) ⁽²⁾	0.039	(% of PM) ⁽²⁾	0.78	0.78
Mercury	7439-97-6	ND	(2)	ND	(2)	ND	ND
Molybdenum	7439-98-7	7.8E-04	(% of PM) ⁽²⁾	7.8E-04	(% of PM) ⁽²⁾	0.016	0.016
Nickel	7440-02-0	1.9E-03	(% of PM) ⁽²⁾	1.9E-03	(% of PM) ⁽²⁾	0.037	0.037
Phosphorus	504	ND	(2)	ND	(2)	ND	ND
Selenium	7782-49-2	2.5E-05	(% of PM) ⁽²⁾	2.5E-05	(% of PM) ⁽²⁾	4.9E-04	4.9E-04
Silver	7440-22-4	3.1E-05	(% of PM) ⁽²⁾	3.1E-05	(% of PM) ⁽²⁾	6.2E-04	6.2E-04
Thallium	7440-28-0	4.9E-06	(% of PM) ⁽²⁾	4.9E-06	(% of PM) ⁽²⁾	9.9E-05	9.9E-05
Vanadium	7440-62-2	3.4E-04	(% of PM) ⁽²⁾	3.4E-04	(% of PM) ⁽²⁾	6.7E-03	6.7E-03
Zinc	7440-66-6	8.4E-03	(% of PM) ⁽²⁾	8.4E-03	(% of PM) ⁽²⁾	0.17	0.17

Filter	Control Efficiency (%) ⁽¹⁾
Baghouse Control Efficiency for PM	99.0

NOTES:

- (a) Emission factor (lb/ton PM generated) = (percentage of PM [% of PM]/100) x (2,000 lb/ton)
- (b) Maximum daily PM generated (lb PM generated/day) = (maximum daily PM collected [lb PM collected/day])
+ (maximum daily PM collected [lb PM collected/day]) x (1 - baghouse control efficiency/100)
- (c) Annual PM generated (tons PM generated/yr) = (annual PM collected [tons PM collected/yr])
+ (annual PM collected [tons PM collected/yr]) x (1 - baghouse control efficiency/100)

REFERENCES:

- (1) See Table 1, Input Process Rates and Parameters.
- (2) Based on baghouse dust analysis conducted by Apex Laboratories, March 2020.

ATTACHMENT C

SAFETY DATA SHEETS





Safety Data Sheet

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Version Number: 3.00
Supersedes Date: 06/24/20

SECTION 1: Identification

1.1. Product identifier

3M™ High Power Brake Cleaner, 08880

Product Identification Numbers

ID Number	UPC	ID Number	UPC
60-4550-8946-0	00051135088807	60-4550-9100-3	00051135088807

7100136846, 7100150166

1.2. Recommended use and restrictions on use

Recommended use

Automotive, Brake Cleaner

1.3. Supplier's details

MANUFACTURER: 3M
DIVISION: Automotive Aftermarket
ADDRESS: 3M Center, St. Paul, MN 55144-1000, USA
Telephone: 1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number

1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

The label elements below were prepared in accordance with OSHA Hazard Communication Standard, 29 CFR 1910.1200. This information may be different from the actual product label information for labels regulated by other agencies.

2.1. Hazard classification

Flammable Aerosol: Category 1.
Gas Under Pressure: Liquefied gas.
Acute Toxicity (oral): Category 4.
Serious Eye Damage/Irritation: Category 2B.
Skin Corrosion/Irritation: Category 2.
Aspiration Hazard: Category 1.
Reproductive Toxicity: Category 1B.
Carcinogenicity: Category 2.
Specific Target Organ Toxicity (single exposure): Category 1.

Specific Target Organ Toxicity (single exposure): Category 3.
Specific Target Organ Toxicity (repeated exposure): Category 1.

2.2. Label elements

Signal word

Danger

Symbols

Flame | Gas cylinder | Exclamation mark | Health Hazard |

Pictograms



Hazard Statements

Extremely flammable aerosol.
Contains gas under pressure; may explode if heated.

Harmful if swallowed.
Causes eye irritation.
Causes skin irritation.
May be fatal if swallowed and enters airways.
May cause drowsiness or dizziness.
May damage fertility or the unborn child.
Suspected of causing cancer.

Causes damage to organs:
sensory organs |

Causes damage to organs through prolonged or repeated exposure:
nervous system |

May cause damage to organs through prolonged or repeated exposure:
sensory organs |

Precautionary Statements

General:

Keep out of reach of children.

Prevention:

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Do not spray on an open flame or other ignition source.
Pressurized container: Do not pierce or burn, even after use.
Do not breathe dust/fume/gas/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wear protective gloves.
Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.

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 eye irritation persists: Get medical advice/attention.

IF ON SKIN: Wash with plenty of soap and water.

If skin irritation occurs: Get medical advice/attention.

Take off contaminated clothing and wash it before reuse.

Rinse mouth.

Do NOT induce vomiting.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

IF exposed or concerned: Get medical advice/attention.

Specific treatment (see Notes to Physician on this label).

Storage:

Protect from sunlight. Do not expose to temperatures exceeding 50C/122F.

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Disposal:

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

Notes to Physician:

This product contains methanol. If there is a reasonable suspicion of methanol poisoning, intravenous (IV) administration with either fomepizole (preferred) or ethanol (if fomepizole is unavailable) should be considered as part of the medical management.

3% of the mixture consists of ingredients of unknown acute oral toxicity.

4% of the mixture consists of ingredients of unknown acute dermal toxicity.

4% of the mixture consists of ingredients of unknown acute inhalation toxicity.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
2-Methylhexane	591-76-4	10 - 30 Trade Secret *
3-Methylhexane	589-34-4	10 - 30 Trade Secret *
Heptane, branched, cyclic and linear	426260-76-6	10 - 30 Trade Secret *
Xylene	1330-20-7	10 - 30 Trade Secret *
Ethylbenzene	100-41-4	1 - 11 Trade Secret *
Methyl Alcohol	67-56-1	< 10 Trade Secret *
Carbon Dioxide	124-38-9	1 - 5 Trade Secret *
Heptane	142-82-5	0.5 - 2.5 Trade Secret *
Dimethylcyclopentane	2532-58-3	0.5 - 1.5 Trade Secret *
Cumene	98-82-8	< 0.3 Trade Secret *
Toluene	108-88-3	< 0.3 Trade Secret *

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

SECTION 4: First aid measures**4.1. Description of first aid measures****Inhalation:**

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

Skin Contact:

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

Eye Contact:

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

If Swallowed:

Do not induce vomiting. Get immediate medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Aspiration pneumonitis (coughing, gasping, choking, burning of the mouth, and difficulty breathing). Central nervous system depression (headache, dizziness, drowsiness, incoordination, nausea, slurred speech, giddiness, and unconsciousness). Target organ effects. See Section 11 for additional details. Target organ effects following prolonged or repeated exposure. See Section 11 for additional details.

4.3. Indication of any immediate medical attention and special treatment required

This product contains methanol. If there is a reasonable suspicion of methanol poisoning, intravenous (IV) administration with either fomepizole (preferred) or ethanol (if fomepizole is unavailable) should be considered as part of the medical management.

SECTION 5: Fire-fighting measures**5.1. Suitable extinguishing media**

Use a fire fighting agent suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture

Closed containers exposed to heat from fire may build pressure and explode.

Hazardous Decomposition or By-Products**Substance**

Formaldehyde

Carbon monoxide

Carbon dioxide

Toxic Vapor, Gas, Particulate

Condition

During Combustion

During Combustion

During Combustion

During Combustion

5.3. Special protective actions for fire-fighters

Water may not effectively extinguish fire; however, it should be used to keep fire-exposed containers and surfaces cool and prevent explosive rupture.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Evacuate area. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use only non-sparking tools. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Warning! A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions

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

6.3. Methods and material for containment and cleaning up

If possible, seal leaking container. Place leaking containers in a well-ventilated area, preferably an operating exhaust hood, or if necessary outdoors on an impermeable surface until appropriate packaging for the leaking container or its contents is available. Contain spill. Cover spill area with a fire-extinguishing foam. Working from around the edges of the spill

inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible using non-sparking tools. Place in a metal container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Do not use in a confined area with minimal air exchange. Keep out of reach of children. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not spray on an open flame or other ignition source. Do not pierce or burn, even after use. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.) Use personal protective equipment (gloves, respirators, etc.) as required.

7.2. Conditions for safe storage including any incompatibilities

Store in a well-ventilated place. Keep container tightly closed. Protect from sunlight. Do not expose to temperatures exceeding 50C/122F. Store away from heat. Store away from acids. Store away from oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
Ethylbenzene	100-41-4	ACGIH	TWA:20 ppm	A3: Confirmed animal carcin.
Ethylbenzene	100-41-4	OSHA	TWA:435 mg/m3(100 ppm)	
Toluene	108-88-3	ACGIH	TWA:20 ppm	A4: Not class. as human carcin, Ototoxicant
Toluene	108-88-3	OSHA	TWA:200 ppm;CEIL:300 ppm	
Carbon Dioxide	124-38-9	ACGIH	TWA:5000 ppm;STEL:30000 ppm	
Carbon Dioxide	124-38-9	OSHA	TWA:9000 mg/m3(5000 ppm)	
Xylene	1330-20-7	ACGIH	TWA:100 ppm;STEL:150 ppm	A4: Not class. as human carcin
Xylene	1330-20-7	OSHA	TWA:435 mg/m3(100 ppm)	
Heptane	142-82-5	ACGIH	TWA:400 ppm;STEL:500 ppm	
Heptane	142-82-5	OSHA	TWA:2000 mg/m3(500 ppm)	
3-Methylhexane	589-34-4	ACGIH	TWA:400 ppm;STEL:500 ppm	
2-Methylhexane	591-76-4	ACGIH	TWA:400 ppm;STEL:500 ppm	
Methyl Alcohol	67-56-1	ACGIH	TWA:200 ppm;STEL:250 ppm	Danger of cutaneous absorption
Methyl Alcohol	67-56-1	OSHA	TWA:260 mg/m3(200 ppm)	
Cumene	98-82-8	ACGIH	TWA:5 ppm	A3: Confirmed animal carcin.
Cumene	98-82-8	OSHA	TWA:245 mg/m3(50 ppm)	SKIN

ACGIH : American Conference of Governmental Industrial Hygienists

AIHA : American Industrial Hygiene Association

CMRG : Chemical Manufacturer's Recommended Guidelines

OSHA : United States Department of Labor - Occupational Safety and Health Administration

TWA: Time-Weighted-Average

STEL: Short Term Exposure Limit

CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls

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

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:

Full Face Shield

Indirect Vented Goggles

Skin/hand protection

Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity.

Gloves made from the following material(s) are recommended: Fluoroelastomer

Polymer laminate

Respiratory protection

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

Half facepiece or full facepiece air-purifying respirator suitable for organic vapors

Half facepiece or full facepiece supplied-air respirator

Organic vapor respirators may have short service life.

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state

Liquid

Color

Colorless

Specific Physical Form:

Aerosol

Odor

Solvent

Odor threshold

No Data Available

pH

Not Applicable

Melting point

No Data Available

Boiling Point

No Data Available

Flash Point

>=15 °F [Test Method: Closed Cup]

Evaporation rate

No Data Available

Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	No Data Available
Flammable Limits(UEL)	No Data Available
Vapor Pressure	40 psi [@ 70 °F]
Vapor Density	>=1.0 [Ref Std: AIR=1]
Density	6.5 lb/gal
Specific Gravity	0.78 [Ref Std: WATER=1]
Solubility in Water	Nil
Solubility- non-water	No Data Available
Partition coefficient: n-octanol/ water	No Data Available
Autoignition temperature	No Data Available
Decomposition temperature	No Data Available
Viscosity	No Data Available
Hazardous Air Pollutants	39.3 % weight [Test Method: Calculated]
Volatile Organic Compounds	749 g/l [Test Method: calculated SCAQMD rule 443.1]
Volatile Organic Compounds	96 % weight [Test Method: calculated per CARB title 2]
Percent volatile	96 % weight
VOC Less H2O & Exempt Solvents	749 g/l [Test Method: calculated SCAQMD rule 443.1]

SECTION 10: Stability and reactivity

10.1. Reactivity

This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

10.2. Chemical stability

Stable.

10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4. Conditions to avoid

Heat

Sparks and/or flames

10.5. Incompatible materials

Strong acids

Strong oxidizing agents

10.6. Hazardous decomposition products

<u>Substance</u>	<u>Condition</u>
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:

May be harmful if inhaled.

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

May cause additional health effects (see below).

Skin Contact:

May be harmful in contact with skin.

Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, dryness, cracking, blistering, and pain. May cause additional health effects (see below).

Eye Contact:

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

Ingestion:

Harmful if swallowed. Chemical (Aspiration) Pneumonitis: Signs/symptoms may include coughing, gasping, choking, burning of the mouth, difficulty breathing, bluish colored skin (cyanosis), and may be fatal.

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

May cause additional health effects (see below).

Additional Health Effects:

Single exposure may cause target organ effects:

Auditory Effects: Signs/symptoms may include hearing impairment, balance dysfunction and ringing in the ears.

Central Nervous System (CNS) Depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

May cause blindness.

Prolonged or repeated exposure may cause target organ effects:

Auditory Effects: Signs/symptoms may include hearing impairment, balance dysfunction and ringing in the ears.

Neurological Effects: Signs/symptoms may include personality changes, lack of coordination, sensory loss, tingling or numbness of the extremities, weakness, tremors, and/or changes in blood pressure and heart rate.

Reproductive/Developmental Toxicity:

Contains a chemical or chemicals which can cause birth defects or other reproductive harm.

Carcinogenicity:

Contains a chemical or chemicals which can cause cancer.

<u>Ingredient</u>	<u>CAS No.</u>	<u>Class Description</u>	<u>Regulation</u>
Cumene	98-82-8	Grp. 2B: Possible human carc.	International Agency for Research on Cancer
Cumene	98-82-8	Anticipated human carcinogen	National Toxicology Program Carcinogens
Ethylbenzene	100-41-4	Grp. 2B: Possible human carc.	International Agency for Research on Cancer

Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or

the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Dermal		No data available; calculated ATE >2,000 - =5,000 mg/kg
Overall product	Inhalation-Vapor(4 hr)		No data available; calculated ATE >20 - =50 mg/l
Overall product	Ingestion		No data available; calculated ATE >300 - =2,000 mg/kg
Heptane, branched, cyclic and linear	Dermal	Rabbit	LD50 > 2,920 mg/kg
Heptane, branched, cyclic and linear	Inhalation-Vapor (4 hours)	Rat	LC50 > 23.3 mg/l
Heptane, branched, cyclic and linear	Ingestion	Rat	LD50 > 5,840 mg/kg
3-Methylhexane	Dermal	Rabbit	LD50 3,000 mg/kg
3-Methylhexane	Inhalation-Vapor (4 hours)	Rat	LC50 > 80 mg/l
3-Methylhexane	Ingestion	Rat	LD50 17,000 mg/kg
Xylene	Dermal	Rabbit	LD50 > 4,200 mg/kg
Xylene	Inhalation-Vapor (4 hours)	Rat	LC50 29 mg/l
Xylene	Ingestion	Rat	LD50 3,523 mg/kg
2-Methylhexane	Dermal	Rabbit	LD50 3,000 mg/kg
2-Methylhexane	Inhalation-Vapor (4 hours)	Rat	LC50 > 80 mg/l
2-Methylhexane	Ingestion	Rat	LD50 17,000 mg/kg
Methyl Alcohol	Dermal		LD50 estimated to be 1,000 - 2,000 mg/kg
Methyl Alcohol	Inhalation-Vapor		LC50 estimated to be 10 - 20 mg/l
Methyl Alcohol	Ingestion		LD50 estimated to be 50 - 300 mg/kg
Ethylbenzene	Dermal	Rabbit	LD50 15,433 mg/kg
Ethylbenzene	Inhalation-Vapor (4 hours)	Rat	LC50 17.4 mg/l
Ethylbenzene	Ingestion	Rat	LD50 4,769 mg/kg
Carbon Dioxide	Inhalation-Gas (4 hours)	Rat	LC50 > 53,000 ppm
Heptane	Dermal	Rabbit	LD50 3,000 mg/kg
Heptane	Inhalation-Vapor (4 hours)	Rat	LC50 103 mg/l
Heptane	Ingestion	Rat	LD50 > 15,000 mg/kg
Dimethylcyclopentane	Ingestion		LD50 estimated to be 300 - 2,000 mg/kg
Toluene	Dermal	Rat	LD50 12,000 mg/kg
Toluene	Inhalation-Vapor (4 hours)	Rat	LC50 30 mg/l
Toluene	Ingestion	Rat	LD50 5,550 mg/kg
Cumene	Dermal	Rabbit	LD50 > 3,160 mg/kg
Cumene	Inhalation-Vapor (4 hours)	Rat	LC50 39.4 mg/l
Cumene	Ingestion	Rat	LD50 1,400 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
Heptane, branched, cyclic and linear	Rabbit	Irritant

3-Methylhexane	Rabbit	Minimal irritation
Xylene	Rabbit	Mild irritant
2-Methylhexane	Rabbit	Minimal irritation
Methyl Alcohol	Rabbit	Mild irritant
Ethylbenzene	Rabbit	Mild irritant
Heptane	Human	Mild irritant
Toluene	Rabbit	Irritant
Cumene	Rabbit	Minimal irritation

Serious Eye Damage/Irritation

Name	Species	Value
Heptane, branched, cyclic and linear	Rabbit	Mild irritant
3-Methylhexane	Rabbit	No significant irritation
Xylene	Rabbit	Mild irritant
2-Methylhexane	Rabbit	No significant irritation
Methyl Alcohol	Rabbit	Moderate irritant
Ethylbenzene	Rabbit	Moderate irritant
Heptane	Professional judgement	Moderate irritant
Toluene	Rabbit	Moderate irritant
Cumene	Rabbit	Mild irritant

Skin Sensitization

Name	Species	Value
Heptane, branched, cyclic and linear	Guinea pig	Not classified
Methyl Alcohol	Guinea pig	Not classified
Ethylbenzene	Human	Not classified
Toluene	Guinea pig	Not classified
Cumene	Guinea pig	Not classified

Respiratory Sensitization

For the component/components, either no data are currently available or the data are not sufficient for classification.

Germ Cell Mutagenicity

Name	Route	Value
Heptane, branched, cyclic and linear	In Vitro	Not mutagenic
Xylene	In Vitro	Not mutagenic
Xylene	In vivo	Not mutagenic
Methyl Alcohol	In Vitro	Some positive data exist, but the data are not sufficient for classification
Methyl Alcohol	In vivo	Some positive data exist, but the data are not sufficient for classification
Ethylbenzene	In vivo	Not mutagenic
Ethylbenzene	In Vitro	Some positive data exist, but the data are not sufficient for classification
Heptane	In Vitro	Not mutagenic
Toluene	In Vitro	Not mutagenic
Toluene	In vivo	Not mutagenic
Cumene	In Vitro	Not mutagenic
Cumene	In vivo	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
Xylene	Dermal	Rat	Not carcinogenic
Xylene	Ingestion	Multiple	Not carcinogenic

		animal species	
Xylene	Inhalation	Human	Some positive data exist, but the data are not sufficient for classification
Methyl Alcohol	Inhalation	Multiple animal species	Not carcinogenic
Ethylbenzene	Inhalation	Multiple animal species	Carcinogenic
Toluene	Dermal	Mouse	Some positive data exist, but the data are not sufficient for classification
Toluene	Ingestion	Rat	Some positive data exist, but the data are not sufficient for classification
Toluene	Inhalation	Mouse	Some positive data exist, but the data are not sufficient for classification
Cumene	Inhalation	Multiple animal species	Carcinogenic

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
Heptane, branched, cyclic and linear	Not Specified	Not classified for female reproduction	Rat	NOAEL Not available	2 generation
Heptane, branched, cyclic and linear	Not Specified	Not classified for male reproduction	Rat	NOAEL Not available	2 generation
Heptane, branched, cyclic and linear	Not Specified	Not classified for development	Rat	NOAEL Not available	2 generation
Xylene	Inhalation	Not classified for female reproduction	Human	NOAEL Not available	occupational exposure
Xylene	Ingestion	Not classified for development	Mouse	NOAEL Not available	during organogenesis
Xylene	Inhalation	Not classified for development	Multiple animal species	NOAEL Not available	during gestation
Methyl Alcohol	Ingestion	Not classified for male reproduction	Rat	NOAEL 1,600 mg/kg/day	21 days
Methyl Alcohol	Ingestion	Toxic to development	Mouse	LOAEL 4,000 mg/kg/day	during organogenesis
Methyl Alcohol	Inhalation	Toxic to development	Mouse	NOAEL 1.3 mg/l	during organogenesis
Ethylbenzene	Inhalation	Not classified for development	Rat	NOAEL 4.3 mg/l	premating & during gestation
Carbon Dioxide	Inhalation	Not classified for male reproduction	Mouse	LOAEL 350,000 ppm	not available
Carbon Dioxide	Inhalation	Not classified for development	Rat	LOAEL 60,000 ppm	24 hours
Toluene	Inhalation	Not classified for female reproduction	Human	NOAEL Not available	occupational exposure
Toluene	Inhalation	Not classified for male reproduction	Rat	NOAEL 2.3 mg/l	1 generation
Toluene	Ingestion	Toxic to development	Rat	LOAEL 520 mg/kg/day	during gestation
Toluene	Inhalation	Toxic to development	Human	NOAEL Not available	poisoning and/or abuse
Cumene	Inhalation	Not classified for development	Rabbit	NOAEL 11.3 mg/l	during organogenesis

Lactation

Name	Route	Species	Value
Xylene	Ingestion	Mouse	Not classified for effects on or via lactation

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Heptane, branched, cyclic and linear	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human and animal	NOAEL Not available	
3-Methylhexane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Rat	NOAEL 4 mg/l	4 hours
3-Methylhexane	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Not available	NOAEL Not available	not available
3-Methylhexane	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Not available	NOAEL Not available	
Xylene	Inhalation	auditory system	Causes damage to organs	Rat	LOAEL 6.3 mg/l	8 hours
Xylene	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Xylene	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	
Xylene	Inhalation	eyes	Not classified	Rat	NOAEL 3.5 mg/l	not available
Xylene	Inhalation	liver	Not classified	Multiple animal species	NOAEL Not available	
Xylene	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Multiple animal species	NOAEL Not available	
Xylene	Ingestion	eyes	Not classified	Rat	NOAEL 250 mg/kg	not applicable
2-Methylhexane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Rat	NOAEL 4 mg/l	4 hours
2-Methylhexane	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Not available	NOAEL Not available	not available
2-Methylhexane	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Not available	NOAEL Not available	
Methyl Alcohol	Inhalation	blindness	Causes damage to organs	Human	NOAEL Not available	occupational exposure
Methyl Alcohol	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	not available
Methyl Alcohol	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL Not available	6 hours
Methyl Alcohol	Ingestion	blindness	Causes damage to organs	Human	NOAEL Not available	poisoning and/or abuse
Methyl Alcohol	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	poisoning and/or abuse
Ethylbenzene	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Ethylbenzene	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human and animal	NOAEL Not available	
Heptane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Heptane	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	

Heptane	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Toluene	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Toluene	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	
Toluene	Inhalation	immune system	Not classified	Mouse	NOAEL 0.004 mg/l	3 hours
Toluene	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	poisoning and/or abuse
Cumene	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Multiple animal species	NOAEL Not available	not available
Cumene	Inhalation	respiratory irritation	May cause respiratory irritation	Human	LOAEL 0.2 mg/l	occupational exposure
Cumene	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Multiple animal species	NOAEL Not available	not available

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Xylene	Inhalation	nervous system	Causes damage to organs through prolonged or repeated exposure	Rat	LOAEL 0.4 mg/l	4 weeks
Xylene	Inhalation	auditory system	May cause damage to organs though prolonged or repeated exposure	Rat	LOAEL 7.8 mg/l	5 days
Xylene	Inhalation	liver	Not classified	Multiple animal species	NOAEL Not available	
Xylene	Inhalation	heart endocrine system gastrointestinal tract hematopoietic system muscles kidney and/or bladder respiratory system	Not classified	Multiple animal species	NOAEL 3.5 mg/l	13 weeks
Xylene	Ingestion	auditory system	Not classified	Rat	NOAEL 900 mg/kg/day	2 weeks
Xylene	Ingestion	kidney and/or bladder	Not classified	Rat	NOAEL 1,500 mg/kg/day	90 days
Xylene	Ingestion	liver	Not classified	Multiple animal species	NOAEL Not available	
Xylene	Ingestion	heart skin endocrine system bone, teeth, nails, and/or hair hematopoietic system immune system nervous system respiratory system	Not classified	Mouse	NOAEL 1,000 mg/kg/day	103 weeks
Methyl Alcohol	Inhalation	liver	Not classified	Rat	NOAEL 6.55 mg/l	4 weeks
Methyl Alcohol	Inhalation	respiratory system	Not classified	Rat	NOAEL 13.1 mg/l	6 weeks
Methyl Alcohol	Ingestion	liver nervous system	Not classified	Rat	NOAEL 2,500 mg/kg/day	90 days
Ethylbenzene	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1.1 mg/l	2 years
Ethylbenzene	Inhalation	liver	Some positive data exist, but the	Mouse	NOAEL 1.1	103 weeks

			data are not sufficient for classification		mg/l	
Ethylbenzene	Inhalation	hematopoietic system	Not classified	Rat	NOAEL 3.4 mg/l	28 days
Ethylbenzene	Inhalation	auditory system	Not classified	Rat	NOAEL 2.4 mg/l	5 days
Ethylbenzene	Inhalation	endocrine system	Not classified	Mouse	NOAEL 3.3 mg/l	103 weeks
Ethylbenzene	Inhalation	gastrointestinal tract	Not classified	Rat	NOAEL 3.3 mg/l	2 years
Ethylbenzene	Inhalation	bone, teeth, nails, and/or hair muscles	Not classified	Multiple animal species	NOAEL 4.2 mg/l	90 days
Ethylbenzene	Inhalation	heart immune system respiratory system	Not classified	Multiple animal species	NOAEL 3.3 mg/l	2 years
Ethylbenzene	Ingestion	liver kidney and/or bladder	Not classified	Rat	NOAEL 680 mg/kg/day	6 months
Carbon Dioxide	Inhalation	heart bone, teeth, nails, and/or hair liver nervous system kidney and/or bladder respiratory system	Not classified	Rat	LOAEL 60,000 ppm	166 days
Heptane	Inhalation	liver nervous system kidney and/or bladder	Not classified	Rat	NOAEL 12 mg/l	26 weeks
Toluene	Inhalation	auditory system eyes olfactory system	Causes damage to organs through prolonged or repeated exposure	Human	NOAEL Not available	poisoning and/or abuse
Toluene	Inhalation	nervous system	May cause damage to organs though prolonged or repeated exposure	Human	NOAEL Not available	poisoning and/or abuse
Toluene	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	LOAEL 2.3 mg/l	15 months
Toluene	Inhalation	heart liver kidney and/or bladder	Not classified	Rat	NOAEL 11.3 mg/l	15 weeks
Toluene	Inhalation	endocrine system	Not classified	Rat	NOAEL 1.1 mg/l	4 weeks
Toluene	Inhalation	immune system	Not classified	Mouse	NOAEL Not available	20 days
Toluene	Inhalation	bone, teeth, nails, and/or hair	Not classified	Mouse	NOAEL 1.1 mg/l	8 weeks
Toluene	Inhalation	hematopoietic system vascular system	Not classified	Human	NOAEL Not available	occupational exposure
Toluene	Inhalation	gastrointestinal tract	Not classified	Multiple animal species	NOAEL 11.3 mg/l	15 weeks
Toluene	Ingestion	nervous system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 625 mg/kg/day	13 weeks
Toluene	Ingestion	heart	Not classified	Rat	NOAEL 2,500 mg/kg/day	13 weeks
Toluene	Ingestion	liver kidney and/or bladder	Not classified	Multiple animal species	NOAEL 2,500 mg/kg/day	13 weeks
Toluene	Ingestion	hematopoietic system	Not classified	Mouse	NOAEL 600 mg/kg/day	14 days
Toluene	Ingestion	endocrine system	Not classified	Mouse	NOAEL 105 mg/kg/day	28 days
Toluene	Ingestion	immune system	Not classified	Mouse	NOAEL 105 mg/kg/day	4 weeks
Cumene	Inhalation	auditory system endocrine system	Not classified	Rat	NOAEL 59 mg/l	13 weeks

		hematopoietic system liver nervous system eyes				
Cumene	Inhalation	kidney and/or bladder	Not classified	Rat	NOAEL 4.9 mg/l	13 weeks
Cumene	Inhalation	respiratory system	Not classified	Rat	NOAEL 59 mg/l	13 weeks
Cumene	Ingestion	kidney and/or bladder heart endocrine system hematopoietic system liver respiratory system	Not classified	Rat	NOAEL 769 mg/kg/day	6 months

Aspiration Hazard

Name	Value
Heptane, branched, cyclic and linear	Aspiration hazard
3-Methylhexane	Aspiration hazard
Xylene	Aspiration hazard
2-Methylhexane	Aspiration hazard
Ethylbenzene	Aspiration hazard
Heptane	Aspiration hazard
Toluene	Aspiration hazard
Cumene	Aspiration hazard

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information**Ecotoxicological information**

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations**13.1. Disposal methods**

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

Incinerate in a permitted waste incineration facility. Facility must be capable of handling aerosol cans. As a disposal alternative, utilize an acceptable permitted waste disposal facility. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

SECTION 14: Transport Information

For Transport Information, please visit <http://3M.com/Transportinfo> or call 1-800-364-3577 or 651-737-6501.

SECTION 15: Regulatory information

15.1. US Federal Regulations

Contact 3M for more information.

EPCRA 311/312 Hazard Classifications:

Physical Hazards

Flammable (gases, aerosols, liquids, or solids)

Gas under pressure

Health Hazards

Acute toxicity

Aspiration Hazard

Carcinogenicity

Reproductive toxicity

Serious eye damage or eye irritation

Skin Corrosion or Irritation

Specific target organ toxicity (single or repeated exposure)

Section 313 Toxic Chemicals subject to the reporting requirements of that section and 40 CFR part 372 (EPCRA):

Ingredient

C.A.S. No

% by Wt

Methyl Alcohol

67-56-1

Trade Secret < 10

Xylene

1330-20-7

Trade Secret 10 - 30

Xylene (Benzene, dimethyl-)

1330-20-7

Trade Secret 10 - 30

Ethylbenzene

100-41-4

Trade Secret 1 - 11

Cumene

98-82-8

Trade Secret < 0.3

15.2. State Regulations

Contact 3M for more information.

15.3. Chemical Inventories

The components of this material are in compliance with the provisions of Philippines RA 6969 requirements. Certain restrictions may apply. Contact the selling division for additional information.

The components of this product are in compliance with the chemical notification requirements of TSCA. All required components of this product are listed on the active portion of the TSCA Inventory.

Contact 3M for more information.

15.4. International Regulations

Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information

NFPA Hazard Classification

Health: 2 Flammability: 4 Instability: 0 Special Hazards: None

Aerosol Storage Code: 3

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address

the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

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Material Safety Data Sheet
Stainless steel Covered Electrodes

Member of the Böhler Welding Group

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 Document: MSDS AW133

WELDING ROD, AVESTA E2209-17
 CHROME

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: **AVESTA 2205**

Classification: AWS A5.4/ASME SFA5.4 Stainless Steel Welding Electrodes
 E2209-17

Products: Stainless Steel Electrodes for Manual Metal Arc Welding.

Company: Böhler Welding Group North America, 4950 Camp Road, Suite 100, Hamburg, NY 14075, USA
 Telephone number: 1-716-648-5600
 Fax number: 1-716-648-4913

Emergency numbers: USA 1-800-424-9300 Chemtrec
 Canada 1-613-996-6666 Canutec

2. HAZARDS IDENTIFICATION

Caution! Protect yourself and others. FUMES AND GASES can be dangerous to your health. ARC RAYS can injure and burn skin. ELECTRIC SHOCK can kill.

Attention! Cancer hazard. Dust and fumes can cause cancer.

OSHA Regulatory status

Welding consumables covered by this MSDS are shipped as non-flammable, nonexplosive, non-reactive articles and do not constitute a hazardous material in solid form under the terms of OSHA Hazard Communications Act. However, some metallic elements from which this product is manufactured are listed in OSHA Hazard Communication Standard (29 CFR 1910.1200).

Solid stainless steel does not contain hexavalent chromium. Chromium as Cr(VI) compound can be found in fumes and dust formed by welding and thermal cutting, mechanical working, hot rolling, hot forging of stainless steel. Cr(VI) is classified by NTP as "Known to be a human carcinogen" and by ACGIH as A1 "Confirmed Human carcinogen". Manganese as metal and inorganic compound in fumes and dust may cause CNS (manganism). Nickel in alloys is not listed by NTP and classified by ACGIH as A5 "Not suspected as a Human carcinogen". Quartz or sand is classified by IARC as "Carcinogenic to humans", by NTP as "Known to be a human carcinogen" and by ACGIH as A2 "Suspected human carcinogen".

Potential health effects

When these products are used in a welding process the following hazards are most important:

Shock: Electrical shock can kill.

Eye contact: Arc rays can severely damage eyes and skin.

Skin contact: Spatter, melting metals and arc rays can cause injuries and start fires.

Inhalation: Dust and fumes produced as a by-product during welding, brazing, thermal cutting or similar processes may contain fumes of chromium (VI) oxides and other welding rod components.

The evidence indicates that workers exposed to Cr(VI) are at an increased risk of developing lung cancer. It also indicates that occupational exposure to Cr(VI) may result in asthma, and damage to the nasal epithelia and skin. To avoid any risk follow the recommendation shown in Federal rule 71:10099-10385 establishing an 8-hour time-weighted average (TWA) exposure limit of 5 micrograms of Cr(VI) per cubic meter of air (5 µg/m³). This is a considerable reduction from the previous PEL of 1 milligram per 10 cubic meters of air (1 mg/10 m³, or 100 µg/m³) reported as CrO₃, which is equivalent to a limit of 52 µg/m³ as Cr(VI).

This rule also contains ancillary provisions for worker protection such as requirements for exposure determination, preferred exposure control methods, including a compliance alternative for a small sector for which the new PEL is Infeasible, respiratory protection, protective clothing and equipment, hygiene areas and practices, medical surveillance, recordkeeping, and start-up dates that include four years for the implementation of engineering controls to meet the PEL.

Section 11 discusses health effects in more detail.

3. COMPONENTS/ INFORMATION ON INGREDIENTS

This product is manufactured by extruding a coating onto a stainless steel wire.

Wire composition (typical values):

Component	CAS No.	% by Weight
Iron	7439-89-6	Balance
Silicon	7440-21-3	0.1
Manganese	7439-96-5	1.7
Chromium	7440-47-3	20.0
Nickel	7440-02-0	10.0
Molybdenum	7439-98-7	Max 0,3
Titanium	7440-32-6	Max 0,1
Copper	7440-50-8	Max 0,3
Cobalt	7440-48-4	Max 0,3

Other elements may be present such as Carbon, Nitrogen, Sulfur, Phosphorous, Arsenic, Boron, Aluminum, Calcium, Columbium, Tantalum and Tungsten. These are either not hazardous or below 0.1% concentration.

Coating ingredients

Component	CAS No.	% by Weight
Iron	7439-89-6	Balance
Manganese	7439-96-5	0 - 17
Chromium	7440-47-3	0 - 20
Nickel	7440-02-0	0 - 32
Molybdenum	7439-98-7	0.8 - 7
Niobium/ Columbium	7440-03-1	0 - 5
Aluminum oxide Al ₂ O ₃	1344-28-1	0 - 10
Titanium dioxide TiO ₂	13463-67-7	0 - 40
Calcium fluoride	7789-75-5	0 - 33
Limestone	1317-65-3	0 - 37
Quartz	14808-60-7	0 - 25

4. FIRST AID MEASURES

Employ first aid techniques recommended by the American Red Cross.

Shock: Turn off power. Remove from exposure area. Immediately call for medical assistance.

Eye Contact: For radiation arc burns, seek medical attention. In case of irritation from particulate, immediately flush with plenty of water for 15 minutes and call for medical assistance. Austenitic stainless steel particles are not magnetic and will not respond to a magnet over the eye.

Skin contact: For skin burns from arc radiation seek medical attention. In case of skin irritation or laceration, wash thoroughly with plenty of soap and water.

Inhalation: Inhalation of dust and/or fumes from cutting and welding operations - If breathing is difficult remove person from exposed area to fresh air.

Ingestion: Accidental ingestion is unlikely. If ingested, call for medical assistance

5. FIRE FIGHTING MEASURES

Welding electrodes are not combustible. There are no special hazards or precautions associated with welding electrodes if in vicinity of a fire.

6. ACCIDENTAL RELEASE MEASURES

Not applicable.

7. HANDLING AND STORAGE

Handling: Handle with care to avoid stings and cuts.

Storage: Store in original packaging. Keep away from acids and other chemical substances that could cause a reaction

8. EXPOSURE CONTROLS/ PERSONAL

PROTECTION Exposure guidelines

ACGIH recommends a general limit to welding fumes of 5 mg/m³ otherwise not specified. Other occupational exposure limits apply to some components and certain of their compounds. Table 1 shows limits according to current US legislation.

Table 1 Occupational exposure limits 8-hour TWA mg/m³

Component	OSHA PEL	ACGIH TLV	Carcinogenetic listing		
			ACGIH	NTP	IARC
Iron oxide, dust & fume as Fe	10	5	A4	No	No
Silicon dust	15 5 (R)	10	No	No	No
Manganese, inorganic compounds as Mn	5	0.2	No	No	No
Manganese, fume as Mn	5	NE	No	No	No
Chromium metal as Cr	1	0.5	A4	No	No
Chromium Cr(II) and Cr(III) compounds Cr	0.5	0.5	A4	No	No
Cr(VI) compounds, water soluble as Cr	0.005*	0.1	A1, BEI	Yes	1
Cr(VI) compounds, insoluble as Cr	0.005*	0.1	A1	Yes	1
Nickel, in alloys as Ni	1	1.5 (I)	A5	No	2B
Nickel, elemental metallic as Ni	1	1.5 (I)	A5	Yes	2B
Nickel, soluble inorganic compounds as Ni	1	0.1 (I)	A5	Yes	1
Nickel, insoluble inorganic compounds Ni	1	0.2 (I)	A1	Yes	1
Nickel, subsulfide as Ni	NA	0.1 (I)	A1	Yes	1
Nickel, carbonyl as Ni	0.007	NE	No	Yes	1
Molybdenum, soluble compounds as Mo	5	0.5(R)	A3	No	No
Molybdenum, metal and insoluble compounds as Mo	15	10(I) 3 (R)	No	No	No
Niobium/Columbium	NE	NE	No	No	No
Aluminum oxide, as Al	10	10	A4	No	No
Titanium in titanium dioxide form, total dust	10	10	A4	No	No
Copper, fume, current as Cu	0.1	0.2	No	No	No
Copper, dusts and mists, current as Cu	1	1	No	No	No
Copper, elemental/metal and oxides proposed as Cu	NE	0.1	A4	No	No
Copper, soluble compounds, proposed Cu	NE	0.05	A4	No	No
Cobalt and inorganic compounds as Co	0.1	0.02	A3, BEI	Yes	2B
Calcium fluoride, as F	2.5	2.5	A4	No	No
Limestone, calcium carbonate, total dust	15 5(R)	10	No	No	No
Quartz, Silica Crystalline	30 10(R)	0.05(R)	A2	Yes	1
Welding Fumes, not otherwise classified	NA	5	No	No	No

TWA=Time Weighted Average, STEL= Short Term Exposure Limit NE=Not Established, R=Respirable fraction I=Inhalable fraction, BEI=Biological Exposure Index ACGIH Ratings: A1=Confirmed Human Carcinogen, A2=Suspected Human Carcinogen, A3=Confirmed Animal Carcinogen with Unknown Relevance to Humans, A4=Not classifiable as a Human Carcinogen, A5=Not suspected a Human Carcinogen. IARC Groups: 1=carcinogenic to humans, 2B=Possibly carcinogenic to humans

*OSHA has proposed a 1.0 µg/m³ PEL for Cr(IV). The final value will be published in January 2006.

Engineering controls

Ventilation: When welding or thermal cutting use enough general ventilation, local exhaust at the arc, or both to keep fumes and gases from the workers breathing zone. Train workers to keep their head out of the welding plume. If the fumes are removed by filtration or some other means and the airgas stream is put back into the room, gases may build up to toxic or asphyxiation level. Gas build-up should be monitored and if excessive should be reduced by some supplementary system and/or general ventilation.

Welding and related processes: Read and understand the MSDS, manufacturers instruction, and precautionary labels for welding consumables. See American National Standard Z49.1, Safety in Welding and Cutting, published by the American Welding Society, 550 N.W. LeJeune Road, Miami, Florida 33126 or download free from <http://www.aws.org> and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, D.C. 20402, for more details on exposure controls.

Eye/ face protection: Arcs produce ultraviolet and infrared radiation. Wear a welder's helmet or use a face shield with protective filter lenses. As a rule start with a lens shade that is too dark to see the weld zone. Then go to a lighter shade (lower number shade), which gives sufficient view of the weld zone. Do not go below the minimum recommended in ANSI Standard Z49.1. Select welding lens shades from the American Welding Society (AWS) publication F2.2. Provide protective screens and flash goggles to shield others.

Skin protection: Wear protective gloves to prevent cuts and skin abrasions, radiation sparks, and electrical shock. A dry welder's glove is recommended. Respiratory protection: Use a NIOSH approved respirator for fumes or an air supplied respirator where local exhaust or general dilution ventilation does not keep exposures below the PEL or TLV for air contaminants.

Protective clothing: Wear hand and body protection during welding, brazing, and thermal cutting on stainless steel. Refer to ANSI Z49.1 for more information. At a minimum this includes hand protection and a protective face shield. It may include arm protectors, aprons, hats, hard hats, and shoulder protectors as well as dark, substantial clothing.

General Hygiene Considerations: Keep head out of fumes. Do not breathe the fumes and gases generated. Keep the workplace dry. Do not touch live electrical parts. Do not eat, smoke, or drink in areas where welding is performed. Utilize good personal hygiene including washing hands and face prior to eating or drinking.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color: Varying. Normally grey, green or red coating.
Odor: Odorless
Odor threshold: Not applicable
Physical state: Solid pH: Not applicable
Melting point: 2500 - 2760 °F (1370 - 1520°C)
Boiling point: Not applicable
Flash point: Not applicable
Evaporation rate: Not applicable
Flammability: Not applicable
Explosive limits: Not applicable
Vapor pressure: Not applicable
Vapor density: Not applicable
Specific gravity: 0.27 - 0.30 lbs./in3 (7.7 - 8.1 kg/dm3)
Solubility (water): Insoluble
Partition coefficient: Not applicable
Auto-ignition temperature: Not applicable
Decomposition temperature: Not applicable
Thermal expansion (ambient to 100°C): 10 - 16x10⁶ m/m°C
Thermal conductivity (ambient temperature): 12 - 30 W/ m°C
Magnetic: Austenitic stainless steels are non-magnetic in most supply conditions. Duplex, ferritic and martensitic stainless steels are magnetic.

10. STABILITY AND REACTIVITY

General: This product is intended for normal welding.

Chemical stability: Stable and non-reactive under normal conditions.

Conditions to avoid: None known

Incompatible materials: May react in contact with strong acids to release gaseous acid decomposition products, e.g. hydrogen, oxides of nitrogen.

Possibility of hazardous by-products - Welding fumes: Decomposition products from welding will include those originating from the volatilization, reaction, or oxidation of ingredients in welding rods, fluxes, and fillers, plus those from the base metal and coatings, etc. Possible decomposition products that may be generated during welding include complex oxides of the ingredients listed in Section 3. Fumes generated during welding may contain: chromium compounds, including hexavalent chromium Cr (VI); nickel; manganese; iron; molybdenum; and silicon compounds. Expected gaseous products would include carbon oxides, nitrogen oxides and ozone.

Fume composition of product (wt %):

Mn	Fe	Cr	Ni	Cu	Γ	Pb
<11	<20	<13	<4	<0.6	<20	<0.1

Generally, the composition and quantity of fumes and gases are dependent upon the base metal and the process, procedures, and consumables being used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include; coatings on the base metal (such as paint, plating, galvanizing, and phosphate coatings), the number of workers performing welding, brazing, thermal cutting, or other related operations, the volume of the work area, the quantity of consumables used, the design and amount of ventilation delivered, the position of the worker's head with respect to the fume plume, and the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from solvent, cleaning, or painting activities) which may decompose by the arc into toxic gases such as phosgene.

The employer is required by OSHA to limit the worker's level of exposure to chemicals for which OSHA has established a PEL in 29 CFR 1910 Subpart Z. The only way to determine a worker's exposure to welding, brazing or thermal cutting decomposition products is by sampling and analyses using accepted industrial hygiene techniques. The composition and quantity of the fumes and gases to which a worker is exposed can be established from an air sample(s) obtained from inside the welder's helmet, if worn, or in the worker's breathing zone. Review ANSI/AWS F1.1 standards for further information on air sampling for welding decomposition products.

11. TOXICOLOGY INFORMATION

Acute effects

In its solid form welding electrodes do not present an inhalation, absorption, or ingestion hazard.

Short-term over-exposures to the fumes generated by welding on stainless steel may result in dizziness; nausea; and irritation of the eyes, skin, lungs, nose and throat. Metal fume fever, a flu-like illness lasting about 24 hours with chills, ache, cough, and fever can be caused by overexposure to metal fumes, including iron, chromium, manganese and copper. Some toxic gases may cause pulmonary edema, asphyxiation and death. Metal dust particles may cause eye, skin and/or respiratory system irritation. Acute asthma attacks may be experienced by asthmatics when metal dust or fume is inhaled.

Chronic effects, inhalation or ingestion

Dust and fumes: Welding and thermal cutting may produce stainless steel dust or fumes containing complex or mixed oxides (spinel) of its components. Over long periods, inhalation of excessive airborne levels may have long term health effects, primarily affecting the lungs, e.g. lung fibrosis, or pneumoconiosis. Overexposure to iron oxide can cause siderosis (deposits of iron in the lungs) which may affect pulmonary function. However, studies of workers exposed to nickel powder and dust and fumes generated in the production of nickel alloys

and stainless steels have not indicated a respiratory cancer hazard.

Nickel: For stainless steels there is no direct evidence of carcinogenic effects in man, nor indirect evidence from animals tested by relevant routes, i.e. inhalation or ingestion. In other studies, using non-relevant routes in animals, alloys with up to 40% nickel caused no significant increase in cancer. The National Toxicology Program modified its classification of nickel in the 10th Report on Carcinogens, 2002. Nickel alloys, e.g. stainless steels were reviewed but were excluded due to human data are inadequate and rodent cancer data not sufficient to list. NTP regards metallic nickel as "reasonably anticipated to be a carcinogen" and nickel compounds are "known human carcinogens". California Proposition 65 has adopted the same distinctions as NTP. ACGIH is now classifying elemental nickel as A5 "Not suspected as a Human carcinogen". OSHA has not made a distinction and lists "nickel metal and insoluble compounds" in 29 CFR 1910.1200.

Chromium: Welding fumes and thermal cutting fumes may contain Cr(VI) hexavalent chromium compounds. Studies have shown that some hexavalent chromium compounds can cause cancer. Chromium as Cr(VI) hexavalent compound in fumes and dust is classified by NTP as "Known to be a human carcinogen" and by ACGIH as A1 "Confirmed Human carcinogen".

Chromium as metal or Cr(II) and Cr(III) oxides is not listed by NTP and is classified by ACGIH as A4 "Not classifiable as a human carcinogen".

However, epidemiological studies amongst welders indicate no extra risk of cancer when welding stainless steels, compared to the slightly increased risk when welding steels that do not contain chromium.

Manganese: Overexposure to manganese can result in central nervous system effects referred to as manganism, including symptoms of muscular weakness and tremors similar to Parkinson's disease.

Molybdenum and Copper: Both molybdenum and copper are necessary nutritional elements. High doses of molybdenum may antagonize absorption of copper. Likewise, high doses of copper may antagonize absorption of molybdenum. Overexposure to Molybdenum causes anemia, gout-like syndrome and increases uric acid levels. In experimental animals molybdenum toxicity causes weight loss, harmful changes of the liver, kidneys, and bones and impaired reflexes.

Cobalt: Cobalt dust may cause an asthma-like disease. Cobalt is listed as "Possibly carcinogenic to humans" by IARC and cobalt sulfate is included in NTP's 11th report on Carcinogens. ACGIH classifies cobalt as A3 Confirmed Animal Carcinogen with Unknown Relevance to Humans.

Quartz: Quartz, sand, or crystalline silica in respirable fraction can cause silicosis, and lung fibrosis. Quartz is listed by IARC as category 1 "Carcinogenic to humans", by NTP as "Known to be a human carcinogen" and by ACGIH as A2 "Suspected Human carcinogen".

Dermatological effects

Stainless steels do not cause nickel sensitization by prolonged skin contact in human. However, nickel is classified as a skin sensitizer. It causes skin sensitization in susceptible individuals through prolonged intimate contact with the skin (e.g. wearing jewellery). Numerous patch tests have established that most stainless steels do not cause sensitization. However, studies have shown that, in some individuals already sensitized to nickel, close and prolonged skin contact with the re-sulfurized free-machining types of stainless steels with 0.15 - 0.35% S (416, 430F, 303, 303Cu) may cause an allergic reaction.

Other observations

NIOSH lists Welding exposure as the 10th largest cause of work related asthma, but makes no distinction between stainless and carbon steel welding. There are some reports indicating that there is a risk of developing asthma from chromium VI compounds and nickel in welding fumes. In the European Union, stainless steel welding fume did not meet the classification criteria required to be listed as a "substance causing asthma".

12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade into components originating from MSDS 600.1 07.01.2005 the consumables or from the materials use din the welding process.

13. DISPOSAL CONSIDERATIONS

RCRA Hazardous waste if discarded, due to the chromium, manganese and nickel contents. Recycle if possible. Surplus and scrap (waste) stainless steel is valuable and in demand for the production of prime stainless steel. Recycling routes are well established, and recycling is therefore the preferred disposal route.

EPCRA / SARA Section 302, 304, 311/312 and 313.

Component	CAS #	Section 302 EHS	Section 304 Spill	Section 311/312 Hazard classes	Section 312 SARA Tier II	Section 313 Form R
			Reporting Quantity, lbs.		Threshold Planning Quantity, lbs.	By weight %
Chromium	7440-47	Not applicable	5,000	Chronic health hazard	10,000	16 - 28
Nickel	7440-02	Not applicable	100	Chronic health hazard	10,000	4.5 - 35
Manganese compounds	N450	Not applicable	No RQ established	Chronic health hazard	10,000	0 - 2.0
Aluminum oxide	1344 28-1	Not applicable	No RQ established	Not established	Not established	0 - 10

14. TRANSPORT INFORMATION

Welding electrodes in the solid form are not classified as HAZMAT. No Label is required during transport.

15. REGULATORY INFORMATION

For welding electrodes the required Label may be transmitted to the customer at the initial shipment, see 29 CFR 1910.1200 (f)(2)(i).

Inventories

OSHA	United States	Included
TSCA	United States	Included

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

WARNING: This product contains or produces chemicals known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health and Safety Code §25249.5 et seq.)

16. OTHER INFORMATION**Basic information used to draw up this MSDS:**

References to key data: OSHA, Standards 29 CFR.1910.1000 -1200 ANSI Z49.1 " Safety in welding and cutting". ANSI/AWS F1.1 Airborne Sampling Method AWS F2.2 Lens Shade Selector EPA Consolidated List of Chemicals Subject to the Emergency Planning and Community-Right -to-Know Act (EPCRA) and section 112(r) of the Clean Air Act. DOT, Standards 49 CFR.172.101-102

National Toxicology Program, 11th Report on Carcinogens, 2005 ACGIH, TLVs and BEIs, 2005 edition International Agency for Research on Cancer. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans', vol. 1- 88

N. Becker: Cancer mortality among arc welders exposed to fumes containing chromium and nickel. Results of a third follow-up: 1989-1995 IMOA, International Molybdenum Institute Avesta Welding MSDS, European version, LR114-02.

This MSDS replaces:

AW133 01.01.2010

Disclaimer

The information contained in this document is based on the present level of our knowledge and experience. The information applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other material or in any other product form.

SAFETY DATA SHEET

This Safety Data Sheet complies with Annex II of 830/2015 amending EC No. 1907/2006, CLP directive 1272/2008, also in accordance with ISO 11014-1 and ANSI Z400.1

DC GOUGING COPPERCLAD ELECTRODES

AIR ARC JOINTED
CARBONS

Issued: 2018-01-14

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name DC GOUGING COPPERCLAD ELECTRODES

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

Not applicable

1.3. Details of the supplier of the safety data sheet

SDS created by TDS Team

Supplier ESAB DENTON

Street address 2800 Airport Road
Denton, TX 76207

Telephone 1-800-372-2123

Email sdsrequest@esab.com

Web site www.esab.com

1.4. Emergency telephone number

Emergency phone number 1-800-372-2123

Available outside office hours No

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The product is not classified

2.2. Label elements

The product do not require labeling

2.3. Other hazards

When the product is used in the gouging process the most important hazards are: Overexposure to fumes and gases from gouging can be dangerous to health. Watch out for splatter, hot metal and slag. It may cause skin burn and cause fire. Excessive noise. Arc rays can injure eyes and burn skin. Electric shock can kill. Avoid touching live electrical parts.

SAFETY DATA SHEET

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DC GOUGING COPPERCLAD ELECTRODES

Issued: 2018-01-14

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical name	CAS No. EC No.	Concentration	Classification	R-phrase H-phrase
Graphite	7782-42-5 231-955-3	66 - 88%	- -	- -
Copper	7440-50-8 231-159-6	10 - 30%	- -	- -
Carbon Black	1333-86-4 215-609-9	2 - 4%	- -	- -

SECTION 4: First aid measures

4.1. Description of first aid measures

No first aid measures should be required for the unused electrodes.

Inhalation IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms occur.

Skin contact Flush skin with large amounts of water. If irritation develops and persists, get medical attention.

Eye contact IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Burns from radiation, see doctor.

Ingestion DO NOT induce vomiting unless directed to do so by a physician or poison control center.

Information for doctors Get medical attention/advice if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Not applicable

4.3. Indication of any immediate medical attention and special treatment needed

Not applicable

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media use dry chemical, CO2, water spray or "alcohol" foam

5.2. Special hazards arising from the substance or mixture

Not applicable



SAFETY DATA SHEET

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DC GOUGING COPPERCLAD ELECTRODES

Issued: 2018-01-14

5.3. Advice for firefighters

Special protective equipment for fire-fighters

No specific measures required for these electrodes prior to gouging.

Gouging should not be carried out in the presence of flammable materials, vapours, tanks, cisterns and pipes and other containers which have held flammable substances unless these have been checked and certified safe.

During a fire, irritating/toxic smoke and fumes may be generated. Do not enter fire area without proper protection. Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece. Shield personnel to protect from venting, rupturing or bursting cans. Move containers from fire area if it can be done without risk. Water spray may be useful in cooling equipment and cans exposed to heat and flame.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General ventilation and local fume extraction must be adequate to keep fume concentrations within safe limits. Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding. Skin contact should be avoided to prevent possible allergic reactions.

6.2. Environmental precautions

Try to prevent the material from entering drains or water courses.

6.3. Methods and material for containment and cleaning up

Not applicable

6.4. Reference to other sections

For Personal protection see section 8. For Disposal see section 13. For Environmental precautions see section 12. For Precautions for safe handling see 7.1.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Preventive handling precautions

Ensure adequate ventilation for the welder and others. Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding. Remove all flammable materials and liquids before welding.

General hygiene

Wash hands before breaks and immediately after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Store welding consumables inside a room without humidity. Do not store welding consumables directly on the ground or beside walls. Store away from chemical substances like acids which could cause chemical reactions.

7.3. Specific end use(s)

Welding process.



SAFETY DATA SHEET

This Safety Data Sheet complies with Annex II of 830/2015 amending EC No. 1907/2006, CLP directive 1272/2008, also in accordance with ISO 11014-1 and ANSI Z400.1

DC GOUGING COPPERCLAD ELECTRODES

Issued: 2018-01-14

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limits

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. Unless noted, all values are for 8 hour time weighted averages (TWA).

National occupational exposure limits

<i>Ingredient</i>	<i>CAS no.</i>	<i>EC No.</i>	<i>Exposure limit mg/m3-ppm</i>		<i>Short-term exposure limit mg/m3-ppm</i>		<i>Remark</i>	<i>Source</i>	<i>Year</i>
Copper	7440-50-8	231-159-6	0,1	-	-	-	as Cu(fume)	OSHA	2016
Copper	7440-50-8	231-159-6	1	-	-	-	as Cu(dust, mist)	OSHA	2016
Graphite	7782-42-5	231-955-3	1,5	-	-	-	-	OSHA	2016
Carbon Black	1333-86-4	215-609-9	3,5	-	-	-	-	OSHA	2016

8.2. Exposure controls

Technical precaution measures

General ventilation and local fume extraction must be adequate to keep fume concentrations within safe limits

Eye / face protection

Wear eye protection appropriate for welding

Safety gloves

Skin contact should be avoided to prevent possible allergic reactions.

Other skin protection

Wear body protection which helps to prevent injury from radiation, sparks and electric shock

Respiratory protection

Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Copper plating for the surface of the black carbon rod

Appearance, colour

Not applicable

Appearance, physical state

Not applicable

Auto-ignition temperature

Not applicable

Boiling point

Carbon 4027 degrees celsius, Copper 2927 degrees celsius

Decomposition temperature

Not applicable

Evaporation rate

Not applicable

Explosive properties

Not applicable



SAFETY DATA SHEET

This Safety Data Sheet complies with Annex II of 830/2015 amending EC No. 1907/2006, CLP directive 1272/2008, also in accordance with ISO 11014-1 and ANSI Z400.1

DC GOUGING COPPERCLAD ELECTRODES

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Flammability (solid, gas)	Not applicable
Flash point	Not applicable
Initial boiling point and boiling range	Not applicable
Melting point	Carbon 3527 degrees celsius, Copper 1084 degrees celsius
Melting point / freezing point	Not applicable
Odour	Not applicable
Odour treshold	Not applicable
Oxidising properties	Not applicable
Partition coefficient: n-octanol / water	Not applicable
pH value	Not applicable
Physical state	solid
Relative density	Carbon 1.7g/cm3, Copper 8.9g/cm3
Solubility	Not applicable
Upper / lower flammability or explosive limits	Not applicable
Vapour density	Not applicable
Vapour pressure	Not applicable
Viscosity	Not applicable

9.2. Other information

Not applicable

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	No hazards to be especially mentioned.
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10.2. Chemical stability

Chemical stability	Stable under the recommended storage and handling conditions prescribed. Hazardous polymerization will not occur. Incompatible materials and conditions to avoid are usually related to welding.
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DC GOUGING COPPERCLAD ELECTRODES

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10.3. Possibility of hazardous reactions

Not applicable

10.4. Conditions to avoid

Conditions to avoid None under normal conditions

10.5. Incompatible materials

Not applicable

10.6. Hazardous decomposition products

Hazardous decomposition products Welding fumes and gases. Additional fume may arise from coatings and contaminants on the base material. Hazardous combustion products - Carbon oxides and other irritating/toxic fumes and smoke.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on toxicological effects When welding, fumes and gases generated can be dangerous to health.

Acute toxicity Excessive exposures may affect human health, as follows: Aspiration may cause pulmonary oedema and pneumonitis Short-term overexposure can cause dizziness, nausea and irritation of the nose, throat or eyes.

Skin corrosion/irritation No data available

Serious eye damage/irritation No data available

Respiratory/skin sensitization May cause sensitisation by skin contact

Germ cell mutagenicity No data available

Genotoxicity No data available

Carcinogenicity This product contains or produces a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

Repeated dose toxicity No data available

Reproductive toxicity No data available

STOT-single exposure No data available

STOT-repeated exposure No data available

Aspiration hazard No data available

LD50 Oral No data available

LD50 Dermal No data available



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LC50 Inhalation No data available

SECTION 12: Ecological information

12.1. Toxicity

Acute toxicity No data available

Toxicity The welding process can affect the environment if fume is released directly into the atmosphere. Residues from welding consumables could degrade and accumulate into soils and ground water.

Aquatic not water endangering

Soil No data available

Acute fish toxicity No data available

Acute algae toxicity No data available

Acute crustacean toxicity No data available

Chronic toxicity No data available

12.2. Persistence and degradability

Persistence and degradability No data available

Decay/transformation No data available

12.3. Bioaccumulative potential

Bioaccumulative potential No data available

12.4. Mobility in soil

Mobility No data available

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment No data available

12.6. Other adverse effects

Not applicable

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Disposal considerations Dispose of any product, residue or packing material according to national and local regulations. Spent fume extraction filters shall be disposed of as dangerous waste.



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Other

Waste management

Packaging and rod scrap should be disposed of as general waste or recycled. No special precautions are required for this product. Fume collected from extraction units should be disposed of in accordance with local regulations

SECTION 14: Transport information

14.1. UN number

Not applicable

14.2. UN proper shipping name

Not applicable

14.3. Transport hazard class(es)

Not applicable

14.4. Packing group

Not applicable

14.5. Environmental hazards

Not applicable

14.6. Special precautions for user

Not applicable

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

Other

No special requirements are necessary in transporting these products



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SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL. of 19 November 2008. on waste and repealing certain Directives.

European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste.



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Other regulations, limitations and legal regulations

Poland Regulations:

ACT of 25 February 2011 on the chemical substances and their mixtures(OJ # 63, poz. 322).

Regulation of the Minister of Labour and Social Policy of 6 June 2014 on Maximum Permissible Concentration and Intensity of Agents Harmful to Health in the Working Environment (Dz. u. z. 2014, poz 817).

The Act on Waste of 14 December 2012, Journal of Laws of 2013, item 21 with amendments

Act of 13th June 2013 on packaging management and packaging waste (Journal of Laws of 2013, item 888).

Regulation of the Minister of the Environment of 9 December 2014 on waste catalogue (Journal of Laws of 2014, item 1923).

Regulation of the Minister of Economy of 21 December 2005. Concerning essential requirements for personal protective equipment (Journal. Laws No. 259, item. 2173).

Regulation of the Minister of Health of 2 February 2011 on tests and measurements of factors harmful to health in the working environment (the Journal of Laws 2011, no. 33, item 166).

USA Regulations :

USA: This product contains or produces a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

CERCLA/SARA Title III Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs): Product is a solid solution in the form of a solid article. Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

EPCRA/SARA Title III 313 Toxic Chemicals: The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.

Copper: 1.0% de minimis concentration

Canada: WHMIS classification: Class D; Division 2, Subdivision A

International Inventories:

Australia: The substance(s) in this product is/are in compliance with the inventory requirements of Australian Inventory of Chemical Substances (AICS)

United States EPA Toxic Substance Control Act: All constituents of this product are on the TSCA inventory list or are excluded from listing.

Canadian Environmental Protection Act (CEPA): All constituent(s) of this product is/are on the Domestic Substance List (DSL).

15.2. Chemical safety assessment

Chemical safety assessment

No data available

Other

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill. ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

SAFETY DATA SHEET

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SECTION 16: Other information

Changes to previous revision

This Safety Data Sheet has been revised due to modifications to Sections 1-16. This SDS supersedes... 1027/05

References to key literature and data sources

Refer to ESAB "Welding and Cutting - Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to: www.esab.com

Other

Additional Information

USA: Contact ESAB at www.esabna.com or 1-800 ESAB-123 if you have any questions about this SDS. American National Standard Z49.1 Safety in Welding and Cutting, ANSI/AWS F1.5 Methods for Sampling and Analyzing Gases from Welding and Allied Processes, ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", 550 North Le Jeune Road, Miami Florida 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169

UK: WMA Publication 236 and 237, "Hazards from Welding fume", "The arc welder at work, some general aspects of health and safety".

Germany: Accident prevention regulation BGV D1, "Welding, cutting and related procedures"

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting, and Allied Processes".

This product has been classified according to the hazard criteria of the CPR and the SDS contains all of the information required by the CPR.

ESAB requests the users of this product to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of this product a user should: notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information. furnish this same information to each of its customers for the products

Request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that ESAB believes to be reliable. Since the conditions of use is outside our control, we assume no liability in connection with any use of this information and no warranty expressed or implied is given. Contact ESAB for more information.



PORTER WARNER INDUSTRIES

SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier: Resin Coated Ceramic Beads

(Coated CeraBeads)

Product Name / Trade Names: BET'R SHELL CeraBeads

Chemical Name or Synonym:

Resin-coated foundry sand; ceramic substrate coated with phenolic resin

Recommended use of the chemical and restrictions on use: Mold-making in metal foundries

Manufacturer:

Porter Warner Industries, LLC
2 East 38th Street
Chattanooga, TN 37410

Phone: 423-266-4735

Emergency Phone: 800-424-9300

FAX: 423-756-1558

2. HAZARD(S) IDENTIFICATION

Classification:

Physical	Health
Possibility of dust generation on handling.	Respiratory or Skin Sensitization – Category 1

Label Elements:



WARNING

May cause irritation to lungs through prolonged or repeated exposure by inhalation. May form combustible dust concentrations in air.

Response:

If exposed or concerned; Seek medical advice.

Disposal:

Dispose of contents/containers in accordance with local regulations.

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Do not breathe dust.

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

Wear protective gloves and safety glasses or goggles.

In case of inadequate ventilation wear respiratory protection.

3. Composition, Information on Ingredients

An ingredient listed below has been associated with one or more immediate and/or delayed health hazards. Risk of damage and effects depends upon duration and level of exposure. BEFORE USING, HANDLING, OR EXPOSURE TO THESE INGREDIENTS, READ AND UNDERSTAND THIS SDS.

		% by weight
CAS#: 9003-35-4	Phenol-Formaldehyde Resin	0.5 – 4.5
CAS#: 108-95-2	Phenol	<0.02
CAS#: 100-97-0	Hexamethylenetetramine	<0.01
CAS#: 1592-23-0	Calcium Stearate (a lubricant)	<0.15
CAS#: 1302-93-8	Mullite ($3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$)	Balance

4. First Aid Measures

Ingestion:

If swallowed, dilute by drinking large quantities of water. If discomfort persists, consult a physician for other treatment instructions.

Inhalation:

Remove victim to fresh air.

Eye Contact:

Immediately flush eyes with water for at least ten minutes. Eyelids should be held apart during irrigation to insure water contact with surface of eye and eyelids. Consult a physician as necessary.

Skin Contact:

Wash skin thoroughly with soap and water.

5. Fire Fighting Instruction

Ceramic Beads are not flammable, combustible, or explosive. In case of fire, to prevent volatilization of the resin components, water should be used to keep fire-exposed containers or bulk material cool.

6. Accidental Release Response

Use personal protective equipment as recommended in Section 8. Clean up spills using dustless methods (water or a HEPA filtered vacuum.) to minimize generation and spread of respirable silica particles. Vacuums with explosion-proof motors are suggested. Collect material in appropriate containers for recycling or disposal.

7. Handling and Storage

HANDLING

Handle in accordance with good industrial hygiene and safety practices. Care should be exercised to avoid breathing dust. Avoid unnecessary exposure and remove material from your eyes, skin and clothing. Wash your hands thoroughly after handling this material.

Refer to ASTM Standard Practice E1132-06 "Standard Practice for Health Requirements relating to occupational Exposure to Respirable Crystalline Silica"

INHALATION: Avoid breathing dust or vapor. Use with adequate ventilation
SKIN: Avoid contact with skin and clothing.
EYES: Avoid contact with eyes.

STORAGE

- Store in a cool dry place to avoid caking or lumping.
- Keep container closed when not in use.
- Use with proper ventilation and engineering controls
- DO not re-use empty container without cleaning and re-certification.

Note: OSHA Hazard Communication Standard 29 CFR §1910.1200 and "Right to Know" laws should always be followed.

8. Exposure Controls / Personal Protection

EXPOSURE CONTROLS

Engineering Controls: Appropriate personal protective equipment and prudent work practices in combination with engineering controls have proven to be effective in minimizing employee exposure to this product. The engineering controls are:

- Local exhaust ventilation
- Process Isolation
- Enclosed system design
- Remote controlled product handling

These techniques may not address all issues involved in your operation. Consequently, we therefore recommend that you consult with experts to determine whether your procedures are adequate.

8. Exposure Controls / Personal Protection – cont'd

PERSONAL PROTECTION

Use NIOSH/MHSA approved respiratory protection equipment when air contaminants can exceed acceptable guidelines. Respirators should be selected and used based on the form and concentration of contaminants in the air. Refer to applicable OSHA laws and ANSI guidelines for selection criteria.

Note: Product has potential to release formaldehyde (ammonia and phenol) vapor during sand core and mold making as well as from decomposition during metal pouring. If employee monitoring shows airborne exposures above the permissible exposure guideline(s), respiratory protection should be selected in accordance with Table I or OSHA Standard 29 CFR §1910.1048 "Formaldehyde."

Exposure Guidelines:

Exposure Guidelines.								
Chemical	Percentage (By wt.)	Exposure Guidelines						Unit
		OSHA		NIOSH		ACGIH		
		TWA	STEL	TWA	STEL	TWA	STEL	
Phenol- Formaldehyde Resin	0.5 – 4.5	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	
Phenol	<0.02	5	N.E.	5	15	5	N.E.	ppm
N.E. = Not Established, R=respirable fraction, ppm=parts per million mg/m ³ = milligrams of contaminant per cubic meter of air								
OSHA Permissible Exposure Limits (PEL) and ACGIH Threshold Limit Values (TLV) are an 8-hour time-weighted average (TWA) concentration during a 40 hour workweek. NIOSH Recommended Exposure limits (REL) is for up to a 10-hour workday during a 40-hour workweek. A “C” denotes a ceiling limit that should not be exceeded during the exposure period. STEL denotes a Short Term Exposure Limit, 15 minutes.								
Entities referenced: (OSHA) Occupational Safety and Health Administration., (NISOH) National Institute for Occupational Safety and Health, and (ACGIH) American Conference of Governmental Industrial Hygienists.								

SKIN PROTECTION: Wear chemical resistant gloves and protective clothing as needed to avoid prolonged or repeated skin contact.

EYE PROTECTION: Safety glasses with side shields or goggles recommended.

OTHER: None known.

9. Physical and Chemical Properties

Appearance and color: Brown or rust colored grain

Bulk Density: 1.7 g/cm³ / 106 lb./ft³

Solubility in Water: Insoluble in Water

Volatility: Not applicable

Melting Point: 1825 C / 3317 F

Boiling Point: Not Applicable

Flammability: Nonflammable Solid

Explosive Property: Not applicable

10. Stability and Reactivity

Stability: This product is stable under normal handling and storage conditions.

Hazardous Polymerization: Will not occur.

Hazardous Decomposition or byproducts: Mullite will dissolve in hydrofluoric acid and produce a corrosive gas (silicon tetrafluoride).

11. Toxicological Information

Acute toxicity: None.

12. Ecological Information

Hexamethylenetetramine (a component) has been tested in accordance with OECD Guidelines 117 and 306. The chemical is not considered to be bio-accumulative with a weighted log Power of <0 and is biodegradable in the marine environment (BOD₂₈=24%)

Environmental Fate: BOD₅ = 0.02 (hexamethylenetetramine)

Biochemical oxygen demand or BOD is a chemical procedure for determining the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a given water sample at certain temperature over a specific time period. It is not a precise quantitative test, although it is widely used as an indication of the organic quality of water.

13. Disposal Considerations

Dispose of in accordance with local, state/provincial, and federal regulations and requirements. Cover the material to minimize generation of airborne dust.

This product is not classified as hazardous waste under the Resource Conservation and Recovery Act (RCRA), or it's regulations, 40 CFR §261

14. Transportation Information

US DEPARTMENT OF TRANSPORTATION

This product is not a hazardous material for purposes of transportation under the U.S. Department of Transportation Table of Hazardous Materials. The formaldehyde and phenol components are not hazardous materials based on the reportable quantities listed in the U.S. Department of Transportation regulation 49 CFR § 172.101.

15. Regulatory Information (Selected Regulations)
--

OSHA Hazard Communication Standard 29 CFR §1910.1200

Crystalline silica is listed under the OSHA standard 29CFR §1910.1200. Formaldehyde is listed as a potential human carcinogen

Resource Conservation and Recovery Act (RCRA) 40 CFR §302

This product is not classified as a hazardous waste under RCRA or its regulations.

International Agency for research on Cancer (IARC)

Both Formaldehyde and Crystalline silica are classified in IARC Group I Carcinogen.

Emergency Planning and Community Right to Know (EPCRA)

Both Formaldehyde and phenol are extremely hazardous substances under Section 302 are toxic chemicals subject to the requirements of Section 313.

EPA Toxic Substance Control Act (TSCA)

Crystalline silica (CAS # 14808-60-7) is listed under TSCA Section 8(b) "*Reporting and Recordkeeping for Identified Chemical Substances*"

National Toxicology Program (NTP)

Respirable silica is classified by this agency as a carcinogen.

16. Other Information

User's Responsibility

The OSHA Hazard Communications Standard 29CFR §1910.1200 and the Canadian Workplace Hazardous Materials Information System (WHMIS) require that the information contained on these sheets be made available to your workers. Educate and train your workers regarding the OSHA and WHMIS precautions. Instruct your workers to handle this product properly. Consult with appropriate experts to guard against hazards associated with the use of this product and its ingredients.

Disclaimer

The information provided herein was believed by Porter Warner Industries to be accurate at the time of preparation, or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with the laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Porter Warner Industries are subject to Porter Warner's terms and conditions of sale.

PORTER WARNER INDUSTRIES MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY PORTER WARNER, except that the product shall conform to Porter Warner's specifications. Nothing contained herein constitutes an offer for the sale of any product.

MATERIAL SAFETY DATA SHEET

0616821
03 00

DATE OF PREPARATION
Jun 7, 2012

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

0616821

PRODUCT NAME

TALON™ Moly Chain & Cable Lubricant

MANUFACTURER'S NAME

Dist. by:
Fastenal Company
Winona, MN 55987

Telephone Numbers and Websites

Product Information	(507)454-5374 www.fastenal.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
9	74-98-6	Propane		
		ACGIH TLV	2500 PPM	760 mm
		OSHA PEL	1000 PPM	
21	106-97-8	Butane		
		ACGIH TLV	800 PPM	760 mm
		OSHA PEL	800 PPM	
5	142-82-5	Heptane		
		ACGIH TLV	400 PPM	50 mm
		ACGIH TLV	500 PPM STEL	
		OSHA PEL	400 PPM	
		OSHA PEL	500 PPM STEL	
2	64742-88-7	Mineral Spirits		
		ACGIH TLV	100 PPM	2 mm
		OSHA PEL	100 PPM	
25	67-63-0	2-Propanol		
		ACGIH TLV	200 PPM	33 mm
		ACGIH TLV	400 PPM STEL	
		OSHA PEL	400 PPM	
35	67-64-1	Acetone		
		ACGIH TLV	500 PPM	180 mm
		ACGIH TLV	750 PPM STEL	
		OSHA PEL	1000 PPM	
2	1317-33-5	Molybdenum Disulfide		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

HMIS Codes

Health	2
Flammability	4
Reactivity	0

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.

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

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

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

SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and laundry before re-use.

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

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

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT

Propellant < 0 °F

LEL

1.0

UEL

12.8

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Containers may explode when exposed to extreme heat.

Application to hot surfaces requires special precautions.

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

SPECIAL FIRE FIGHTING PROCEDURES

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

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

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

Not Available

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep away from heat, sparks, and open flame. Vapors will accumulate readily and may ignite explosively.

During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Contents under pressure. Do not puncture, incinerate, or expose to temperature above 120F. Heat from sunlight, radiators, stoves, hot water, and other heat sources could cause container to burst. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

VENTILATION

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

RESPIRATORY PROTECTION

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

PROTECTIVE GLOVES

None required for normal application of aerosol products where minimal skin contact is expected. For long or repeated contact, wear chemical resistant gloves.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	5.90 lb/gal	707 g/l
SPECIFIC GRAVITY	0.71	
BOILING POINT	<0 - 395 °F	<-18 - 201 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	98%	
EVAPORATION RATE	Faster than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
	Volatile Weight 61.82%	Less Water and Federally Exempt Solvents

SECTION 10 — STABILITY AND REACTIVITY**STABILITY — Stable****CONDITIONS TO AVOID**

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION**CHRONIC HEALTH HAZARDS**

No ingredient in this product is an IARC, NTP or OSHA listed carcinogen.

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
74-98-6	Propane	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
106-97-8	Butane	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
142-82-5	Heptane	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
64742-88-7	Mineral Spirits	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
67-63-0	2-Propanol	LC50 RAT	4HR	Not Available
		LD50 RAT		5045 mg/kg
67-64-1	Acetone	LC50 RAT	4HR	Not Available
		LD50 RAT		5800 mg/kg
1317-33-5	Molybdenum Disulfide	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Do not incinerate. Depressurize container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

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

US Ground (DOT)

May be classed as LTD. QTY. OR ORM-D

UN1950, AEROSOLS, 2.1, LIMITED QUANTITY, (ERG#126)

Canada (TDG)

May be classed as LTD. QTY. OR ORM-D

UN1950, AEROSOLS, CLASS 2.1, LIMITED QUANTITY, (ERG#126)

IMO

May be shipped as Limited Quantity

UN1950, AEROSOLS, CLASS 2.1, LIMITED QUANTITY, EmS F-D, S-U, ADR (D)

IATA/ICAO

UN1950, AEROSOLS, FLAMMABLE, 2.1, LIMITED QUANTITY

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

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

CALIFORNIA PROPOSITION 65

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

TSCA CERTIFICATION

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

SECTION 16 — OTHER INFORMATION

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

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

* add to "Supply Usage 2018"

APR 21 2016

SDS for FERRUX® 746



VESUVIUS

Vesuvius USA
Foundry
20200 Sheldon Road, Cleveland, Ohio 44142

HOT TOP compound

put on liquid visers on
pouring floor

Safety Data Sheet

FERRUX® 746	SDS Number SDS-10594 Revision: 9 Legacy Number:
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Preparation Information:

Site: All	Contact Julie Pyle at (440) 826-4548 for further product information or medical emergency during normal business hours.
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Section 1: Product and Company Identification

Product Name: FERRUX® 746	Chemical Name: N/A	Formula: MIXTURE	CAS Number: N/A
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Product Use: Exothermic/insulating powder for molten metal.
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Supplier Information:

Supplier Name: Foseco	Supplier Phone: (440) 826-4548
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Supplier Address:

20200 Sheldon Rd. Cleveland, OH 44142 USA

Manufacturer Information:

Manufacturer Name: Foseco	Manufacturer Phone: (440) 826-4548
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Manufacturer Address:


20200 Sheldon Rd. Cleveland, OH 44142 USA

Emergency Contact Information:

CHEMTREC (800) 424-9300 (USA) CANUTEC (613) 996-6666 (CANADA)
--

CC, Gary

Section 2: Hazard(s) Identification

Hazard Classification: Carcinogenicity - Category 1A Specific Target Organ Toxicity, Repeated or Prolonged Exposure - Category 1			
Signal Word: Danger			
Hazard Statement(s): May cause lung cancer. Causes damage to lungs (silicosis) through prolonged or repeated exposure by inhalation of respirable crystalline silica.			
Pictograms: 			
Precautionary Statement(s):			
Prevention Do not handle until all safety precautions have been read and understood. Do not breathe dust. Use personal protective equipment as required to prevent inhalation of crystalline silica. Do not eat, drink or smoke when using this product.	Response Get medical advice/attention if you feel unwell.	Storage N/A	Disposal Dispose of contents/container in accordance with local, state and federal regulations.
Hazards not Otherwise Classified: None			
Percentage of the mixture consisting of ingredients of unknown toxicity: 92%			

Section 3: Composition/Information on Ingredients

Ingredient:	CAS No. / Other Identifiers:	% Weight:
Sodium Nitrate*	7631-99-4	3-7
Alumina (non-fibrous)	1344-28-1	30-60
Aluminum (granular)	7429-90-5	10-30
Wood Dust	N/A	1-5
Graphite	7782-42-5	1-5
Iron Oxide	1309-37-1	5-10
Sodium Silico Fluoride:	16893-85-9	1-5
Crystalline Silica (Quartz)	14808-60-7	1-5
*Oxidizer. This product generates high		

SDS for FERRUX® 746

temperatures when ignited due to exothermic reaction of the aluminum.

Section 4: First Aid Measures

Emergency Overview: N/A
Potential Health Effects: Skin, eyes and mucous membrane irritation possible. Fluoride dust and fumes can cause nose bleeds.
Chronic Health Hazards: Prolonged inhalation of dust from product may result in fluorosis or other respiratory damage. Fluorides can cause loss of appetite, vomiting, increase in bone density and can affect CNS, skeleton and kidneys. Inhalation of crystalline silica can cause silicosis of the lungs.
Medical Conditions Generally Aggravated by Exposure: Pre-existing skin and respiratory ailments.

Routes of Entry:

Eyes? Yes	Skin? Yes	Inhalation? Yes	Ingestion? No	Other? N/A
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Carcinogenicity:

NTP? Yes	IARC? Yes	OSHA? N/A	WHMIS? N/A	Other? N/A
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Details:

IARC has determined there is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica and so is categorized as a Group 1 carcinogen. NTP has classified crystalline silica as a known human carcinogen and ACGIH has classified it as a suspected human carcinogen.

Eye Contact: Flush with copious amounts of water. Consult physician if symptoms persist
Skin Contact: Wash with soap and water. Consult physician if perspiration persists.
Inhalation: Remove person to fresh air. Consult physician if problems persist.
Ingestion: Drink lime water (0.15%) or milk. Induce vomiting. Consult physician immediately. Do not make an unconscious person vomit.

Section 5: Fire-Fighting Measures

Flash Point: N/A	Auto-Ignition: N/A	LEL: N/A	UEL: N/A
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NFPA Hazard Classification:

Health: 2	Flammable: 2	Reactivity: 1	Special Hazard: N/A
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HMIS Hazard Classification:

Health: 2	Flammable: 2	Reactivity: 1	PPE: E
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SDS for FERRUX® 746

Extinguishing Media: Dry sand, inert material, CO2. Do not use water.
Special Fire Fighting Procedures: Product will burn intensely. Do not use water. Product contains granular aluminum, which can react with water at high temperatures to form H2 gas.
Unusual Fire and Explosion Hazards: SENSITIVITY TO MECHANICAL IMPACT: N/A SENSITIVITY TO STATIC DISCHARGE: N/A OTHER: Produces H2 gas in contact with acids or caustics. Avoid atmospheric dust clouds when handling, especially in presence of open flames, sparks and heating apparatus.

Section 6: Accidental Release Measures

Remove all sources of ignition. Sweep up, taking care not to create or inhale dust. Wear approved respirator. Electrical and mechanical equipment should be spark proof.

Section 7: Handling and Storage

Store in a cool, dry area below 150 Deg. F., away from acids, or alkalis.

Section 8: Exposure Controls/Personal Protection

Exposure Limits Ingredient	PEL-OSHA	TLV-ACGIH	Other
Sodium Nitrate	N/A	N/A	N/A
Alumina (non-fibrous)	15 mg/M3 (total)	1 mg/M3 (respirable)	N/A
Aluminum (granular)	15 mg/M3 (total)	1 mg/M3 (respirable)	N/A
Wood Dust	N/A	1 mg/M3 (inhalable)	N/A
Graphite	15 mppcf	2 mg/M3 (respirable)	N/A
Iron Oxide	10 mg/M3 (as fume)	5 mg/M3 (respirable)	N/A
Sodium Silico Fluoride	2.5 mg/M3 as F	2.5 mg/M3 as F	N/A
Crystalline Silica (Quartz)	0.05 mg/M3 (respirable)	0.025 mg/M3 (respirable)	N/A

Details:

N/A

Respiratory Protection:

If PEL/TLV is exceeded, use NIOSH approved mask/respirator for the above listed ingredients.

Ventilation

LOCAL: N/A

SPECIAL: N/A

MECHANICAL: As required to maintain levels below the listed PEL /TLVs.

ENGINEERING CONTROLS: N/A

Protective Equipment:

GLOVES: Cloth

EYE: Safety glasses with side shields

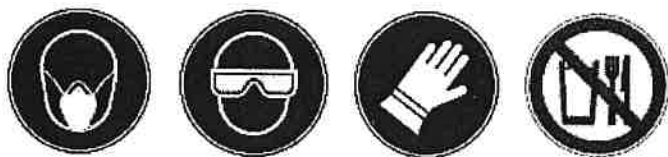
CLOTHING: As required to prevent prolonged exposure to skin.

Personnel Sampling Procedure:

N/A

SDS for FERRUX® 746

PPE Symbols Displayed:



Section 9: Physical and Chemical Properties

	Chemical Properties
Appearance (physical state, color, etc.):	Reddish/brown powder.
Odor:	No odor
Odor threshold:	N/A
pH:	N/AV
Melting point/freezing point:	N/AV
Initial boiling point and boiling range:	N/AV
Flash point:	N/AV
Evaporation rate:	N/A
Flammability (solid, gas):	Combustible. Keep away from sources of ignition.
Upper/lower flammability or explosive limits:	N/AV
Vapor pressure:	N/A
Vapor density:	N/A
Relative density:	N/AV
Solubility(ies):	Moderate in water
Partition coefficient: n-octanol/water:	N/A
Auto ignition temperature:	N/AV
Decomposition temperature:	N/AV
Viscosity:	N/A
Other Relevant Properties:	N/A

Section 10: Stability and Reactivity

Stability: Stable	Avoid: N/A
Reactivity: Stable	Avoid: N/A
Other: N/A	
Incompatibility: Water, acids, caustics.	
Hazardous Decomposition of By-products Chlorides, CO, CO ₂ , NOX, Al ₂ O ₃ , Na ₂ O, and H ₂ gas.	
Polymerization: Will not occur.	Avoid: N/A

Section 11: Toxicological Information

Chemical Name	% Wt.	LD50	LC50	Route of Exposure:	Short / Long Term Exposure Effects:	Known Carcinogen:
Sodium Silico Fluoride	1-5	125 mg/Kg - oral rat	N/AV	Ingestion	N/AV	No
Sodium Nitrate	3-7	1267 mg/Kg - oral rat	N/AV	Ingestion	N/AV	No

Other Studies:
N/AV

Section 12: Ecological Information

Ecotoxicity:
N/AV

Environmental Fate:
N/AV

Section 13: Disposal Considerations

Dispose of in accordance with local, state and federal regulations.

Section 14: Transport Information

International N/A
United States N/A
Canada N/A
European Community N/A

Section 15: Regulatory Information**US Federal Regulations****TSCA**

All components of this product are included on the EPA TSCA Chemical Substance Inventory.

SARA 311 and 312 Hazard Categories:

Immediate (Acute) Health Hazard:	Yes
Delayed (Chronic) Health Hazard:	Yes
Fire Hazard:	No

SDS for FERRUX® 746

Reactivity:	No
Sudden Release of Pressure:	No

SARA Section 313 Notification:		
This product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. The chemical(s) is/are listed below.		
Chemical Name	CAS #	Standard Wt. %
Aluminium	7429-90-5	25.0
Ozone Depleting Substances: N/A		
Volatile Organic Compounds (VOC): N/A		
US State Regulation: N/A		
Canadian Regulation:		
WHMIS CLASSIFICATION: See Section 2 for GHS Hazard Classification This Product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.		
European Regulation: N/A		
Other Regulation: N/A		
MITI: N/A		

N/A is Not Applicable
N/K is Not Known
N/AV is Not Available

Section 16: Other Information

Document Revision History:

Revision: 9	Date Created: 06/07/99 Date of Last Revision: 04/13/2016	Last Approval Date: 04/13/2016
Document Author: Jackie Gerber	Document Manager: Julie Pyle	

SDS Status: Revised Section 8

Disclaimer

Information contained within this safety data sheet is based on the current state of knowledge and relates to such products, their intended usage and the required safety precautions. Although every effort has been made to ensure that this information is correct and gives adequate safety margins in line with current knowledge, it does not constitute a specification and no information for other purposes, particularly information regarding properties of the delivered materials, may be inferred. Determination of the technical suitability of each material and complying with any guidance relating to safe usage remain the sole responsibility of the user. Consequently, beyond any separately agreed contractual arrangements, the aforementioned manufacturer and its subsidiaries exclude any and all liability resulting from the use of the product. Unknown hazards may be inherent in all materials; therefore these materials shall be treated with caution. Although certain hazards are described herein, we are unable to guarantee that these are the only hazards.

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C0902
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MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) is for welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. The OSHA standard must be consulted for specific requirements. This Data Sheet complies with European Commission Directive 89/106/EEC, 91/155/EEC, ISD 11014-1 and ANSI Z400.1. This document is translated in several languages and is available on our website at www.hobartbrothers.com, from your sales representative or by calling customer service at 1 (937) 332-4000.

SECTION 1 - IDENTIFICATION

Manufacturer/Supplier

Name: HOBART BROTHERS COMPANY
Address: 101 TRADE SQUARE EAST, TROY, OH 45373
Website: www.hobartbrothers.com

WELDING WIRE, HOBART

EXCEL-ARC 71

Telephone No: +1 (937) 332-4000
Emergency No: +1 (800) 424-9300

Products Type:

TUBULAR ARC WELDING ELECTRODES FOR FLUX CORED, METAL CORED AND COMPOSITE SUBMERGED ARC WELDING

GROUP A: Product For:

Trade Name:

Gas Shielded Carbon and Low Alloy Steel

E71T-1M; ECLIPSE RXR-XLS, ULTIMET 716; EXCEL-ARC 71; FABCO 82HD, 85, 90, HORNET, RXR, RXR-XLS, TR70, XL-71; FABCOR 71, 80XLS, 86R, 96, 702, F6; FABDUAL T9M, T91M; FLUX-COR 2, 7, 37, 80A1; GALVACOR; HOBART E71T-GS; METAL-COR 6, 6L, 80D2, EN-VISION; METALLOY 70, 70R, 70X, 76, 80D2, EM12K-S, EM13K-S, EM13K-S MOD, X-CEL; SPEED-ALLOY 70, 71, 71A, 71-V, 719, 75, 105D2; SPEED-COR 6; SUPER-COR; TM 11, 22, 37, 55, 72, 73, 81A1, 95D2, 105D2, 711M, 791, 811A1, RX7; TRIPLE-7, 8; VERSATILE; VERTI-COR I, II, III; VISION AP70, HiDep 70, MetCOR 70; SubCOR EM12K-S, EM13K-S, EM13K-S MOD

GROUP B: Product For:

Trade Name:

Self-Shielded Carbon Steel

FABSHIELD 4, 21B, 23, 55, 7027; SELF-SHIELD 4, 11, 11GS; SPEED-SHIELD 11, GS; TM 44, 121, 123

GROUP C: Product For:

Trade Name:

Carbon and Low Alloy Steel

ELEMENT 70C6, 70T LF, 71Ni1C, 71Ni1M, 71T1C, 71T LF, 71T1M, 81K2C, 81Ni2C, 81K2M; FABCO 70XHP, 80K2-C, 81K2-C, 85XHP, 811N1, 91K2-C, 107G, 110, 110K3-M, 115, 712 C, 712M, 750M, 803, 812 Ni1M, MIL-101-TM, 911N2; FABCO XTREME 101, 120, B2, B3, B3V; FABCOR 90, 100F3-S, 209, 1100, 4130SR, CVN, EDGE, EDGE MC; FABSHIELD 3Ni1, 71K6, 71T8, 81N1, 81N1+, 81N2, K54, XLNT-6, XLR-8, X80, X90, X100, OFFSHORE 71Ni, OFFSHORE 81Ni; FLUX-COR 90K2; FORMULA XL8Ni1, XL8Ni1-C, XL525, XL550; HOBART SSW-10; MATRIX; METAL-COR MAXIM; METALLOY 71, 71SG, 80B2, 80N1, 80N2, 90, 90B3, 92-S, F2-S, 100, 100F3-S, 120-S, B2-S, B3-S, N1-S, N2-S, VANTAGE, VANTAGE D2, VANTAGE N1, W-S; MX2; PREMIER 70; PW-201; SPEED-ALLOY 81Ni1-V, 81Ni2-V, 85, 91B3, 111-V, 115, 125, 712, 712M, 790; TM 71 HYD, 81B2, 81N1, 81N2, 81W, 91B3, 91K2, 91N2, 95K2, 101K3, 111K3, 115, 125K4, 770, 771, 71HYN, 811B2, 811N1, 811N2, 811N3, 811W, 881K2, 910, 911B3, 911N2, 991K2, 101, 1101K3-C, 1101K3-M; VERTI-COR 70, 72, 81Ni2, 91B3, 91K2, 91N2, 11Ni1; MEGAFIL 810M, 710M, 713R, 350B, 731B, 235M, 825R, 735B 240M, 716R, 821R, 822R, 740B, 281 M, 281MCR, 781R, 781RCR, 281B, 741M, 610M, 940M, 742M, 1100M, 550R, 610R, 620R, 690R, 741B, 501B, 610B, 742B, 745, 807M, 807B, 236M, 237M, 836R, P36B, 736B, 737B; SubCOR SL 731, SL 840 HC, SL 735 1W, SL 735 2W, SL 735 3W, SL 735 4W, SL 735 5W, SL 741, SL 742, SL 745, SL 281 Cr, SL P1, SL P1 MOD, SL P11, SL P12 MOD, SL P36, SL P22, SL P24; SubCOR 92-S, F2-S, 100F3-S, 120-S, N1-S, W-S, B2-S, B3-S, 4130 SR

GROUP D: Product For:

Trade Name:

Corrosion Resisting Steel

FABCOR 409, F6W; FABLOY 409, 439; FABTUF 960; METAL-COR 409, 409Cb, 439; METALLOY 18CrCb, 409, 439; POWERCORE 91; SPEED-ALLOY 5055; TM B6, B9; MEGAFIL PSM; SubCOR SL P5, SL P9, SL P91, SL P92

SECTION 2 - IDENTIFICATION OF HAZARDS

IMPORTANT - This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in Section 8. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS INGREDIENT	CAS	EINECS ¹	REGULATORY HAZARD CLASSIFICATION/DESIGNATION	IARC ^E	NTP ^Z	OSHA ^H 65 ⁰
ALUMINUM	7429-90-5	231-072-3	67/548/EEC ^A			
ALUMINUM OXIDE	1344-28-1	215-691-6	F - R10, R15, R17			
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	None			
BARIUM COMPOUNDS (as Barium)	7440-39-3	231-149-1	Carc 3 ⁰ - R40	2B		X
BARIUM FLUORIDE	7787-32-8	232-108-0	None			
CALCIUM CARBONATE	1317-65-3	215-279-6	None			
CERIUM OXIDE	1306-38-3	215-150-4	None			
CHROMIUM	7440-47-3	231-157-5	O - R9; Carc 1 ⁰ - R45; Muta 2 - R46; Repr 3 - R62; T+ - R26; T - R24/25, R48/23; C - R35, R42/43; N - R50, R53 ^{1H}	1 ¹ , 3 ¹	K ¹¹	X ¹¹
COBALT	7440-48-4	231-158-0	Xn; R42/43, R53	2B		X
COPPER	7440-50-8	231-159-6	None			
FLUORSPAR	7789-75-5	232-188-7	None			
IRON	7439-89-6	231-096-4	None			
IRON OXIDE	1309-37-1	215-168-2	None			
LITHIUM CARBONATE	554-13-2	209-062-5	F - R14/15; C - R34 ^T	3		
LITHIUM FLUORIDE	7789-24-4	232-152-0	F - R14/15; C - R34 ^T			
LITHIUM OXIDE	12057-24-8	235-019-5	F - R14/15; C - R34 ^T			
MAGNESIUM	7439-95-4	231-104-6	F - R11, R15, R17			
MAGNESIUM OXIDE	1309-48-4	215-171-9	None			
MANGANESE	7439-96-5	231-105-1	Xn - R20/22 ^T			
MANGANESE OXIDE	1344-43-0	215-171-9	None			
MOLYBDENUM	7439-98-7	231-107-2	Xn - R48/20/22; Xi - R36/37 ^X			
NICKEL	7440-02-0	231-111-4	Carc 3 ⁰ - R40; T - R43, R48/23			
SILICA	14808-60-7	238-878-4	Xn - R48/20, R40/20	1 ¹	K	X
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	1 ¹	K	X
SILICON	7440-21-3	231-130-8	None	3	K	X
STRONTIUM FLUORIDE	7783-48-4	232-000-3	None			
TITANIUM	7440-32-6	231-142-3	None			
TITANIUM DIOXIDE	13463-67-7	236-675-5	None	2B		X
ZIRCONIUM	7440-67-7	231-176-9	F - R15, R17			

F - European Inventory of Existing Chemical Substances Number Δ - European Union Directive 67/548/EEC - Annex 1 E - International Agency for Research on Cancer (1 - Human Carcinogen, 2A - Probably Carcinogenic to Humans, 2B - Possibly Carcinogenic to Humans, 3 - Unclassifiable as to Carcinogenicity in Humans, 4 Probably Not Carcinogenic to Humans) Z - US National Toxicology Program (K - Known Carcinogen, S - Suspected Carcinogen) H - OSHA Known Carcinogen List O - California Proposition 65 (X - On Proposition 65 list) --- Dashes indicate the ingredient is not listed with the IARC, NTP, OSHA or 65 Φ - Carcinogen, Mutagen or Reproductive Category per European Council Directive 67/548/EEC Annex I T - Metal and Chromium III Compounds Σ - Chromium VI Compounds ΣΣ - Chromium (VI) Trioxide EU 67/548/EEC Classification/Designation Y - Manganese Dioxide EU 67/548/EEC Classification/Designation X - Molybdenum Trioxide EU 67/548/EEC Classification/Designation T - Lithium EU 67/548/EEC Classification/Designation Ψ - Silica Crystalline α-Quartz

The following symbols correspond with the EU 67/548/EEC column above are in European Union Directive 67/548/EEC Annex 1 and EC 1272/2008 Annex VI - Table 3.2:

F - Flammable	Xn - Harmful	Xi - Irritant	O - Oxidizer
C - Corrosive	N - Dangerous for the Environment	T - Toxic	T+ - Extremely Toxic



MATERIAL SAFETY DATA SHEET

WARNING! - Avoid breathing welding fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment.

PRIMARY ROUTES OF ENTRY: Respiratory System, Eyes and/or Skin.

ELECTRIC SHOCK: Arc welding and associated processes can kill. See Section 8.

ARC RAYS: The welding arc can injure eyes and burn skin.

FUMES AND GASES: Can be dangerous to your health.

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in this section, plus those from the base metal and coating, etc., as noted above. Monitor for the materials identified in the list within this section.

Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, antimony trioxide, barium, calcium oxide, chromium, cobalt, copper, fluorspar or fluorides, lithium, manganese, nickel, silica and strontium. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium, silicon and molybdenum. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 and F1.3, available from the "American Welding Society", 8669 Doral Blvd., Suite 130, Doral, FL 33166.

SECTION 3 - HAZARDOUS INGREDIENTS

GROUP AND %WEIGHT				GROUP AND %WEIGHT			
INGREDIENT	CAS	EINECS	A B C ⁽⁶⁾ D	INGREDIENT	CAS	EINECS	A B C ⁽⁶⁾ D
ALUMINUM	7429-90-5	231-072-3	<2 <5 <3 ⁽⁶⁾ ---	LITHIUM OXIDE	12057-24-8	235-019-5	--- <2 <2 <2
ALUMINUM OXIDE	1344-28-1	215-691-6	--- <3 <3	MAGNESIUM	7439-95-4	231-104-6	--- <3 <2 <2
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	--- <1 ⁽¹²⁾ <1 ⁽¹³⁾ <2	MAGNESIUM OXIDE	1309-48-4	215-171-9	--- <3 <2 <2
BARIUM CMPDS (as Ba)	7440-39-3	231-149-1	--- <1 ⁽¹⁾ <1 ⁽³⁾ <2	MANGANESE	7439-96-5	231-105-1	<5 <2 <4 <2
BARIUM FLUORIDE	7787-32-8	232-108-0	--- <2 ⁽⁷⁾ <2 ⁽¹¹⁾ <2	MANGANESE OXIDE	1344-43-0	215-171-9	--- <2 <2 <2
CALCIUM CARBONATE	1317-65-3	215-279-6	--- <2 ⁽⁷⁾ <2 ⁽¹¹⁾ <2	MOLYBDENUM	7439-98-7	231-107-2	<1 <2 <2 <2
CERIUM OXIDE	1306-38-3	215-150-4	--- <2 ⁽⁷⁾ <2 ⁽¹¹⁾ <2	NICKEL	7440-02-0	231-111-4	--- <4 <4 <1
CHROMIUM	7440-47-3	231-157-5	--- <3 <3 5-20	SILICA	14808-60-7	238-878-4	<2 <2 <2 <2
COBALT	7440-48-4	231-158-0	--- <1 ⁽¹⁰⁾ <1 ⁽¹⁰⁾ <2	(Amorphous Silica Fume)	69012-64-2	273-761-5	--- <2 <2 <2
COPPER	7440-50-8	231-159-6	<1 ⁽²⁾ <2 ⁽²⁾ <1 ⁽²⁾ <1 ⁽²⁾	SILICON	7440-21-3	231-130-8	<4 <2 ⁽⁴⁾ <4 <2
FLUORSPAR	7789-75-5	232-188-7	<5 ⁽⁵⁾ <10 <5	STRONTIUM FLUORIDE	7783-48-4	232-000-3	--- <2 ⁽⁸⁾ <2 <2
IRON	7439-89-6	231-096-4	75-98 75-95 75-98 75-95	TITANIUM	7440-32-6	231-142-3	--- <2 <2 <2
IRON OXIDE	1309-37-1	215-168-2	--- <12 <2	TITANIUM DIOXIDE	13463-67-7	236-675-5	<10 <4 ⁽⁴⁾ <10 <2
LITHIUM CARBONATE	554-13-2	209-062-5	--- <2 <2	ZIRCONIUM	7440-67-7	231-176-9	--- <1 <1 <1
LITHIUM FLUORIDE	7789-24-4	232-152-0	--- <2 ⁽⁹⁾ <2 ⁽⁹⁾ <2				

--- Dashes indicate the ingredient is not present within the group of products. (1) Present only in FABSHIELD 21B, 23; TM 121, 123; SELF-SHIELD 11, 11G5 (2) Present only in FABCO 110K3-M; FABCOR F6W; GALVACOR; METALLOY WS; TM-81W, 811W; all MEGAFIL and SubCOR SL products (3) Present only in FABCO XTREME 120, B2, B3; FABSHIELD 3N1I, 71K6, 71T8, 81N1, 81N1+, 81N2, XLNT-6, X90; FABSHIELD OFFSHORE 71N1 (4) Present only in FABSHIELD 55 (5) Present only in METALLOY EM13K-S; SPEED-ALLOY 10SD2; TM 55, 75A1, 95D2, 10SD2 (6) Present only in FABCO XTREME 120, B2, B3; FABSHIELD 3N1I, 71K6, 71T8, 81N1, 81N1+, 81N2, XLNT-6; FABSHIELD OFFSHORE 71N1 Present only in FABSHIELD 7027 (8) Present only in FABSHIELD 21B; TM 121 (9) Present only in FABCO 750M; FABSHIELD 7027 (10) Present only in FABSHIELD 71K6, 81N2 (11) Present only in FABSHIELD 71T8, 81N1+, XLNT-6, X90; FABSHIELD OFFSHORE 71N1; (12) Present only in FABCOR CVN; MATRIX; METAL-COR MAXIM; METALL VANTAGE, VANTAGE CVN, VANTAGE D2, VANTAGE N1 (13) Present only in ELEMENT 70T LF

SECTION 4 - FIRST AID MEASURES

INHALATION: If breathing is difficult provide fresh air and contact physician.

EYE/SKIN INJURIES: For radiation burns, see physician.

Section 11 of this MSDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this MSDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Solid objects can be picked up and placed into a container. Wear proper personal protective equipment while handling. Do not discard as general trash.

SECTION 7 - HANDLING AND STORAGE

HANDLING: No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.

STORAGE: Keep separate from acids and strong bases to prevent possible chemical reactions.

SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL or ACGIH TLV. The OSHA PEL for Particulate - Not Otherwise Classified (PNOC) is 5 mg/m³ - Respirable Fraction, 15 mg/m³ - Total Dust. The ACGIH TLV for Particles - Not Otherwise Specified (PNOS) is 3 mg/m³ - Respirable Particles, 10 mg/m³ - Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA Particulate - Not Otherwise Classified (PNOC) and ACGIH Particles - Not Otherwise Specified (PNOS). An Industrial Hygienist, the OSHA Permissible Exposure Limits for Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits. European Union Occupational Exposure Limits (EU OEL) are listed with the most stringent limit among the EU member nations. All exposure limits are in milligrams per cubic meter (mg/m³).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV	EU OEL
ALUMINUM###	7429-90-5	231-072-3	1 R* (Dust)	1 R* {A4}	4 I*; 1.5 R* - Germany
ALUMINUM OXIDE##	1344-28-1	215-691-6	5 R*	1 R* {A4}	1.5 R* (Aerosol) - Germany; 2 - Poland
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	0.5 (as Sb)	0.5 (as Sb) {A2}	0.1 I*; 0.4*** - Hungary
BARIUM CMPDS (as Ba)	7440-39-3	231-149-1	0.5 (as Ba)	0.5 (as Ba) {A4}	0.1 I* (Aerosol); 0.4*** (Aerosol) - Austria
BARIUM FLUORIDE#	7787-32-8	232-108-0	0.5 (as Ba)	0.5 (as Ba) {A4}	0.5 I* (Aerosol as Ba), 4*** (Aerosol as Ba) - Germany
CALCIUM CARBONATE	1317-65-3	215-279-6	5 R*, 5 (as CaO)	3 R*, 2 (as CaO)	0.5 I* (Aerosol as Ba), 4*** (Aerosol as Ba) - Germany
CERIUM OXIDE	1306-38-3	215-150-4	5 R* (Dust), 15 (Dust)	3 R* (Dust), 10 (Dust)	10 I* (Aerosol) - UK; 3 R* (Aerosol) - Switzerland
CHROMIUM#	7440-47-3	231-157-5	1 (Metal)	0.5 (Metal) {A4}	4 I*; 1.5 R* (as Dust - NOS) - Germany
			0.5 (Cr II & Cr III Cpnds)	0.5 (Cr III Cpnds) {A4}	0.1 I* (Aerosol) - Switzerland
			0.005 (Cr VI Cpnds)	0.05 (Cr VI Sol Cpnds) {A1}	0.005; 0.01*** - Denmark
				0.01 (Cr VI Insol Cpnds) {A1}	0.005 (Total Aerosol); 0.015*** (Total Aerosol) - Sweden
COBALT	7440-48-4	231-158-0	0.1 (Dust and Fume)	0.02 {A3}	0.01 I*; 0.02*** - Denmark
COPPER	7440-50-8	231-159-6	0.1 (Fume), 1 (Dust)	0.2 (Fume), 1 (Dust)	0.1 I* (Aerosol); 0.2 I*** (Aerosol) - Germany
FLUORSPAR	7789-75-5	232-188-7	2.5 (as F)	2.5 (as F) {A4}	0.1; 0.2*** - Denmark
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe ₂ O ₃) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
					3 R* (Aerosol as Fe ₂ O ₃) - Switzerland
					7*** (as Fe ₂ O ₃) - Denmark



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IRON OXIDE	1309-37-1	215-168-2	10 (Oxide Fume)	5 R* (Fe ₂ O ₃) {A4}	3 R* (Aerosol as Fe ₂ O ₃) - Switzerland 7*** (as Fe ₂ O ₃) - Denmark
ALUMINUM CARBONATE	554-13-2	209-062-5	5 R* (Dust), 15 (Dust)	3 R* (Dust), 10 (Dust)	4 I*; 1.5 R* (as Dust - NOS) - Germany
ALUMINUM FLUORIDE	7789-24-4	232-152-0	2.5 (as F)	2.5 (as F) {A4}	2.5 - UK
LITHIUM OXIDE	12057-24-8	235-019-5	1 ■ ■	3 R* (Dust), 10 (Dust)	4 I*; 1.5 R* (as Dust - NOS) - Germany
MAGNESIUM+	7439-95-4	231-104-6	5 R*	3 R*	3 R* (Aerosol) - Switzerland
MAGNESIUM OXIDE	1309-48-4	215-171-9	15 (Fume, Total Part)	10 I* {A4}	4 I* (Aerosol); 1.5 R*** (Aerosol) - Germany
MANGANESE#	7439-96-5	231-105-1	5 CL** (Fume) 1, 3 STEL*** ■	0.1 I* {A4} ♦ 0.02 R* ♦ ♦	3 R* (Aerosol as Mg) - Switzerland 4 I* (Aerosol as Mg); 1.5 R*** (Aerosol as Mg) - Germany
MANGANESE OXIDE	1344-43-0	215-171-9	5 CL** (Fume) 1, 3 STEL*** ■	0.1 I* {A4} ♦ 0.02 R* ♦ ♦	0.02 R* (Aerosol); 0.16 R*** (Aerosol) - Germany
MOLYBDENUM	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol)	0.2 I* (Aerosol) - Germany
NICKEL#	7440-02-0	231-111-4	1 (Metal) 1 (Sol Cpnds) 1 (Insol Cpnds)	0.5 R* (Sol Cpnds) {A3} 1.5 I* (Ele) {A5} 0.1 I* (Sol Cpnds) {A4}	0.2; 0.4*** - Denmark 0.02 R* (Aerosol); 0.16 R*** (Aerosol) - Germany
SILICA++	14808-60-7	238-878-4	0.1 R*	0.2 I* (Insol Cpnds) {A1}	0.2 I* (Aerosol) - Germany
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	0.025 R* {A2}	0.2; 0.4*** - Denmark
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	3 R* - Spain;
STRONTIUM FLUORIDE	7783-48-4	232-000-3	2.5 (as F)	3 R*	4; 10*** - Poland
TITANIUM+	7440-32-6	231-142-3	5 R*	2.5 (as F) {A4}	0.05; 0.1*** - Denmark
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	3 R*	
ZIRCONIUM	7440-67-7	231-176-9	5 (Zr Cpnds)	10 {A4}	
				5, 10 STEL*** (Zr Cpnds) {A4}	

R* - Respirable Fraction R*** - Respirable Fraction - Short Term Exposure Limit I* - Inhalable Fraction I*** - Inhalable Fraction - Short Term Exposure Limit ** - Ceiling Limit *** - Short Term Exposure Limit + - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH ++ - Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form #- Reportable material under Section 313 of SARA ## - Reportable material under Section 313 of SARA only in fibrous form ### - Reportable material under Section 313 of SARA as dust or fume ■ - NIOSH REL TWA and STEL ■■ - AIHA Ceiling Limit of 1 mg/m³ ♦ - Limit of 0.1 mg/m³ is for Inhalable Mn in 2013 by ACGIH ♦♦ - Limit of 0.02 mg/m³ is for Respirable Mn in 2013 by ACGIH Ele - Element Sol - Soluble Insol - Insoluble Inorg - Inorganic Cpnds - Compounds NOS - Not Otherwise Specified {A1} - Confirmed Human Carcinogen per ACGIH {A2} - Suspected Human Carcinogen per ACGIH {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH {A5} - Not Suspected as a Human Carcinogen per ACGIH (noncrystalline) form

VENTILATION: Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV/OELs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

RESPIRATORY PROTECTION: Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the regulatory limits.

EYE PROTECTION: Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others from the weld arc flash.

PROTECTIVE CLOTHING: Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection as well as dark non-synthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS: Not applicable

SPECIAL PRECAUTIONS (IMPORTANT): Maintain exposure below the PEL/TLV/OEL. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV/OEL. Always use exhaust ventilation. Refer to the following sources for important additional information: American National Standard (ANSI) Z49.1; Safety in Welding and Cutting published by the American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 20402.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded.

PHYSICAL STATE: Cored Wire

COLOR: Gray

ODOR: N/A

FORM: Round Wire

SECTION 10 - STABILITY AND REACTIVITY

GENERAL: Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.

STABILITY: This product is stable under normal conditions.

REACTIVITY: Contact with acids or strong bases may cause generation of gas.

SECTION 11 - TOXICOLOGICAL INFORMATION

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS: Welding Fumes - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. Aluminum Oxide - Irritation of the respiratory system. Antimony Compounds - Irritation of nose, throat, eyes and skin. Barium - Aching eyes, rhinitis, frontal headache, wheezing, laryngeal spasms, salivation or anorexia. Calcium Oxide - Dust or fumes may cause irritation of the respiratory system, skin and eyes. Chromium - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people. Cobalt - Pulmonary irritation, cough, dermatitis, weight loss. Copper - Metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. Fluorides - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis. Iron, Iron Oxide - None are known. Treat as nuisance dust or fume. Lithium Compounds - Overexposure may cause tremor and nausea. Magnesium, Magnesium Oxide - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. Manganese, Manganese Oxide - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure. Molybdenum, Cerium Oxide - Irritation of the eyes, nose and throat. Nickel, Nickel Compounds - Metallic taste; nausea, tightness in chest, metal fume fever, allergic reaction. Silica (Amorphous) - Dust and fumes may cause irritation of the respiratory system, skin and eyes. Strontium Compounds - Strontium salts are generally non-toxic and are normally present in the human body. In large oral doses, they may cause gastrointestinal disorders, vomiting and diarrhea. Titanium Dioxide - Irritation of respiratory system. Zirconium - May cause irritation of the eyes, nose and throat due to mechanical effects.

LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS: Welding Fumes - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." Aluminum Oxide - Pulmonary fibrosis and emphysema. Antimony Compounds - Metal fume fever, dermatitis, keratitis, conjunctivitis and ulceration and perforation of the nasal septum. Avoid conditions in which fresh hydrogen will react with antimony to form stibine which is extremely toxic. Barium - Long term overexposure to soluble barium compounds may cause nervous disorders and may have deleterious effects on the heart, circulatory system and musculature. Calcium Oxide - Prolonged overexposure may cause ulceration of the nose and perforation of the nasal septum, dermatitis and pneumonia. Chromium - Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds. Cobalt - Repeated overexposure to cobalt compounds can produce reduced pulmonary function, diffuse nodular fibrosis of lungs and respiratory hypersensitivity. Copper - Copper poisoning has been reported in the literature from exposure to high levels of copper. Liver damage can occur due to copper accumulating in the liver characterized by cell destruction and cirrhosis. High levels of copper may cause anemia and jaundice. High levels of copper may cause central



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nervous system damage characterized by nerve fiber separation and cerebral degeneration. Fluorides - Serious bone erosion (Osteoporosis) and mottling of teeth. Iron, Iron Oxide Fumes - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to it and its compounds ceases. Iron and magnetite (Fe_3O_4) are not regarded as fibrogenic materials. Lithium Compounds - May be considered as potentially teratogenic. Magnesium, Magnesium Oxide - No adverse long term health effects have been reported in the literature. Manganese, Manganese Oxide - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Molybdenum, Cerium Oxide - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. Nickel, Nickel Compounds - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. Silica (Amorphous) - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential. Strontium Compounds - Strontium at high doses is known to concentrate in bone. Major signs of chronic toxicity, which involve the skeleton, have been labeled as "strontium rickets". Titanium Dioxide - Pulmonary irritation and slight fibrosis. Zirconium - May cause pulmonary fibrosis and pneumoconiosis.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.

EMERGENCY AND FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.

CARCINOGENICITY: Chromium VI compounds, nickel compounds and silica (crystalline quartz) are classified as IARC Group 1 and NTP Group K carcinogens. Titanium dioxide, antimony trioxide compounds and cobalt compounds are classified as IARC Group 2B carcinogens. Chromium VI compounds, cobalt compounds, nickel compounds, silica (crystalline quartz) and welding fumes must be considered as carcinogens under OSHA (29 CFR 1910.1200).

CALIFORNIA PROPOSITION 65: For Group C and D products: **WARNING:** This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.) For Group A and B products: **WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

SECTION 12 - ECOLOGICAL INFORMATION

Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

SECTION 13 - DISPOSAL CONSIDERATIONS

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

SECTION 14 - TRANSPORT INFORMATION

No international regulations or restrictions are applicable. No special precautions are necessary.

SECTION 15 - REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label and the material safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA TITLE III: Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name

RQ(lb)

TPQ (lb)

Products on this MSDS are a solid solution in the form of a solid article.

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate

In use: Immediate delayed

EPCRA/SARA TITLE III 313 TOXIC CHEMICALS: The following metallic components are listed as SARA 313 "Toxic Chemicals" and potentially subject to annual SARA 312 reporting: Antimony Trioxide, Chromium, Cobalt, Copper, Lithium Carbonate, Manganese, and Nickel. See Section 3 for weight percentage.

CANADIAN WHMIS CLASSIFICATION: Class D; Division 2, Subdivision A

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

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

SECTION 16 - OTHER INFORMATION

The following Risk and Safety Phrase Texts and Hazard Statements correspond with the columns labeled - EU 67/548/EEC within Section 2 of this material safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

EU Directive 67/548/EEC - Risk Phrase Texts

R9 - Explosive when mixed with

combustible material

R10 - Flammable

R11 - Highly flammable

R14/15 - Reacts violently with water,

liberating extremely flammable gases

R15 - Contact with water liberates

extremely flammable gases

R17 - Spontaneously flammable in air

R20/22 - Harmful by inhalation and if

swallowed

R24/25 - Toxic in contact with skin and

if swallowed

R26 - Very toxic by inhalation

R34 - Causes burns

R35 - Causes severe burns

R36/37 - Irritating to eyes and

respiratory system

R40 - Limited evidence of a

carcinogenic effect

R40/20 - Harmful: possible risk of

irreversible effects through inhalation

R42/43 - May cause sensitization by

inhalation and skin contact

R43 - May cause sensitization by skin

contact

R45 - May cause cancer

R46 - May cause heritable genetic

damage

R48/20 - Harmful: danger of serious

damage to health by prolonged

exposure through inhalation

R48/20/22 - Harmful: danger of serious

damage to health by prolonged

exposure through inhalation and if

swallowed

R48/23 - Toxic: danger of serious

damage to health by prolonged

exposure through inhalation

R50 - Very toxic to aquatic organisms

R53 - May cause long-term adverse

effects in the aquatic environment

R62 - Possible risk of impaired fertility

For additional information please refer to the following sources:

USA: American National Standard (ANSI) Z49.1 "Safety in Welding and Cutting", ANSI/American Welding Society (AWS) F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWS F3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 8669 Dorval Blvd., Suite 130, Dorval, FL 33166. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

Hobart Brothers Company strongly recommends the users of this product study this MSDS, the product label information and become aware of all hazards associated with welding. Hobart Brothers Company believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers Company cannot make any expressed or implied warranty as to this information.

SAFETY DATA SHEET

1. Identification

Product identifier	MAR-PROOF H/S LACQUER SANDING SEALER
Other means of identification	
Product code	I-1410-00
Recommended use	Interior wood finish.
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Manufacturer	
Company Name	FORREST Technical Coatings
Address	1011 McKinley Street P.O. Box 22110
City	Eugene
State	OR
Zip	97402
Country	United States
Telephone	1 (541) 342-1821
Contact person	EHS Department
Website	www.forrestpaint.com
E-mail	info@forrestpaint.com
Emergency phone number	1 (800) 424-9300 (CHEMTREC - Contract # 8730) USA & Canada +1 703-527-3887 (CHEMTREC - Contract # 8730) Outside USA and Canada

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 2
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
	Germ cell mutagenicity	Category 1B
	Carcinogenicity	Category 1B
	Reproductive toxicity (the unborn child)	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure	Category 2
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 3
	Hazardous to the aquatic environment, long-term hazard	Category 3
OSHA defined hazards	Not classified.	

Label elements



Signal word Danger

Hazard statement Extremely flammable liquid and vapor. Harmful if swallowed. Causes skin irritation. Causes serious eye damage. May cause drowsiness or dizziness. May cause genetic defects. May cause cancer. Suspected of damaging the unborn child. May cause damage to organs through prolonged or repeated exposure. Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

Precautionary statement

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response

If swallowed: Call a poison center/doctor if you feel unwell. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. 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. Immediately call a poison center/doctor. Rinse mouth. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. In case of fire: Use appropriate media to extinguish.

Storage

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

Disposal

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

Hazard(s) not otherwise classified (HNOC)

None known.

Supplemental information

57.53% of the mixture consists of component(s) of unknown acute oral toxicity. 70.25% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 70.25% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
BUTYL ACETATE		123-86-4	10-25
METHYL ETHYL KETONE		78-93-3	10-25
SOLVENT NAPHTHA, LIGHT ALIPHAT		64742-89-8	10-25
TOLUENE		108-88-3	10-25
ISOPROPANOL		67-63-0	<10
n-BUTYL ALCOHOL		71-36-3	<10
ZINC STEARATE		557-05-1	<10

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact

Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Ingestion

Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical advice/attention if you feel unwell.

Most important symptoms/effects, acute and delayed

May cause drowsiness and dizziness. Headache. Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain. Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information	Take off all contaminated clothing immediately. IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.
5. Fire-fighting measures	
Suitable extinguishing media	Alcohol resistant foam. Water fog. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Extremely flammable liquid and vapor.
6. Accidental release measures	
Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Take precautionary measures against static discharge. Use only non-sparking tools. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Following product recovery, flush area with water. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.
7. Handling and storage	
Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not breathe mist or vapor. Do not get this material in contact with eyes. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Do not taste or swallow. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
BUTYL ACETATE (CAS 123-86-4)	PEL	710 mg/m3	
ISOPROPANOL (CAS 67-63-0)	PEL	150 ppm 980 mg/m3	
METHYL ETHYL KETONE (CAS 78-93-3)	PEL	400 ppm 590 mg/m3	
n-BUTYL ALCOHOL (CAS 71-36-3)	PEL	200 ppm 300 mg/m3	
ZINC STEARATE (CAS 557-05-1)	PEL	100 ppm 5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Table Z-2 (29 CFR 1910.1000)

Components	Type	Value
TOLUENE (CAS 108-88-3)	Ceiling TWA	300 ppm 200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
BUTYL ACETATE (CAS 123-86-4)	STEL	200 ppm
	TWA	150 ppm
ISOPROPANOL (CAS 67-63-0)	STEL	400 ppm
	TWA	200 ppm
METHYL ETHYL KETONE (CAS 78-93-3)	STEL	300 ppm
	TWA	200 ppm
n-BUTYL ALCOHOL (CAS 71-36-3)	TWA	20 ppm
TOLUENE (CAS 108-88-3)	TWA	20 ppm
ZINC STEARATE (CAS 557-05-1)	TWA	10 mg/m3

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
ISOPROPANOL (CAS 67-63-0)	40 mg/l	Acetone	Urine	*
METHYL ETHYL KETONE (CAS 78-93-3)	2 mg/l	MEK	Urine	*
TOLUENE (CAS 108-88-3)	0.3 mg/g	o-Cresol, with hydrolysis	Creatinine in urine	*
	0.03 mg/l	Toluene	Urine	*
	0.02 mg/l	Toluene	Blood	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

n-BUTYL ALCOHOL (CAS 71-36-3) Can be absorbed through the skin.
TOLUENE (CAS 108-88-3) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

n-BUTYL ALCOHOL (CAS 71-36-3) Skin designation applies.
TOLUENE (CAS 108-88-3) Skin designation applies.

US - Tennessee OELs: Skin designation

n-BUTYL ALCOHOL (CAS 71-36-3)

Can be absorbed through the skin.

US NIOSH Pocket Guide to Chemical Hazards: Skin designation

n-BUTYL ALCOHOL (CAS 71-36-3)

Can be absorbed through the skin.

Appropriate engineering controls

Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment**Eye/face protection**

Chemical respirator with organic vapor cartridge and full facepiece.

Skin protection**Hand protection**

Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection

Chemical respirator with organic vapor cartridge and full facepiece.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

When using do not smoke. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties**Appearance****Physical state**

Liquid.

Form

Liquid.

Color

Clear.

Odor

Solvent.

Odor threshold

Not available.

pH

Not available.

Melting point/freezing point

Not available.

Initial boiling point and boiling range

170 - 300 °F (76.67 - 148.89 °C) estimated

Flash point

16.0 °F (-8.9 °C) estimated

Evaporation rate

Not available.

Flammability (solid, gas)

Not applicable.

Upper/lower flammability or explosive limits**Flammability limit - lower (%)**

1.3 % estimated

Flammability limit - upper (%)

12 % estimated

Explosive limit - lower (%)

Not available.

Explosive limit - upper (%)

Not available.

Vapor pressure

56.79 hPa estimated

Vapor density

Not available.

Relative density

Not available.

Solubility(ies)**Solubility (water)**

Not available.

Partition coefficient (n-octanol/water)

Not available.

Auto-ignition temperature

338 °F (170 °C) estimated

Decomposition temperature

Not available.

Viscosity

Not available.

Other information

Density	7.56 lb/gal
Flammability class	Flammable IB estimated
Percent volatile	74.21 %w/w
Specific gravity	0.91
VOC (Weight %)	665.93 g/l MATERIAL 668.39 g/l COATING

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Nitrates. Ammonia. Amines. Isocyanates. Caustics. Chlorine.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause damage to organs through prolonged or repeated exposure by inhalation. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye damage.
Ingestion	Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics	Headache. May cause drowsiness and dizziness. Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain.
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Information on toxicological effects

Acute toxicity	Harmful if swallowed. Narcotic effects.
Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity	May cause genetic defects.
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Carcinogenicity	May cause cancer.
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IARC Monographs. Overall Evaluation of Carcinogenicity

TOLUENE (CAS 108-88-3) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not available.

Reproductive toxicity	Suspected of damaging the unborn child.
Specific target organ toxicity - single exposure	May cause drowsiness and dizziness.
Specific target organ toxicity - repeated exposure	May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	May cause damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

Components		Species	Test Results
BUTYL ACETATE (CAS 123-86-4)			
Aquatic			
Fish	LC50	Fathead minnow (<i>Pimephales promelas</i>)	17 - 19 mg/l, 96 hours
ISOPROPANOL (CAS 67-63-0)			
Aquatic			
Fish	LC50	Bluegill (<i>Lepomis macrochirus</i>)	> 1400 mg/l, 96 hours
METHYL ETHYL KETONE (CAS 78-93-3)			
Aquatic			
Crustacea	EC50	Water flea (<i>Daphnia magna</i>)	4025 - 6440 mg/l, 48 hours
Fish	LC50	Sheepshead minnow (<i>Cyprinodon variegatus</i>)	> 400 mg/l, 96 hours
n-BUTYL ALCOHOL (CAS 71-36-3)			
Aquatic			
Crustacea	EC50	Water flea (<i>Daphnia magna</i>)	1897 - 2072 mg/l, 48 hours
Fish	LC50	Bluegill (<i>Lepomis macrochirus</i>)	100 - 500 mg/l, 96 hours
TOLUENE (CAS 108-88-3)			
Aquatic			
Crustacea	EC50	Water flea (<i>Daphnia magna</i>)	19.6 mg/l, 48 hours
Fish	LC50	Rainbow trout, donaldson trout (<i>Oncorhynchus mykiss</i>)	14.1 - 17.16 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

BUTYL ACETATE	1.78
ISOPROPANOL	0.05
METHYL ETHYL KETONE	0.29
n-BUTYL ALCOHOL	0.88
TOLUENE	2.73

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1263
UN proper shipping name	Paint

Transport hazard class(es)

Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	149, B52, IB2, T4, TP1, TP8, TP28
Packaging exceptions	150
Packaging non bulk	173
Packaging bulk	242

IATA

UN number	UN1263
UN proper shipping name	Paint
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Environmental hazards	No.
ERG Code	3H
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed.
Cargo aircraft only	Allowed.

IMDG

UN number	UN1263
UN proper shipping name	Paint
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-E,S-E
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

DOT



15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

BUTYL ACETATE (CAS 123-86-4)	Listed.
ISOPROPANOL (CAS 67-63-0)	Listed.
METHYL ETHYL KETONE (CAS 78-93-3)	Listed.
n-BUTYL ALCOHOL (CAS 71-36-3)	Listed.
TOLUENE (CAS 108-88-3)	Listed.
ZINC STEARATE (CAS 557-05-1)	Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical

No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
TOLUENE	108-88-3	10-25
ISOPROPANOL	67-63-0	<10
n-BUTYL ALCOHOL	71-36-3	<10
ZINC STEARATE	557-05-1	<10

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

TOLUENE (CAS 108-88-3)

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

Not regulated.

Safe Drinking Water Act (SDWA)

Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

METHYL ETHYL KETONE (CAS 78-93-3)	6714
TOLUENE (CAS 108-88-3)	6594

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

METHYL ETHYL KETONE (CAS 78-93-3)	35 %WV
TOLUENE (CAS 108-88-3)	35 %WV

DEA Exempt Chemical Mixtures Code Number

METHYL ETHYL KETONE (CAS 78-93-3)	6714
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US state regulations**US - California Candidate Chemicals: Listed**

ISOPROPANOL (CAS 67-63-0)
 METHYL ETHYL KETONE (CAS 78-93-3)
 SOLVENT NAPHTHA, LIGHT ALIPHAT (CAS 64742-89-8)

US - California Candidate Chemicals: Listed on initial list

TOLUENE (CAS 108-88-3)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. Massachusetts RTK - Substance List

BUTYL ACETATE (CAS 123-86-4)
 ISOPROPANOL (CAS 67-63-0)
 METHYL ETHYL KETONE (CAS 78-93-3)
 n-BUTYL ALCOHOL (CAS 71-36-3)
 TOLUENE (CAS 108-88-3)
 ZINC STEARATE (CAS 557-05-1)

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

BUTYL ACETATE (CAS 123-86-4)
 ISOPROPANOL (CAS 67-63-0)
 METHYL ETHYL KETONE (CAS 78-93-3)
 n-BUTYL ALCOHOL (CAS 71-36-3)
 TOLUENE (CAS 108-88-3)
 ZINC STEARATE (CAS 557-05-1)

US. Pennsylvania Worker and Community Right-to-Know Law

BUTYL ACETATE (CAS 123-86-4)
 ISOPROPANOL (CAS 67-63-0)
 METHYL ETHYL KETONE (CAS 78-93-3)
 n-BUTYL ALCOHOL (CAS 71-36-3)
 TOLUENE (CAS 108-88-3)
 ZINC STEARATE (CAS 557-05-1)

US. Rhode Island RTK

BUTYL ACETATE (CAS 123-86-4)
 ISOPROPANOL (CAS 67-63-0)
 METHYL ETHYL KETONE (CAS 78-93-3)
 n-BUTYL ALCOHOL (CAS 71-36-3)
 TOLUENE (CAS 108-88-3)
 ZINC STEARATE (CAS 557-05-1)

US. California Proposition 65

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

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

BENZENE (CAS 71-43-2) Listed: February 27, 1987
 ETHYL BENZENE (CAS 100-41-4) Listed: June 11, 2004

US - California Proposition 65 - CRT: Listed date/Developmental toxin

BENZENE (CAS 71-43-2) Listed: December 26, 1997
 TOLUENE (CAS 108-88-3) Listed: January 1, 1991

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

TOLUENE (CAS 108-88-3) Listed: August 7, 2009

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

BENZENE (CAS 71-43-2) Listed: December 26, 1997

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

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

Issue date	08-14-2016
Version #	01
HMIS® ratings	Health: 3* Flammability: 3 Physical hazard: 0
NFPA ratings	Health: 3 Flammability: 3 Instability: 0

NFPA ratings



Disclaimer

The information and recommendations in this safety data sheet are, to the best of our knowledge, accurate as of the date of issue. Nothing herein shall be deemed to create any warranty, expressed or implied. It is the responsibility of the user to determine the applicability of this information and the suitability of the material or product for any particular purpose.



SAFETY DATA SHEET

1. Identification

Product identifier Jump Start® Starting Fluid

Other means of identification

Product Code No. 05671 (Item# 1003843)

Recommended use Starting fluid

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufactured or sold by:

Company name CRC Industries, Inc.

Address 885 Louis Dr.
Warminster, PA 18974 US

Telephone

General Information 215-674-4300

Technical Assistance 800-521-3168

Customer Service 800-272-4620

24-Hour Emergency 800-424-9300 (US)

(CHEMTREC) 703-527-3887 (International)

Website www.crcindustries.com

2. Hazard(s) identification

Physical hazards	Flammable aerosols	Category 1
	Gases under pressure	Compressed gas
Health hazards	Skin corrosion/irritation	Category 2
	Carcinogenicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Aspiration hazard	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2
	Hazardous to the aquatic environment, long-term hazard	Category 3
OSHA defined hazards	Not classified.	

Label elements



Signal word Danger

Hazard statement Extremely flammable aerosol. Contains gas under pressure; may explode if heated. May be fatal if swallowed and enters airways. Causes skin irritation. May cause drowsiness or dizziness. Suspected of causing cancer. Toxic to aquatic life. Harmful to aquatic life with long lasting effects.

Precautionary statement**Prevention**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not spray on an open flame or other ignition source. Pressurized container: Do not pierce or burn, even after use. Do not apply while equipment is energized. Extinguish all flames, pilot lights and heaters. Vapors will accumulate readily and may ignite. Use only with adequate ventilation; maintain ventilation during use and until all vapors are gone. Open doors and windows or use other means to ensure a fresh air supply during use and while product is drying. If you experience any symptoms listed on this label, increase ventilation or leave the area. Avoid breathing mist or vapor. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Avoid release to the environment.

Response

If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. If on skin: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. If exposed or concerned: Get medical advice/attention.

Storage

Store in a well-ventilated place. Store locked up. Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F. Exposure to high temperature may cause can to burst.

Disposal

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

Hazard(s) not otherwise classified (HNOC)

None known.

3. Composition/information on ingredients**Mixtures**

Chemical name	Common name and synonyms	CAS number	%
heptane, branched, cyclic and linear		426260-76-6	70 - 80
diethyl ether		60-29-7	10 - 20
carbon dioxide		124-38-9	5 - 10
ethanol		64-17-5	< 1.5
chloroethane		75-00-3	< 1
distillates (petroleum), hydrotreated light		64742-47-8	< 1

Specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures**Inhalation**

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact

Remove contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye contact

Rinse with water. Get medical attention if irritation develops and persists.

Ingestion

Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed

Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Skin irritation. May cause redness and pain.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information

IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures**Suitable extinguishing media**

Water fog. Alcohol resistant foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media

None known.

Specific hazards arising from the chemical

Contents under pressure. Pressurized container may rupture when exposed to heat or flame. During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Fire-fighting equipment/instructions

In case of fire: Stop leak if safe to do so. Move containers from fire area if you can do so without risk. Containers should be cooled with water to prevent vapor pressure build up.

General fire hazards

Extremely flammable aerosol. Contents under pressure. Pressurized container may rupture when exposed to heat or flame.

6. Accidental release measures**Personal precautions, protective equipment and emergency procedures**

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist or vapor. Emergency personnel need self-contained breathing equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. This product is miscible in water. Prevent product from entering drains. Stop the flow of material, if this is without risk. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage**Precautions for safe handling**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Pressurized container: Do not pierce or burn, even after use. Do not use if spray button is missing or defective. Do not spray on a naked flame or any other incandescent material. Do not smoke while using or until sprayed surface is thoroughly dry. Do not cut, weld, solder, drill, grind, or expose containers to heat, flame, sparks, or other sources of ignition. Use caution around energized equipment. The metal container will conduct electricity if it contacts a live source. This may result in injury to the user from electrical shock and/or flash fire. Avoid breathing mist or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Should be handled in closed systems, if possible. Use only in well-ventilated areas. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices. For product usage instructions, see the product label.

Conditions for safe storage, including any incompatibilities

Level 3 Aerosol.

Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50°C/122 °F. Do not puncture, incinerate or crush. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection**Occupational exposure limits**

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
carbon dioxide (CAS 124-38-9)	PEL	9000 mg/m3
chloroethane (CAS 75-00-3)	PEL	5000 ppm 2600 mg/m3
diethyl ether (CAS 60-29-7)	PEL	1000 ppm 1200 mg/m3
distillates (petroleum), hydrotreated light (CAS 64742-47-8)	PEL	400 ppm 400 mg/m3
ethanol (CAS 64-17-5)	PEL	100 ppm 1900 mg/m3 1000 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
carbon dioxide (CAS 124-38-9)	STEL	30000 ppm
	TWA	5000 ppm
chloroethane (CAS 75-00-3)	TWA	100 ppm
diethyl ether (CAS 60-29-7)	STEL	500 ppm
	TWA	400 ppm
ethanol (CAS 64-17-5)	STEL	1000 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
carbon dioxide (CAS 124-38-9)	STEL	54000 mg/m3
		30000 ppm
	TWA	9000 mg/m3
		5000 ppm
distillates (petroleum), hydrotreated light (CAS 64742-47-8)	TWA	100 mg/m3
ethanol (CAS 64-17-5)	TWA	1900 mg/m3
		1000 ppm

Biological limit values No biological exposure limits noted for the ingredient(s).

Exposure guidelines**US - California OELs: Skin designation**

chloroethane (CAS 75-00-3) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

chloroethane (CAS 75-00-3) Can be absorbed through the skin.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash fountain and emergency showers are recommended.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear protective gloves such as: Nitrile. Butyl rubber.

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls are not feasible or if exposure exceeds the applicable exposure limits, use a NIOSH-approved cartridge respirator with an organic vapor cartridge. Use a self-contained breathing apparatus in confined spaces and for emergencies. Air monitoring is needed to determine actual employee exposure levels.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Observe any medical surveillance requirements. When using do not smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties**Appearance**

Physical state Liquid.

Form Aerosol.

Color Colorless.

Odor Hydrocarbon-like.

Odor threshold Not available.

pH Not available.

Melting point/freezing point -189.9 °F (-123.3 °C) estimated

Initial boiling point and boiling range	94.3 °F (34.6 °C) estimated
Flash point	< 20 °F (< -6.7 °C) Tag Closed Cup
Evaporation rate	Fast.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	0.5 % estimated
Flammability limit - upper (%)	36.5 % estimated
Vapor pressure	5024.7 hPa estimated
Vapor density	> 1 (air = 1)
Relative density	0.7
Solubility (water)	Slightly soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	320 °F (160 °C) estimated
Decomposition temperature	Not available.
Viscosity (kinematic)	< 20 cSt (104 °F (40 °C))
Percent volatile	100 %

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Heat, flames and sparks. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Aluminum.
Hazardous decomposition products	Carbon oxides. Acrid smoke.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause drowsiness and dizziness. Headache. Nausea, vomiting. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.

Symptoms related to the physical, chemical and toxicological characteristics	Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Skin irritation. May cause redness and pain.
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Information on toxicological effects

Acute toxicity	May be fatal if swallowed and enters airways.
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Components	Species	Test Results
diethyl ether (CAS 60-29-7)		
Acute		
Inhalation		
LC50	Rat	32000 ppm, 4 Hours
Oral		
LD50	Rat	3230 - 3920 mg/kg

Components	Species	Test Results
distillates (petroleum), hydrotreated light (CAS 64742-47-8)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg
ethanol (CAS 64-17-5)		
Acute		
Dermal		
LD50	Rabbit	20 g/kg
Inhalation		
LC50	Rat	8000 mg/l, 4 hours
Oral		
LD50	Rat	6.2 g/kg
heptane, branched, cyclic and linear (CAS 426260-76-6)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Inhalation		
LC50	Rat	> 60 mg/l, 4 hours
Oral		
LD50	Rat	> 5000 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

chloroethane (CAS 75-00-3)	3 Not classifiable as to carcinogenicity to humans.
diethyl ether (CAS 60-29-7)	3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	May cause drowsiness and dizziness.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	May be fatal if swallowed and enters airways. If aspirated into lungs during swallowing or vomiting, may cause chemical pneumonia, pulmonary injury or death.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity	Toxic to aquatic life. Harmful to aquatic life with long lasting effects.
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Components	Species	Test Results
diethyl ether (CAS 60-29-7)		
Aquatic		
Fish	LC50	Fathead minnow (Pimephales promelas) 2560 mg/l, 96 hours

Components	Species		Test Results
distillates (petroleum), hydrotreated light (CAS 64742-47-8)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	1.1 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	3 mg/l, 96 hours
ethanol (CAS 64-17-5)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	7.7 - 11.2 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	> 100 mg/l, 96 hours
heptane, branched, cyclic and linear (CAS 426260-76-6)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	1.5 mg/l, 48 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

chloroethane	1.43
diethyl ether	0.89
ethanol	-0.31

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal of waste from residues / unused products	If discarded, this product is considered a RCRA ignitable waste, D001. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Contents under pressure. Do not puncture, incinerate or crush. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose in accordance with all applicable regulations.
Hazardous waste code	D001: Waste Flammable material with a flash point <140 F
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1950
UN proper shipping name	Aerosols, flammable, Limited Quantity
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Label(s)	2.1
Packing group	Not applicable.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	N82
Packaging exceptions	306
Packaging non bulk	None
Packaging bulk	None

IATA

UN number	UN1950
UN proper shipping name	Aerosols, flammable, Limited Quantity
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-

Packing group	Not applicable.
ERG Code	10L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN1950
UN proper shipping name	AEROSOLS, Limited Quantity
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Packing group	Not applicable.
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

chloroethane (CAS 75-00-3)

CERCLA Hazardous Substance List (40 CFR 302.4)

chloroethane (CAS 75-00-3) Listed.

diethyl ether (CAS 60-29-7) Listed.

CERCLA Hazardous Substances: Reportable quantity

chloroethane (CAS 75-00-3) 100 LBS

diethyl ether (CAS 60-29-7) 100 LBS

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center (800-424-8802) and to your Local Emergency Planning Committee.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

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

chloroethane (CAS 75-00-3)

diethyl ether (CAS 60-29-7)

Safe Drinking Water Act (SDWA)

Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

diethyl ether (CAS 60-29-7) 6584

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

diethyl ether (CAS 60-29-7) 35 %WV

DEA Exempt Chemical Mixtures Code Number

diethyl ether (CAS 60-29-7) 6584

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

ethanol (CAS 64-17-5) Low priority

Food and Drug Administration (FDA)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312	Immediate Hazard - Yes
Hazard categories	Delayed Hazard - Yes
	Fire Hazard - Yes
	Pressure Hazard - Yes
	Reactivity Hazard - No
SARA 302 Extremely hazardous substance	No

US state regulations**US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))**

chloroethane (CAS 75-00-3)

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

carbon dioxide (CAS 124-38-9)

chloroethane (CAS 75-00-3)

diethyl ether (CAS 60-29-7)

ethanol (CAS 64-17-5)

US. Massachusetts RTK - Substance List

carbon dioxide (CAS 124-38-9)

chloroethane (CAS 75-00-3)

diethyl ether (CAS 60-29-7)

ethanol (CAS 64-17-5)

US. Pennsylvania Worker and Community Right-to-Know Law

carbon dioxide (CAS 124-38-9)

chloroethane (CAS 75-00-3)

diethyl ether (CAS 60-29-7)

distillates (petroleum), hydrotreated light (CAS 64742-47-8)

ethanol (CAS 64-17-5)

US. Rhode Island RTK

carbon dioxide (CAS 124-38-9)

chloroethane (CAS 75-00-3)

diethyl ether (CAS 60-29-7)

ethanol (CAS 64-17-5)

US. California Proposition 65

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

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

chloroethane (CAS 75-00-3)

Listed: July 1, 1990

US - California Proposition 65 - CRT: Listed date/Developmental toxin

toluene (CAS 108-88-3)

Listed: January 1, 1991

Volatile organic compounds (VOC) regulations**EPA**

VOC content (40 CFR 51.100(s)) 94.5 %

Consumer products (40 CFR 59, Subpt. C) Not regulated

State

Consumer products Not regulated

VOC content (CA) 94.5 %

VOC content (OTC) 94.5 %

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

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

Issue date	08-29-2017
Prepared by	Allison Yoon
Version #	01
Further information	Not available.
HMIS® ratings	Health: 1* Flammability: 4 Physical hazard: 0 Personal protection: B
NFPA ratings	Health: 1 Flammability: 4 Instability: 0

NFPA ratings



Disclaimer

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. This information is accurate to the best of CRC's knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label. For further clarification of any information contained on this (M)SDS consult your supervisor, a health & safety professional, or CRC Industries, Inc..

Revision Information

This document has undergone significant changes and should be reviewed in its entirety.

LINCORE® M

Severe Impact

KEY FEATURES

- Deposit resists severe impact as well as moderate abrasion
- Produces an austenitic manganese deposit that work-hardens
- Recommended for build-up and repair of Hadfield-type austenitic manganese materials as well as carbon and low alloy steels
- Unlimited layers with proper preheat and interpass temperatures and procedures

TYPICAL APPLICATIONS

- Hammers
- Dredge parts
- Crushers
- Breaker bars
- Buckets

WELDING PROCESSES

Flat

DIAMETERS / PACKAGING

Diameter in (mm)	25 lb (11.3 kg) Steel Spool	50 lb (22.7 kg) Coil	125 lb (56.7 kg) Speed-Feed® Drum	600 lb (272 kg) Speed-Feed® Drum
0.045 (1.1)	ED031128			
1/16 (1.6)	ED031129			
5/64 (2.0)	ED031130	ED011160		
7/64 (2.8)		ED011164	ED011163	ED011162

MECHANICAL PROPERTIES⁽¹⁾

Rockwell Hardness (R _C)	
As-Welded	Work Hardened
18 - 28	30 - 48

DEPOSIT COMPOSITION⁽¹⁾

	%C	%Mn	%Si	%Cr	%Ni
Open Arc	0.60	13.0	0.4	4.9	0.5

TYPICAL OPERATING PROCEDURES

Diameter, Polarity ESO - in (mm)	Wire Feed Speed m/min (in/min)	Voltage (Volts)	Approx. Current (Amps)	Deposition Rate kg/hr (lb/hr)
0.045 in (1.1 mm), DC+ 1 (25)	5.1 (200)	22	80	1.5 (3.3)
	8.9 (350)	24	145	2.7 (6.0)
	12.7 (500)	26	185	4.4 (9.6)
1/16 in (1.6 mm), DC+ 1 1/8 (30)	3.8 (150)	23	130	2.2 (4.9)
	6.4 (250)	25	200	3.9 (8.6)
	8.9 (350)	27	250	5.6 (12.4)
5/64 in (2.0 mm), DC+ 1 1/4 (32)	3.2 (125)	24	240	2.9 (6.4)
	4.4 (175)	27	300	4.2 (9.3)
	6.4 (250)	29	360	6.2 (13.6)
7/64 in (2.8 mm), DC+ 1 3/4 (45)	1.9 (75)	25	240	3.5 (7.8)
	3.2 (125)	27	360	6.2 (13.6)
	3.8 (150)	28	395	7.5 (16.6)
7/64 in (2.8 mm), DC+ 2 1/2 (64)	1.9 (75)	25	240	3.6 (8.0)
	4.4 (175)	30	400	8.8 (19.5)
	5.7 (225)	32	455	11.6 (25.6)

⁽¹⁾ Composition and properties depend upon dilution. Single layer deposit properties depend upon base metal and/or build-up material.

NOTE: As with all austenitic manganese welding products, interpass temperatures should be limited to 260°C (500°F) maximum. A stringer bead, or at most, a slight weave is recommended to limit heat build-up. Excessive heat build-up causes manganese carbide precipitation which damages the toughness of austenitic manganese.

Safety Data Sheets (SDS) and Certificates of Conformance are available on our website at www.lincolnelectric.com

FUMES AND GASES can be hazardous to your health.

- Fumes from the normal use of this product contain significant quantities of potentially hazardous compounds. See consumable product label/insert.
- Keep your head out of the fumes.
- Use enough ventilation and local exhaust to keep fumes and gases from your breathing zone and the general area.
- An approved respirator should be used unless exposure assessments are below applicable exposure limits.

TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

CUSTOMER ASSISTANCE POLICY

The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

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Material safety Data Sheet
SECTION 1. Product and Company Identification

1.1. Product Identification	
Product name:	PROSTAR S-6 WELDING WIRE, MILD STEEL
Classification:	EN ISO 14341-A 4Si1 - AWS A5.18 ER70S-6
1.2. Relevant identified uses of the substance or mixture and uses advised against	
Descrizione/Utilizzo	Wire for welding in protective atmosphere (GMAW), for professional and industrial uses
1.3. Details of the supplier of the safety data sheet	
Company Name Address City and County	Sidergas S.p.A. Viale Rimembranza 17 37015 S. Ambrogio Valpolicella (VR) ITALIA tel. 045 6862044 fax 045 6861048
e-mail address of the competent person responsible for the Safety Data Sheet	info@sidergas.com Ing. Alessandro Fagnani
Product distribution by:	Sidergas S.p.A.
1.4. Emergency telephone number For urgent inquiries refer to:	0039 045 6862044 (office time only)

SECTION 2. Hazards Identification.

2.1. Classification of the substance or mixture.
The product is considered "article" under REACH (Regulation 1907/2006), so the product shall not be subject to mandatory safety data sheet, neither of Classification and Labelling in accordance with Regulation 1272/2008 (CLP). The information contained in this document is provided as a precautionary measure and relate to substances contained in the article itself.
Depending on its composition, the product is not classified as hazardous pursuant to the provisions set forth in Directives 67/548/EEC and 1999/45/EC and Regulation (EC) 1272/2008 (CLP) (and subsequent amendments and supplements).
Any additional information concerning the risks for health and / or the environment are given in sections 11 and 12 of this sheet.

2.1.1. Regulation 1272/2008 (CLP) and following amendments and adjustments.

Hazard classification and indication: ---

2.2 Label elements.

The product is not subject to hazard labelling pursuant to Regulation (EC) 1272/2008 (CLP) and subsequent amendments.

 Hazard pictograms: --
 Signal words: --
 Hazard statements (H): --
 Precautionary statements (P): --

2.3. Other hazards.

Not dangerous in massive form. The fine particles from processing may be highly flammable. The molten metal and fine particles are very reactive in contact with water, acids, alkalis, strong oxidizing agents, halogenated compounds and certain metal oxides.

During the welding step the main dangers are mechanical, chemical and due to radiation, in particular:

- Welding fumes (mainly metal oxides and in some cases, their salts): long-term exposure to welding fumes may result in dizziness, fainting, nausea, tiredness, irritation to the respiratory tract and eyes, metal fever fume. Chronic exposure can reduce lung function. Prolonged inhalation of compounds containing nickel and chromium above the exposure limits may cause cancer, exposure to fumes containing manganese can lead to damage to the nervous system and respiratory tract
- Heat: contact with the molten metal can cause severe burns and cause fires;
- Ultraviolet radiation: prolonged exposure to ultraviolet radiation can cause serious damage to the skin and eyes;
- Electric shock involved in the welding system.

SECTION 3. Composition/Information on ingredients.
3.1. Substances. Information not relevant.

3.2. Mixtures. Contains:

Identification.	Concentration %.	Classification 67/548/CEE.	Classification 1272/2008 (CLP).
Iron in massive form (alloys)			
AS. 7439-89-6	94-98		
CE. 231-096-4			
INDEX. -			
Nr. Reg. 01-2119462838-24-0067			

Note: Upper limit is not included into the range.

The full wording of the Risk (R) and hazard (H) phrases is given in section 16 of the sheet.

T+ = Very Toxic(T+), T = Toxic(T), Xn = Harmful(Xn), C = Corrosive(C), Xi = Irritant(Xi), O = Oxidizing(O), E = Explosive(E), F+ = Extremely Flammable(F+), F = Highly Flammable(F), N = Dangerous for the Environment(N)

It is reported as an example a percentage composition of the various elements present in welding wire PROSTAR S-6:

HEAT ANALYSIS

Element	C %	S %	P %	Mn %	Si %	Cu %	Sn %	Cr %	Ni %	Mo %	Ti %	Ca %	As %	V %	Zr %	Al %	N %	B %
	0,074	0,019	0,009	1,629	0,948	0,143	0,006	0,027	0,031	0,008	0,012	0,001	0,003	0,003	0,000	0,002	0,006	0,001

SECTION 4. First aid measures.**4.1. Description of first aid measures.**

Exposure by inhalation: Move to fresh air.

Exposure by contact with skin: Wash immediately with plenty of water. Remove contaminated clothing and shoes. Wash thoroughly with soap and water. If irritation occurs, get medical attention. Wash with soap and water.

Exposure by contact with eyes: Hold eyes open and flush with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue flushing.

Exposure by ingestion: Do not induce vomiting. Drink plenty of water. Get medical attention.

Exposure by inhalation: Move to fresh air. If symptoms persist, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

No evidence of damage to health attributable to the product have been reported.

4.3. Indication of any immediate medical attention and special treatment needed.

Information not available.

SECTION 5. Firefighting measures.**5.1. Extinguishing media.****SUITABLE EXTINGUISHING EQUIPMENT**

Use extinguishers appropriate for the surrounding materials that caught fire.

UNSUITABLE EXTINGUISHING EQUIPMENT

None in particular. Molten metal may react violently with water.

5.2. Special hazards arising from the substance or mixture.**HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE**

Do not breathe combustion products (fumes of metallic oxides).

5.3. Advice for firefighters.**GENERAL INFORMATION**

In the form of wire the product is non-flammable and there is not a risk of explosion. Fine dust may ignite and pose a risk of explosion. During the combustion are produced dangerous fumes containing metal oxides.

Use jets of water to cool the containers to prevent product decomposition and the development of substances potentially hazardous for health. Always wear full fire prevention gear. Collect extinguishing water to prevent it from draining into the sewer system. Dispose of contaminated water used for extinction and the remains of the fire according to applicable regulations.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS

Normal fire fighting clothing i.e. fire kit (BS EN 469), gloves (BS EN 659) and boots (HO specification A29 and A30) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137).

SECTION 6. Accidental release measures.**6.1. Personal precautions, protective equipment and emergency procedures.**

Use breathing equipment if fumes or powders are released into the air. These indications apply for both processing staff and those involved in emergency procedures.

6.2. Environmental precautions.

The product must not penetrate into the sewer system or come into contact with surface water or ground water.

6.3. Methods and material for containment and cleaning up.

Confine using earth or inert material. Collect as much material as possible and eliminate the rest using jets of water. Contaminated material should be disposed of in compliance with the provisions set forth in point 13.

6.4. Reference to other sections.

Any information on personal protection and disposal is given in sections 8 and 13.

SECTION 7. Handling and storage.
7.1. Precautions for safe handling.

Ensure an accurate localized ventilation / aspiration in the workplace during welding. Do not eat, drink or smoke during use. Before handling the product, consult all the other sections of this Information Sheet. Avoid leakage of the product into the environment. Keep the workplace clean by avoiding dust build-up.

7.2. Conditions for safe storage, including any incompatibilities.

Keep the product in clearly labelled containers. Keep containers away from any incompatible materials, see section 10 for details.

7.3. Specific end use(s).

No other use than specified in Section 1.2 of this Information Sheet.

SEZIONE 8. Exposure controls/personal protection.
8.1. Control parameters.

Occupational exposure limits

Description	Type	Status	TWA/8h		STEL/15min
			mg/m3	ppm	mg/m3
IRON, SOLUBLE SALTS AS Fe	TLV-ACGIH		1		
IRON OXIDE (Fe2O3)	TLV-ACGIH		5 respirable fraction		
ALUMINUM METAL insoluble compounds	TLV-ACGIH		1	0,9	
ALUMINIUM POWDER	WEL	UK	4 (respirable) 10 (total)		
	TLV	CH	3		
	OSHA - PEL		5 (respirable) 15 (total)		
NICKEL	TLV-ACGIH		1,5		
	TLV	CH	0,5		
	WEL	UK	0,1		
	OSHA - PEL		0,015		
Insoluble inorganic Nickel compounds	TLV-ACGIH		0,2 A1, Inhalable fraction		
Soluble inorganic Nickel compounds	TLV-ACGIH		0,1 A4, Inhalable fraction		
LEAD	TLV-ACGIH		0,05		
	OEL	EU	0,15		
Chromium and Cr (II) and Cr (III) compounds (not soluble)	OEL	EU	2		
		IT	0,5		
	WEL	UK	0,5		
	TLV-ACGIH		0,5		
SILICON, POWDER	OSHA - PEL		5 (respirable) 15 (total)		
TIN AND INORGANIC COMPOUNDS (EXPRESSED AS TIN)	OEL	EU	2		
	TLV-ACGIH		2		
MANGANESE element and inorganic compounds (as Mn)	TLV-ACGIH		0,2		
Molybdenum metal and insoluble compounds (as Mo)	TLV-ACGIH		10 (inhalable fraction note 3) 3 (respirable fraction note 4)		
ARSENIC and inorganic compounds (As)	TLV-ACGIH		0,01		

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SEZIONE 8. Exposure controls/personal protection.

Antimony and compounds (as Sb)	TLV-ACGIH	0,5
COPPER	OSHA - PEL	1 (dust / mist) 0.1 (fumes)

8.2. Exposure controls.

Observance of safety measures used in handling chemical substances. As the use of adequate technical equipment must always take priority over personal protection equipment, ensure good ventilation at the workplace through effective local aspiration. If these steps do not keep the concentration of the product below the exposure limit values in the workplace, wear suitable protection for the respiratory tract

SKIN PROTECTION

Cover exposed areas with appropriate clothing.

HAND PROTECTION

Use gloves for welders

BODY PROTECTION

Not required.

EYE PROTECTION

Use masks with UV protection suitable for your application.

RESPIRATORY PROTECTION

In case of exceeding the threshold value of one or more of the substances present in the preparation for daily exposure in workplace environment or to a fraction established by the company's prevention and protection, wear a half-mask with filter type combined FFA1P2 suitable to protect from dust and welding fumes and vapors (ref. EN 141 standard).

The use of means of respiratory protection is necessary in the absence of technical measures to limit worker exposure. The protection provided by masks is in any case limited.

THFRMAL HAZARDS

Use appropriate personal protective equipment during welding to protect from heat and possible liquid metal (CEN standards).

SECTION 9. Physical and chemical properties.

9.1. Information on basic physical and chemical properties.

Appearance	Solid (wire in massive form)
Colour	bright copper
Odour	odourless
Odour threshold.	Not available.
pH.	Not available.
Melting point / freezing point.	1500°C
Initial boiling point.	Not applicable.
Boiling range.	Not available.
Flash point.	Not applicable.
Evaporation Rate	Not available.
Flammability of solids and gases	Not available.
Lower inflammability limit.	Not available.
Upper inflammability limit.	Not available.
Lower explosive limit.	Not available.
Upper explosive limit.	Not available.
Vapour pressure.	Not available.
Vapour density	Not available.
Relative density.	Not available.
Solubility	7,96 kg/dm ³
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature.	Not available.
Decomposition temperature.	Not available.
Viscosity	Not available.
Explosive properties	Not available.
Oxidising properties	Not available.

SECTION 10. Stability and reactivity.

10.1. Reactivity.

There are no particular risks of reaction with other substances in normal conditions of use.

10.2. Chemical stability.

The product is stable in normal conditions of use and storage.

10.3. Possibility of hazardous reactions.

No hazardous reactions are foreseeable in normal conditions of use and storage.

10.4. Conditions to avoid.

None in particular. The wire is made from metals in massive form and is stable and non-reactive under normal conditions of use. However the usual precautions used for chemical products should be respected.

10.5. Incompatible materials.

Avoid contact with acids.

10.6. Hazardous decomposition products.

By thermal decomposition when heated or in the event of fire, vapors potentially dangerous to health can be released

SECTION 11. Toxicological information.

According to currently available data, this product has not yet produced health damages. Anyway, it must be handled carefully according to good industrial practices. This product may have slight health effects on sensitive people, by inhalation and/or cutaneous absorption and/or contact with eyes and/or ingestion.

11.1. Information on toxicological effects.

Information on the product not available.

Long-term exposure to welding fumes may result in dizziness, fainting, nausea, tiredness, irritation to the respiratory tract and eyes, metal fume fever. Chronic exposure can reduce lung function. Exposure to fumes containing manganese can lead to damage to the nervous system and respiratory tract.

The IARC classifies welding fumes as possibly carcinogenic to humans (2B), the target organ is the lung and it is assumed that the risk is limited to the welding of stainless steel as containing Cr and Ni. However, the currently available epidemiological data on mortality and incidence of lung cancer do not provide clear evidence that nickel and hexavalent chromium compounds are the most important risk factor (Sjogren and Langard, 2004). The ACGIH does not provide a classification of the carcinogenicity of welding fumes. The carcinogenic role of welding fumes is still debated, especially for little evidence derived from epidemiological studies and by the few and not conclusive experimental studies on animals.

SECTION 12. Ecological information.

Use this product according to good working practices. Avoid littering. Inform the competent authorities, should the product reach waterways or sewers or contaminate soil or vegetation. No acute or chronic classification is assigned to Iron Alloys in massive form.

12.1. Toxicity.	Information not available.
12.2. Persistence and degradability.	Information not available.
12.3. Bioaccumulative potential.	Information not available.
12.4. Mobility in soil.	Information not available.
12.5. Results of PBT and vPvB assessment.	On the basis of available data, the product does not contain any PBT or vPvB in percentage greater than 0,1%.
12.6. Other adverse effects.	Information not available.

SECTION 13. Disposal considerations.
13.1. Waste treatment methods.

Reuse, when possible. The hazard level of waste containing this product must be evaluated according to applicable regulations. Disposal must be performed through an authorised waste management firm, in compliance with national and local regulations. Solid residues may be suitable for disposal in an authorised landfill site.

CONTAMINATED PACKAGING

Contaminated packaging must be recovered or disposed of in compliance with national waste management regulations.

SECTION 14. Transport information.

The product is not dangerous under current provisions of the Code of International Carriage of Dangerous Goods by Road (ADR) and by Rail (RID), of the International Maritime Dangerous Goods Code (IMDG), and of the International Air Transport Association (IATA) regulations.

SECTION 15. Regulatory information.
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture.

<u>Seveso Category:</u>	None
<u>Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006.</u>	None
<u>Substances in Candidate List (Art. 59 REACH).</u>	None
<u>Substances subject to authorisation (Annex XIV REACH).</u>	None
<u>Substances subject to exportation reporting pursuant to (EC) Reg. 689/2008:</u>	None
<u>Substances subject to the Rotterdam Convention:</u>	None
<u>Substances subject to the Stockholm Convention:</u>	None
<u>Healthcare controls.</u>	Information not available.

15.2. Chemical safety assessment.

The welding wire PROSTAR S-6 is considered an article and not a substance or a mixture according to the REACH Regulation. No chemical safety assessment has been processed for the article. At the time of writing the exposure scenario of substance Iron (Registration number: 01-2119462838-24-0067-XXXX) was not available.

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SECTION 16. Other information.

Training for workers:

Worker training should include content, updates and duration as a function of the risk profiles assigned to work areas to which they belong, in the manner prescribed by applicable national and local regulations.

LEGEND:

- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- CAS NUMBER: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE NUMBER: Identifier in ESIS (European archive of existing substances)
- CLP: EC Regulation 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX NUMBER: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as Reach Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: EC Regulation 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA STEL: Short-term exposure limit
- TWA: Time-weighted average exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation.

GENERAL BIBLIOGRAPHY

1. Directive 1999/45/EC and following amendments
2. Directive 67/548/EEC and following amendments and adjustments
3. Regulation (EC) 1907/2006 (REACH) of the European Parliament
4. Regulation (EC) 1272/2008 (CLP) of the European Parliament
5. Regulation (EC) 790/2009 (I Atp. CLP) of the European Parliament
6. Regulation (EC) 453/2010 of the European Parliament
7. Regulation (EC) 286/2011 (II Atp. CLP) of the European Parliament
8. The Merck Index. - 10th Edition
9. Handling Chemical Safety
10. NIOSH - Registry of Toxic Effects of Chemical Substances
11. INRS - Fiche Toxicologique (toxicological sheet)
12. Patty - Industrial Hygiene and Toxicology
13. N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
14. ECHA website

Note for users:

The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product.

This document must not be regarded as a guarantee on any specific product property.

The use of this product is not subject to our direct control; therefore, users must, under their own responsibility, comply with the current health and safety laws and regulations. The producer is relieved from any liability arising from improper uses.

Provide appointed staff with adequate training on how to use chemical products.

Note for users:

The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product.

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Provide appointed staff with adequate training on how to use chemical products.



WELDING WIRE, STAINLESS STEEL

309L

SAFETY DATA SHEET

SDS – Cr-Ni Coated Electrodes

Revision 11

Issue Date – July, 2013

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Manufacturer/Supplier Name: Sandvik Wire and Heating Technologies

Address: P.O. Box 1220, Scranton, PA 18501-1220

Phone Number: (570) 585-7500

Trade Name: SANDVIK

Classification: AWS A5.4/ASME SFA 5.4, ASME SFA 5.4 Section III, ABS, CWB-AWS A5.4, Covered Corrosion-resisting Chromium and Chromium Nickel Steel Welding Electrodes

Product Type: -15, -16 and -17 type Manual Metal Arc Welding Electrodes

Product Identifiers: 307-15, 307-16, 308L-15, 308/308L-16, 308/308L-17, 308-15, 308/308H-16, 308/308H-17, 347-15, 347-16, 316L-15, 316/316L-16, 316/316L-17, 316-15, 316/316H-16, 316/316H-17, 308MoL-15, 308MoL-16, 317-15, 317-16, 318-15, 318-16, 309-15, 309-16, 309-17, 309L-15, 309L-16, 309L-17, 309Cb-15, 309Cb-16, 309MoL-16, 309MoL-17, 309Mo-15, 309Mo-16, 310-15, 310-16, 310H-15, 310H-16, 312-16, 29-9-16SA, 320-15, 320-16, 330-15, 330-16, 410-15, 410-16, 410NiMo-15, 410NiMo-16, 420-15, 420-16, 430-15, 430-16, 630-15, 630-16, 20.25.5.LCu, 25.22.2.LMnB, 27.31.4LCu, 22.12.HTR, 2209-16, 2209-17, 2209-15, 25.10.4.LR, 383-15, 383-16, 385-15, 385-16, 25.20.LB

SECTION 2: HAZARDS IDENTIFICATION

Chrome-Nickel coated electrodes are welding consumables consisting of a solid core wire and a flux coating.

EMERGENCY OVERVIEW

Effects of Over-exposure:

Electric arc welding may create one or more of the following health hazards:

FUMES AND GASES can be dangerous to your health.

SHORT-TERM (acute) OVEREXPOSURE to welding fumes may result in discomfort, such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

LONG-TERM (chronic) OVEREXPOSURE to welding fumes can lead to siderosis (iron deposits in lungs), central nervous system, liver or kidney damage, skin and respiratory sensitization (allergic reaction), and is believed by some investigators to affect pulmonary function.

PRIMARY ROUTE OF ENTRY is the respiratory system.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing eye, respiratory or allergic conditions.

ARC RAYS can injure eyes and burn skin.

ELECTRIC SHOCK can kill.

CARCINOGENICITY:

Certain hexavalent chromium compounds, nickel metal and compounds and respirable crystalline silica are listed in the National Toxicology Program (NTP) Annual Report on Carcinogens, found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs, or listed by OSHA/ACGIH as potential carcinogens.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

The following is composition information of the product as manufactured.

Hazardous Ingredient	CAS No.	WT %
Calcium Carbonate (CaCO ₃)	471-34-1	1-10
Calcium Fluoride (CaF ₂)	7789-75-5	1-10
Chromium (Cr)	7440-47-3	5-30
Copper (Cu)	7440-50-8	0-4
Iron (Fe)	7439-89-6	Bal.
Manganese (Mn)	7439-96-5	1-10
Molybdenum (Mo) ¹⁾	7439-98-7	1-10
Nickel (Ni)	7440-02-0	1-35
Niobium (Nb) ²⁾	7440-03-1	0.5-1
Potassium (K)	7440-09-7	0-1
Sodium (Na)	7440-23-5	1-10



Hazardous Ingredient	CAS No.	WT %
Silicon (Si)	7440-21-3	1-10
Silica (SiO ₂) (quartz)	14808-60-7	<0.5
Sodium Aluminum Fluoride (Na ₃ AlF ₆)	15096-52-3	1-10
Sodium Fluoride (NaF)	7681-49-4	0-2
Titanium Dioxide (TiO ₂)	13463-67-7	1-20

The following are typical constituents of welding fumes and gases. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form than ingredients listed above. Decomposition products of normal operation include those originating from the volatilization reaction, or oxidation of the materials shown above, plus those from the base metal and coating, etc. which may include paint, plating, galvanizing, or phosphate coatings on steels which would produce phosphine gas and other contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities which may be decomposed by the arc into toxic gases such as phosphene).

Fume Constituent (Gases)	CAS No.	Fume Constituents (Solids)	CAS No.
Carbon Dioxide (CO ₂)	124-38-9	Calcium Fluoride (CaF ₂)	7789-75-5
Carbon Monoxide (CO)	630-08-0	Chromates (CrO ₃)	1333-82-0
Dinitrogen Tetroxide (N ₂ O ₄)	10544-72-6	Copper Oxide (CuO)	1344-70-3
Hydrogen Fluoride (HF)	7664-39-3	Manganese Tetraoxide (Mn ₃ O ₄)	1317-35-7
Nitric Oxide (NO)	10102-43-9	Nickel Oxide (NiO)	1314-06-3
Nitrogen Dioxide (NO ₂)	10102-44-0	Silicon Dioxide (SiO ₂) (quartz)	14808-60-7
Ozone (O ₃)	10028-15-6	Iron Oxide (Fe ₂ O ₃)	1309-37-1
Phosgene (COCl ₂) *	75-44-5	Molybdenum Trioxide (MoO ₃) ¹⁾	1313-27-5
Phosphine (PH ₃) **	7803-51-2	Sodium Aluminum Fluoride (Na ₃ AlF ₆)	15096-52-3
		Sodium Fluoride (NaF)	7681-49-4
		Niobium Oxide (NbO) ²⁾	12034-57-0
		Sodium Oxide (NaO)	1313-59-3
		Potassium Oxide (KO)	12136-45-7
		Titanium Dioxide (TiO ₂)	13463-67-7

¹⁾ Only in Molybdenum-alloyed grades.

²⁾ Only in Niobium-alloyed grades.

* May result from contact with chlorinated hydrocarbon vapors.

** May result from welding on phosphate coated steels.

Refer to Section 8 for occupational exposure limits.

SECTION 4: FIRST AID MEASURES

Eye: If eye irritation occurs, flush eyes immediately with water while holding open eyelids. Get medical attention if irritation persists.

Skin: None normally needed. Get immediate medical attention for treatment of burns.

Inhalation: Remove victim to fresh air. Give artificial respiration if needed. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SECTION 5: FIRE FIGHTING MEASURES

(Nonflammable) – Welding arc and sparks can ignite combustibles and flammables. Refer to American National Z49.1 for fire prevention during the use of welding and allied procedures.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Pick up and return to container for use.



SECTION 7: HANDLING AND STORAGE

Avoid breathing welding fumes. Keep your head out of the fumes. Use with enough ventilation or exhaust at the arc, or both, to keep fumes and gases below the occupational exposure limits in your breathing zone and the general area. Use air sampling to determine the need for corrective action. (Refer to Section 10 for additional information)

Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Fumes from welding and oxygen depletion can alter the air quality causing injury or death.

Take appropriate precautions to prevent fires and explosion.

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, Safety in Welding and Cutting, published by the American Welding Society, P.O. Box 351040, Miami, FL 33135; and OSHA Publication 2206 (29CFR 1910), U.S. Government Printing Office, Washington, DC 20402, for more information. Assure compliance with the OSHA Standard on Chromium (VI), 29CFR 1910.1026.

Storage: Store in a dry area. Refer to product data sheet (available from Sandvik Materials Technology) for specific storage information.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

See Appendix A for occupational exposure limits for Canadian Provinces

The following are the occupational exposure limits for the components of the product as manufactured.

Ingredient	OSHA PEL	ACGIH TLV	ACGIH STEL
Calcium Carbonate (CaCO_3)	5 mg/m ³ TWA (respirable fraction) 15 mg/m ³ TWA (total dust)	None Established	-
Calcium Fluoride (CaF_2) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	-
Chromium (Cr) (as metal)	1 mg/m ³ TWA	0.5 mg/m ³ TWA	-
Copper (Cu) (as dust and mists)	1 mg/m ³ TWA	1 mg/m ³ TWA	-
Iron (Fe) (as Iron oxide)	10 mg/m ³ TWA (as fume)	5 mg/m ³ TWA (respirable)	-
Manganese (Mn)	5 mg/m ³ Ceiling Limit	0.02 mg/m ³ (respirable) 0.1 mg/m ³ (inhalable)	-
Molybdenum (Mo) ¹⁾	15 mg/m ³ TWA (total dust)	3 mg/m ³ TWA (respirable fraction) 10 mg/m ³ TWA (inhalable)	-
Nickel (Ni) (elemental)	1 mg/m ³ TWA	1.5 mg/m ³ TWA (inhalable)	-
Niobium (Nb) ²⁾	None Established	None Established	-
Potassium (K)	None Established	None Established	-
Sodium (Na)	None Established	None Established	-
Silicon (Si)	5 mg/m ³ TWA (respirable) 15 mg/m ³ TWA (total dust)	None Established	-
Silica (SiO_2) (quartz)	10 (respirable fraction) TWA % SiO_2+2 (total dust) 30 TWA % SiO_2+2 TWA	0.025 mg/m ³ TWA (respirable)	-
Sodium Aluminum Fluoride (Na_3AlF_6) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	-
Sodium Fluoride (NaF) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	-
Titanium Dioxide (TiO_2)	15 mg/m ³ TWA (total dust)	10 mg/m ³ TWA	-

The following are the occupational exposure limits for the typical decomposition products.

GASES			
Fume Constituent	OSHA PEL	ACGIH TLV	ACGIH STEL



GASES			
Fume Constituent	OSHA PEL	ACGIH TLV	ACGIH STEL
Carbon Dioxide (CO ₂)	5,000 ppm TWA	5,000ppm TWA	30,000 ppm
Carbon Monoxide (CO)	50 ppm TWA	25 ppm TWA	-
Dinitrogen Tetraoxide (N ₂ O ₄)	None Established	None Established	
Hydrogen Fluoride (HF)	3 ppm TWA	0.5 ppm TWA	2 ppm Ceiling
Nitric Oxide (NO)	25 ppm TWA	25 ppm TWA	-
Nitrogen Dioxide (NO ₂)	5 ppm Ceiling Limit	0.2 ppm TWA	
Ozone (O ₃)	0.1 ppm TWA	0.1 ppm TWA ***	-
Phosgene (COCl ₂) *	0.1 ppm TWA	0.1 ppm TWA	-
Phosphine (PH ₃) **	0.3 ppm TWA	0.3 ppm TWA	1 ppm

SOLIDS			
Fume Constituents	OSHA PEL	ACGIH TLV	ACGIH STEL
Calcium Fluoride (CaF ₂) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	-
Chromates (CrO ₃) (CrVI)	0.005 mg/m ³ TWA (as CrVI) 0.0025 action level	0.05 mg/m ³ TWA water soluble(as Cr) 0.01 mg/m ³ TWA certain water insoluble (as Cr)	-
Chromium (III) Compounds	0.5 mg/m ³ TWA (as Cr)	0.5 mg/m ³ TWA (as Cr)	
Copper Oxide (CuO) (as Cu fume)	0.1 mg/m ³ TWA	0.2 mg/m ³ TWA	-
Iron Oxide	10 mg/m ³ TWA (as fume)	5 mg/m ³ TWA (respirable)	-
Manganese Tetraoxide (Mn ₃ O ₄) (as Mn fume)	5 mg/m ³ Ceiling Limit	0.2 mg/m ³ TWA (fume)	-
Molybdenum Trioxide (MoO ₃) ¹⁾ (as Mo)	15 mg/m ³ TWA (total dust)	3 mg/m ³ TWA (respirable fraction) 10 mg/m ³ TWA (inhalable)	-
Nickel Oxide (NiO) (as nickel)	1 mg/m ³ TWA	0.2 mg/m ³ TWA (inhalable)	-
Silica (SiO ₂) (quartz)	$\frac{10}{\%SiO_2+2}$ (respirable fraction) TWA $\frac{30}{\%SiO_2+2}$ (total dust) TWA	0.025 mg/m ³ TWA (respirable fraction)	-
Sodium Aluminum Fluoride (Na ₃ AlF ₆) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	-
Sodium Fluoride (NaF) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	-
Niobium Oxide (NbO) ²⁾	None Established	None Established	-
Sodium Oxide (NaO)	None Established	None Established	-
Potassium Oxide (KO)	None Established	None Established	-
Titanium Dioxide (TiO ₂)	15 mg/m ³ TWA (total dust)	10 mg/m ³ TWA	-

¹⁾ Only in Molybdenum-alloyed grades.

²⁾ Only in Niobium-alloyed grades.

Definitions:

PEL - Permissible Exposure Limit (29CFR 1910) – An exposure limit that is published and enforced by OSHA as a legal standard.

TLV - Threshold Limit Value – An exposure limits that is established by the American Conference of Governmental Industrial Hygienists (ACGIH). as a time weighted average concentration for a normal 8-hour work day and a 40-hour work week to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

TWA - Time weighted average – The employee's average airborne exposure in any 8-hour work shift of a 40-hour work week which shall not be exceeded

STEL - Short Term Exposure Limit. (STEL) OSHA (29CFR 1910) – A 15-minute time weighted average exposure which should not be exceeded at any time during a work day.



Ceiling Limit – The concentration that should not be exceeded during any part of the working exposure.

- * May result from contact with chlorinated hydrocarbon vapors.
- ** May result from welding on phosphate coated steels.
- *** For light work: 0.1ppm; for moderate work: 0.08ppm; and for heavy work: 0.05ppm of O₃.

Ventilation: Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases below TLV/PEL in the workers' breathing zone and the general area. Train each welder to keep his/her head out of the fumes. Refer to ANSI Z49.1 and Section 10 for additional information.

Respiratory Protection: Use respirable fume respirator or air-supplied respirator when welding in confined area, or where local exhaust or ventilation does not keep exposure below TLV/PEL. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, OSHA 1910.1026, ANSI Z88.2 and good Industrial Hygiene practice.

Protective Clothing: Wear head, hand, and body protection to help prevent injury from radiation, sparks, and electric shock. See ANSI Z49.1 and OSHA 1910.1026. At a minimum, this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and dark substantial clothing. Train each welder not to touch live electrical parts, and to insulate his/her person from work and ground.

Eye Protection: Wear helmet or use face shield with filter lens. Lens filter should be as dark as possible without obstructing view of the weld zone. Provide protective screens and flash goggles, if necessary, to shield others.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Chrome-Nickel coated electrodes are welding consumables consisting of a solid core wire and a flux coating.

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable under normal conditions of storage or use.

Incompatibility/Conditions to Avoid: None known. Welding arc and sparks can ignite combustibles and flammables. Refer to American National Z49.1 for fire prevention during the use of welding and allied procedures.

Hazardous Decomposition Product

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, and the process, procedures, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, galvanizing, or phosphate coatings on steels which would produce phosphine gas), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities which may be decomposed by the arc into toxic gases such as phosgene).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form than ingredients in the manufactured product. Typical decomposition is also listed in Section 3. Decomposition products of normal operation include those originating from the volatilization reaction, or oxidation of the materials shown in Section 3, plus those from the base metal and coating, etc., as noted above.

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet, if worn, or in the worker's breathing zone. See ANSI/AWS F1.1, available from the American Welding Society, P.O. Box 351040, Miami, FL 33135.

SECTION 11: TOXICOLOGICAL INFORMATION

No acute toxicity data is available, however, these products are not expected to be acutely toxic. See Section 2 for information on human health effects.

SECTION 12: ECOLOGICAL INFORMATION



No specific data is available. These products are not expected to present an environmental hazard.

SECTION 13: DISPOSAL INFORMATION

WASTE DISPOSAL METHOD: Prevent waste from contaminating the surrounding environment. Discard any product, residue, disposable container, or liner in an environmentally accepted manner, in full compliance with federal, state, and local regulations.

SECTION 14: TRANSPORT INFORMATION

These products are not regulated for transportation under DOT, IATA or IMDG.

SECTION 15: REGULATORY INFORMATION

CERCLA 103 Reportable Quantity: These products are not subject to CERCLA reporting requirement.

SARA TITLE III:

Hazard Category for Section 311/312: Acute Health, Chronic Health

Section 313 (40CFR 372) Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:

Chromium*	7440-47-3	5-30%
Copper*	7440-50-8	0-4%
Manganese*	7440-96-5	1-10%
Nickel*	7440-02-0	1-35%

* This includes all compounds of these elements.

Section 302 Extremely Hazardous Substances (TPQ): None

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.

California Proposition 65: This product contains chromium, nickel and crystalline silica, which are known to the State of California to cause cancer.

Canadian Environmental Protection Act: All of the ingredients are listed on the Canadian Domestic Substances List.

Canadian WHMIS Classification: Class D-2-A (Very Toxic Material causing other toxic effects)

This SDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the SDS contains all of the information required by the CPR.

EU RoHS: Finished welds using Sandvik welding consumables are RoHS compliant. Sandvik Stainless Steel Welding Products contain Chromium. When welded Sandvik Stainless Steel Welding Products will produce Cr VI (hexavalent chrome), however, the weld deposit does not contain Cr VI as it will all be in the zero valent state or as Cr III as an oxide. Finished products manufactured using Sandvik Stainless Steel Welding Products will not contain Cr VI.

SECTION 16: OTHER INFORMATION

HMIS Ratings:	Health – 1*	Flammability - 0	Instability - 0
NFPA Ratings:	Health - 1	Flammability - 0	Physical Hazard - 0



* indicates the potential for chronic health effects.

SDS Updated July 2013: Comprehensive Review. Updated exposure limits.

DISCLAIMER: This product is intended for use only by qualified individuals experienced and trained in welding safety. Conditions of use and suitability of the product for particular uses are beyond our control, and while the information herein is given in good faith, SANDVIK MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nor does Sandvik assume any liability arising out of use of the product described herein. In no event shall Sandvik be liable for any special, incidental, or consequential damages in connection with this SDS.

Appendix A

Occupational Exposure Limits for Canadian Provinces

The following are the occupational exposure limits for the components of the product as manufactured.

Ingredient	CAS	Ontario	Quebec	British Columbia
Calcium Carbonate (CaCO ₃)	471-34-1	None Established	10 mg/m ³ TWA total dust	10 mg/m ³ TWA total dust 20 mg/m ³ STEL
Calcium Fluoride (CaF ₂) (as F)	7789-75-5	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA
Chromium (Cr) (as chromium metal)	7440-47-3	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA
Copper (Cu) (as copper dust and mist)	7440-50-8	1 mg/m ³ TWA	1 mg/m ³ TWA	1 mg/m ³ TWA
Iron (Fe) (as iron oxide)	7439-89-6	5 mg/m ³ TWA (respirable dust)	5 mg/m ³ TWA	5 mg/m ³ TWA
Manganese (Mn) (as Mn and inorganic compounds)	7439-96-5	0.1 mg/m ³ TWA	5 mg/m ³ TWA	0.2 mg/m ³ TWA
Molybdenum (Mo) ¹⁾ (as Mo and insoluble compounds)	7439-98-7	3 mg/m ³ TWA respirable 10 mg/m ³ TWA inhalable	10 mg/m ³ TWA (as insoluble compounds)	3 mg/m ³ TWA respirable 10 mg/m ³ TWA inhalable
Nickel (Ni)	7440-02-0	1 mg/m ³ TWA inhalable (metal) 0.2 mg/m ³ TWA inhalable (insoluble)	1 mg/m ³ TWA (as metal and insoluble compounds)	0.05 mg/m ³ TWA (as metal and inorganic compounds)
Niobium (Nb) ²⁾	7440-03-1	None Established	None Established	None Established
Potassium (K)	7440-09-7	None Established	None Established	None Established
Sodium (Na)	7440-23-5	None Established	None Established	None Established
Silicon (Si)	7440-21-3	10 mg/m ³ TWA total dust	10 mg/m ³ TWA total dust	10 mg/m ³ TWA total dust (as PNOC)
Silica (SiO ₂) (quartz)	14808-60-7	0.1 mg/m ³ TWA	0.1 mg/m ³ TWA (respirable)	0.025 mg/m ³ TWA
Sodium Aluminum Fluoride (Na ₃ AlF ₆) (as F)	15096-52-3	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA
Sodium Fluoride (NaF) (as F)	7681-49-4	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA
Titanium Dioxide (TiO ₂)	13463-67-7	10 mg/m ³ TWA total dust	10 mg/m ³ TWA total dust	3 mg/m ³ TWA respirable 10 mg/m ³ TWA total dust

Appendix A

The following are the occupational exposure limits for the typical decomposition products.

GASES			
Fume Constituent	Ontario	Quebec	British Columbia
Carbon Dioxide (CO ₂)	5,000 ppm TWA 30,000 ppm STEL	5,000 ppm TWA 30,000 ppm STEL	5,000 ppm TWA 15,000 ppm STEL
Carbon Monoxide (CO)	25 ppm TWA 100 ppm STEL	35 ppm TWA 200 ppm STEL	25 ppm TWA 100 ppm STEL
Dinitrogen Tetroxide (N ₂ O ₄)	None Established	None Established	None Established
Hydrogen Fluoride (HF)	0.5 ppm TWA 2 ppm Ceiling	3 ppm Ceiling	2 ppm Ceiling
Nitric Oxide (NO)	25 ppm TWA	25 ppm TWA	25 ppm TWA
Nitrogen Dioxide (NO ₂)	3 ppm TWA 5 ppm STEL	3 ppm TWA	1 ppm Ceiling
Ozone (O ₃)	0.1 ppm TWA 0.3 ppm STEL	0.1 ppm Ceiling	0.1 ppm TWA***
Phosgene (COCl ₂) *	0.1 ppm TWA	0.1 ppm TWA	0.1 ppm TWA
Phosphine (PH ₃) **	0.3 ppm TWA 1 ppm STEL	0.3 ppm TWA 1 ppm STEL	0.3 ppm TWA 1 ppm STEL

SOLIDS			
Fume Constituent †	Ontario	Quebec	British Columbia
Calcium Fluoride (CaF ₂) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA
Chromates (CrO ₃) (CrVI)	0.01 mg/m ³ TWA (as insoluble compounds) 0.05 mg/m ³ TWA (as hexavalent chromium comp)	0.01 mg/m ³ TWA (as water insoluble comp) 0.05 mg/m ³ TWA (as water soluble comp)	0.01 mg/m ³ TWA (insoluble) 0.025 mg/m ³ TWA (water soluble) 0.1 mg/m ³ Ceiling
Chromium (III) Compounds	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA
Copper Oxide (CuO) (as copper fume)	0.2 mg/m ³ TWA	0.2 mg/m ³ TWA	0.2 mg/m ³ TWA
Iron Oxide (as fume)	5 mg/m ³ TWA respirable	5 mg/m ³ TWA	5 mg/m ³ TWA 10 mg/m ³ STEL
Manganese Tetraoxide (Mn ₃ O ₄) (as Mn inorganic compounds)	0.2 mg/m ³ TWA	0.2 mg/m ³ TWA	0.2 mg/m ³ TWA
Molybdenum Trioxide (MoO ₃) ¹⁾ (as insoluble compounds)	3 mg/m ³ TWA (respirable) 10 mg/m ³ TWA (inhalable)	3 mg/m ³ TWA (respirable) 10 mg/m ³ TWA (inhalable)	3 mg/m ³ TWA (as respirable) 10 mg/m ³ TWA (inhalable)
Nickel Oxide (NiO) (as nickel soluble compounds)	0.1 mg/m ³ TWA (Inhalable)	0.1 mg/m ³ TWA	0.05 mg/m ³ TWA
Silica (SiO ₂) (quartz)	0.1 mg/m ³ TWA	0.1 mg/m ³ TWA	0.025 mg/m ³ TWA
Sodium Aluminum Fluoride (Na ₃ AlF ₆) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA
Sodium Fluoride (NaF) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA
Niobium Oxide (NbO) ²⁾	None Established	None Established	None Established
Sodium Oxide (NaO)	None Established	None Established	None Established
Potassium Oxide (KO)	None Established	None Established	None Established
Titanium Dioxide (TiO ₂)	10 mg/m ³ TWA	10 mg/m ³ TWA total dust	3 mg/m ³ TWA respirable 10 mg/m ³ TWA total dust

The following are the occupational exposure limits for the components of the product as manufactured.

<u>Ingredient</u>	<u>CAS</u>	<u>Prince Edward Island</u> <u>Newfoundland and Labrador</u>	<u>Saskatchewan</u>	<u>Alberta</u>
Calcium Carbonate (CaCO ₃)	471-34-1	None Established	10 mg/m ³ TWA 20 mg/m ³ STEL	10 mg/m ³ TWA
Calcium Fluoride (CaF ₂) (as F)	7789-75-5	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³
Chromium (Cr)	7440-47-3	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA (as Cr metal) 1.5 mg/m ³ STEL	0.5 mg/m ³ (as Cr metal)
Copper (Cu) (as copper dust and mist)	7440-50-8	1 mg/m ³ TWA	1 mg/m ³ TWA	1 mg/m ³ TWA
Iron (Fe) (as iron oxide)	7439-89-6	5 mg/m ³ TWA (respirable)	5 mg/m ³ TWA 10 mg/m ³ STEL (dust and fume)	5 mg/m ³ TWA (respirable)
Manganese (Mn) (as Mn metal and inorganic compounds)	7439-96-5	0.2 mg/m ³ TWA	0.2 mg/m ³ TWA 0.6 mg/m ³ STEL	0.2 mg/m ³ TWA
Molybdenum (Mo) ¹⁾ (as Mo and insoluble compounds)	7439-98-7	3 mg/m ³ TWA (respirable fraction) 10 mg/m ³ TWA inhalable	3 mg/m ³ TWA (respirable) 6 mg/m ³ STEL 10 mg/m ³ (inhalable) 20 mg/m ³ STEL	3 mg/m ³ (respirable) 10 mg/m ³ total dust
Nickel (Ni) (as nickel metal)	7440-02-0	1.5 mg/m ³ TWA	1.5 mg/m ³ TWA (inhalable fraction) 3 mg/m ³ STEL	1.5 mg/m ³ TWA
Niobium (Nb) ²⁾	7440-03-1	None Established	None Established	None Established
Potassium (K)	7440-09-7	None Established	None Established	None Established
Sodium (Na)	7440-23-5	None Established	None Established	None Established
Silicon (Si)	7440-21-3	None Established	10 mg/m ³ TWA 20 mg/m ³ STEL	3 mg/m ³ TWA (respirable) 10 mg/m ³ TWA (total dust) (as PNOC)
Silica (SiO ₂) (quartz)	14808-60-7	0.025 mg/m ³ TWA	0.05 mg/m ³ TWA	0.025 mg/m ³ TWA (respirable)
Sodium Aluminum Fluoride (Na ₃ AlF ₆) (as F)	15096-52-3	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA
Sodium Fluoride (NaF) (as F)	7681-49-4	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA
Titanium Dioxide (TiO ₂)	13463-67-7	10 mg/m ³ TWA	10 mg/m ³ TWA 20 mg/m ³ STEL	10 mg/m ³ TWA

The following are the occupational exposure limits for the typical decomposition products.

<u>GASES</u>	<u>Prince Edward Island</u> <u>Newfoundland and Labrador</u>	<u>Saskatchewan</u>	<u>Alberta</u>
<u>Fume Constituent</u>			
Carbon Dioxide (CO ₂)	5,000 ppm TWA 30,000 ppm STEL	5,000 ppm TWA 30,000 ppm STEL	5,000 ppm TWA 30,000 ppm STEL
Carbon Monoxide (CO)	25 ppm TWA	25 ppm TWA 190 ppm STEL	25 ppm TWA
Dinitrogen Tetroxide (N ₂ O ₄)	None Established	None Established	None Established
Hydrogen Fluoride (HF)	0.5 ppm TWA	0.5 ppm TWA	0.5 ppm TWA

GASES			
<u>Fume Constituent</u>	<u>Prince Edward Island</u> <u>Newfoundland and Labrador</u>	<u>Saskatchewan</u>	<u>Alberta</u>
	2 ppm Ceiling Limit	2 ppm Ceiling Limit	
Nitric Oxide (NO)	25 ppm TWA	25 ppm TWA 38 ppm STEL	25 ppm TWA
Nitrogen Dioxide (NO ₂)	3 ppm TWA 5 ppm STEL	3 ppm TWA 5 ppm STEL	3 ppm TWA 5 ppm STEL
Ozone (O ₃)	0.1 ppm TWA ***	0.05 ppm TWA 0.15 ppm STEL	0.1 ppm TWA 0.3 ppm STEL
Phosgene (COCl ₂) *	0.1 ppm TWA	0.1 ppm TWA 0.3 ppm STEL	0.1 ppm TWA
Phosphine (PH ₃) **	0.3 ppm TWA 1 ppm STEL	0.3 ppm TWA 1 ppm STEL	0.3 ppm TWA 1 ppm STEL

SOLIDS			
<u>Fume Constituent</u>	<u>Prince Edward Island</u> <u>Newfoundland and Labrador</u>	<u>Saskatchewan</u>	<u>Alberta</u>
Calcium Fluoride (CaF ₂) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA
Chromates (CrO ₃) (CrVI)	0.05 mg/m ³ TWA (water soluble comp) 0.01 mg/m ³ TWA (certain water insoluble comp)	0.05 mg/m ³ TWA 0.15 mg/m ³ STEL (soluble) 0.01 mg/m ³ TWA 0.03 mg/m ³ STEL (insoluble)	0.05 mg/m ³ TWA (soluble comp) 0.01 mg/m ³ TWA (as insoluble compounds)
Chromium (III) Compounds	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA 1.5 mg/m ³ STEL	0.5 mg/m ³ TWA
Copper Oxide (CuO) (as copper fume)	0.2 mg/m ³ TWA	0.2 mg/m ³ TWA 0.6 mg/m ³ STEL	0.2 mg/m ³ TWA
Iron Oxide	5 mg/m ³ TWA (respirable)	5 mg/m ³ TWA 10 mg/m ³ STEL (as fume)	5 mg/m ³ TWA (respirable)
Manganese Tetraoxide (Mn ₃ O ₄)	0.2 mg/m ³ TWA (as fume)	0.2 mg/m ³ TWA 0.6 mg/m ³ STEL (as inorganic compound)	0.2 mg/m ³ TWA (inorganic compound)
Molybdenum Trioxide (MoO ₃) (as molybdenum insoluble compounds) ¹⁾	3 mg/m ³ TWA (respirable fraction) 10 mg/m ³ TW A (inhalable)	3 mg/m ³ TWA, 6 mg/m ³ STEL (respirable) 10 mg/m ³ TWA, 20 mg/m ³ STEL (total dust)	3 mg/m ³ TWA (respirable) 10 mg/m ³ (total dust)
Nickel Oxide (NiO) (as nickel soluble compounds)	0.1 mg/m ³ TWA	0.1 mg/m ³ TWA 0.3 mg/m ³ STEL	0.1 mg/m ³ TWA
Silica (SiO ₂) (quartz)	0.025 mg/m ³ TWA	0.005 mg/m ³ TWA	0.025 mg/m ³ TWA (respirable)
Sodium Aluminum Fluoride (Na ₃ AlF ₆) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA
Sodium Fluoride (NaF) (as F)	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA
Niobium Oxide (NbO) ²⁾	None Established	None Established	None Established
Sodium Oxide (NaO)	None Established	None Established	None Established
Potassium Oxide (KO)	None Established	None Established	None Established
Titanium Dioxide (TiO ₂)	10 mg/m ³ TWA	10 mg/m ³ TWA 20 mg/m ³ STEL	10 mg/m ³ TWA

The following are the occupational exposure limits for the components of the product as manufactured.

<u>Ingredient</u>	<u>CAS</u>	<u>Nunavut</u> <u>Northwest Territories</u>	<u>Yukon</u>	<u>Nova Scotia</u> <u>New Brunswick</u> <u>Manitoba</u>
Calcium Carbonate (CaCO ₃)	471-34-1	5 mg/m ³ TWA (respirable) 10 mg/m ³ TWA (total dust)	10 mg/m ³ TWA 20 mg/m ³ STEL	10 mg/m ³ TWA
Calcium Fluoride (CaF ₂) (as F)	7789-75-5	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA 2.5 mg/m ³ STEL	2.5 mg/m ³ TWA
Chromium (Cr) (as chromium metal)	7440-47-3	0.5 mg/m ³ TWA 1.5 mg/m ³ STEL	0.1 mg/m ³ TWA 3 mg/m ³ STEL	0.5 mg/m ³ TWA
Copper (Cu) (as copper dust and mist)	7440-50-8	1 mg/m ³ TWA 2 mg/m ³ STEL	1 mg/m ³ TWA 2 mg/m ³ STEL	1 mg/m ³ TWA
Iron (Fe) (as iron oxide)	7439-89-6	5 mg/m ³ TWA 10 mg/m ³ STEL (as fume)	5 mg/m ³ TWA 10 mg/m ³ STEL (as fume)	5 mg/m ³ TWA (respirable dust)
Manganese (Mn) (as Mn and inorganic compounds)	7439-96-5	5 mg/m ³ Ceiling	5mg/m ³ TWA	0.2 mg/m ³ TWA
Molybdenum (Mo) ¹⁾ (as Mo and insoluble compounds)	7439-98-7	10 mg/m ³ TWA 20 mg/m ³ STEL	10 mg/m ³ TWA 20 mg/m ³ STEL	3 mg/m ³ TWA respirable 10 mg/m ³ TWA inhalable
Nickel (Ni)	7440-02-0	1 mg/m ³ TWA 2 mg/m ³ STEL	1 mg/m ³ TWA 3 mg/m ³ STEL	1.5 mg/m ³ TWA inhalable
Niobium (Nb) ²⁾	7440-03-1	None Established	None Established	None Established
Potassium (K)	7440-09-7	None Established	None Established	None Established
Sodium (Na)	7440-23-5	None Established	None Established	None Established
Silicon (Si)	7440-21-3	5 mg/m ³ TWA (respirable) 10 mg/m ³ TWA (total dust)	10 mg/m ³ TWA 20 mg/m ³ STEL	None Established
Silica (SiO ₂) (quartz)	14808-60-7	0.1 mg/m ³ TWA (respirable) 0.3 mg/m ³ TWA (total dust)	300 particles/mL	0.025 mg/m ³ TWA
Sodium Aluminum Fluoride (Na ₃ AlF ₆) (as F)	15096-52-3	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA 2.5 mg/m ³ STEL	2.5 mg/m ³ TWA
Sodium Fluoride (NaF) (as F)	7681-49-4	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA 2.5 mg/m ³ STEL	2.5 mg/m ³ TWA
Titanium Dioxide (TiO ₂)	13463-67-7	5 mg/m ³ TWA (respirable) 10 mg/m ³ TWA (total dust)	10 mg/m ³ TWA 20 mg/m ³ STEL	10 mg/m ³ TWA

The following are the occupational exposure limits for the typical decomposition products.

GASES			
<u>Fume Constituent</u>	<u>Nunavut</u> <u>Northwest Territories</u>	<u>Yukon</u>	<u>Nova Scotia</u> <u>New Brunswick</u> <u>Manitoba</u>
Carbon Dioxide (CO ₂)	5,000 ppm TWA 15,000 ppm STEL	5,000 ppm TWA 15,000 ppm STEL	5,000 ppm TWA 30,000 ppm STEL
Carbon Monoxide (CO)	50 ppm TWA 400 ppm STEL	50 ppm TWA 400 ppm STEL	25 ppm TWA
Dinitrogen Tetroxide (N ₂ O ₄)	None Established	None Established	None Established
Hydrogen Fluoride (HF)	3 ppm TWA 6 ppm STEL	3 ppm TWA 3 ppm STEL	0.5 ppm 2 ppm Ceiling Limit
Nitric Oxide (NO)	25 ppm TWA 35 ppm STEL	25 ppm TWA 35 ppm STEL	25 ppm TWA
Nitrogen Dioxide (NO ₂)	3 ppm TWA 5 ppm STEL	5 ppm TWA	3 ppm TWA 5 ppm STEL
Ozone (O ₃)	0.1 ppm TWA 0.3 ppm STEL	0.1 ppm TWA 0.3 ppm STEL	0.1 ppm TWA ***
Phosgene (COCl ₂) *	0.1 ppm TWA 0.3 ppm STEL	0.1 ppm TWA 0.3 ppm STEL	0.1 ppm
Phosphine (PH ₃) **	0.3 ppm TWA 1 ppm STEL	0.3 ppm TWA 1 ppm STEL	0.3 ppm TWA 1 ppm STEL

SOLIDS			
<u>Fume Constituent</u>	<u>Nunavut</u> <u>Northwest Territories</u>	<u>Yukon</u>	<u>Nova Scotia</u> <u>New Brunswick</u> <u>Manitoba</u>
Calcium Fluoride (CaF ₂) (as F)	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA 25 mg/m ³ STEL	2.5 mg/m ³ TWA
Chromates (CrO ₃) (CrVI)	0.05 mg/m ³ TWA 0.15 mg/m ³ STEL (soluble or insoluble compounds)	0.1 mg/m ³ TWA 0.1 mg/m ³ STEL (as chromates)	0.05 mg/m ³ TWA (as water soluble comp) 0.01 mg/m ³ TWA (ascertain water insoluble comp)
Chromium (III) Compounds	0.5 mg/m ³ TWA, 1.5 mg/m ³ STEL	0.15 mg/m ³ TWA 0.15 mg/m ³ STEL	0.5 mg/m ³ TWA
Copper Oxide (CuO) (as copper fume)	0.2 mg/m ³ TWA 0.6 mg/m ³ STEL	0.2 mg/m ³ TWA 0.2 mg/m ³ STEL	0.2 mg/m ³ TWA
Iron Oxide	5 mg/m ³ TWA 10 mg/m ³ STEL (as fume)	5 mg/m ³ TWA 10 mg/m ³ STEL (as fume)	5 mg/m ³ TWA
Manganese Tetraoxide (Mn ₃ O ₄)	5 mg/m ³ TWA	5 mg/m ³ TWA (as Mn compounds)	0.2 mg/m ³ TWA
Molybdenum Trioxide (MoO ₃) ¹⁾ (as molybdenum insoluble compounds)	10 mg/m ³ TWA 20 mg/m ³ STEL	10 mg/m ³ TWA 20 mg/m ³ STEL	3 mg/m ³ TWA (as respirable) 10 mg/m ³ TWA (Inhalable)
Nickel Oxide (NiO) (as nickel soluble compounds)	0.1 mg/m ³ TWA 0.3 mg/m ³ STEL	0.1 mg/m ³ TWA 0.3 mg/m ³ STEL	0.1 mg/m ³ TWA
Silica (SiO ₂) (quartz)	0.1 mg/m ³ TWA (respirable) 0.3 mg/m ³ TWA (total dust)	300 particles/mL	0.025 mg/m ³ TWA



SOLIDS			
<u>Fume Constituent</u>	<u>Nunavut</u> <u>Northwest Territories</u>	<u>Yukon</u>	<u>Nova Scotia</u> <u>New Brunswick</u> <u>Manitoba</u>
Sodium Aluminum Fluoride (Na_3AlF_6) (as F)	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA 25 mg/m ³ STEL	2.5 mg/m ³ TWA
Sodium Fluoride (NaF) (as F)	2.5 mg/m ³ TWA 5 mg/m ³ STEL	2.5 mg/m ³ TWA 25 mg/m ³ STEL	2.5 mg/m ³ TWA
Niobium Oxide (NbO) ²⁾	None Established	None Established	None Established
Sodium Oxide (NaO)	None Established	None Established	None Established
Potassium Oxide (KO)	None Established	None Established	None Established
Titanium Dioxide (TiO_2)	5 mg/m ³ TWA (respirable) 10 mg/m ³ TWA (total dust)	10 mg/m ³ TWA 20 mg/m ³ STEL	10 mg/m ³ TWA

¹⁾ Only in Molybdenum-alloyed grades.

²⁾ Only in Niobium-alloyed grades.

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Material safety data sheet

SECTION 1. Product and Company Identification

1.1. Product Identification	
Product name:	PROSTAR S-6
Classification:	EN ISO 14341-A 4Si1 – AWS A5.18 ER70S-6
1.2. Relevant identified uses of the substance or mixture and uses advised against	
Descrizione/Utilizzo	Wire for welding in protective atmosphere (GMAW), for professional and industrial uses
1.3. Details of the supplier of the safety data sheet	
Company Name Address City and County	Sidergas S.p.A. Viale Rimembranza 17 37015 S. Ambrogio Valpolicella (VR) ITALIA tel. 045 6862044 fax 045 6861048
e-mail address of the competent person responsible for the Safety Data Sheet	info@sidergas.com Ing. Alessandro Fagnani
Product distribution by:	Sidergas S.p.A.
1.4. Emergency telephone number For urgent inquiries refer to:	0039 045 6862044 (office time only)

SECTION 2. Hazards identification.

2.1. Classification of the substance or mixture.

The product is considered "article" under REACH (Regulation 1907/2006), so the product shall not be subject to mandatory safety data sheet, neither of Classification and Labelling in accordance with Regulation 1272/2008 (CLP).

The information contained in this document is provided as a precautionary measure and relate to substances contained in the article itself.

Depending on its composition, the product is not classified as hazardous pursuant to the provisions set forth in Directives 67/548/EEC and 1999/45/EC and Regulation (EC) 1272/2008 (CLP) (and subsequent amendments and supplements).

Any additional information concerning the risks for health and / or the environment are given in sections 11 and 12 of this sheet.

2.1.1. Regulation 1272/2008 (CLP) and following amendments and adjustments.

Hazard classification and indication: ----

2.2 Label elements.

The product is not subject to hazard labelling pursuant to Regulation (EC) 1272/2008 (CLP) and subsequent amendments.

Hazard pictograms: --
Signal words: --
Hazard statements (H): --
Precautionary statements (P): --

2.3. Other hazards.

Not dangerous in massive form. The fine particles from processing may be highly flammable. The molten metal and fine particles are very reactive in contact with water, acids, alkalis, strong oxidizing agents, halogenated compounds and certain metal oxides.

During the welding step the main dangers are mechanical, chemical and due to radiation, in particular:

- Welding fumes (mainly metal oxides and in some cases, their salts): long-term exposure to welding fumes may result in dizziness, fainting, nausea, tiredness, irritation to the respiratory tract and eyes, metal fever fume. Chronic exposure can reduce lung function. Prolonged inhalation of compounds containing nickel and chromium above the exposure limits may cause cancer, exposure to fumes containing manganese can lead to damage to the nervous system and respiratory tract
- Heat: contact with the molten metal can cause severe burns and cause fires;
- Ultraviolet radiation: prolonged exposure to ultraviolet radiation can cause serious damage to the skin and eyes;
- Electric shock involved in the welding system.

SECTION 3. Composition/information on ingredients.

3.1. Substances. Information not relevant.

3.2. Mixtures. Contains:

Identification.	Concentration %.	Classification 67/548/CEE.	Classification 1272/2008 (CLP).
Iron in massive form (alloys)			
CAS. 7439-89-6	94-98		
CE. 231-096-4			
INDEX. -			
Nr. Reg. 01-2119462838-24-0067			

Note: Upper limit is not included into the range.

The full wording of the Risk (R) and hazard (H) phrases is given in section 16 of the sheet.

T+ = Very Toxic(T+), T = Toxic(T), Xn = Harmful(Xn), C = Corrosive(C), Xi = Irritant(Xi), O = Oxidizing(O), F = Explosive(F), F+ = Extremely Flammable(F+), F = Highly Flammable(F), N = Dangerous for the Environment(N)

It is reported as an example a percentage composition of the various elements present in welding wire PROSTAR S-6:

HEAT ANALYSIS

Element	C %	S %	P %	Mn %	Si %	Cu %	Sn %	Cr %	Ni %	Mo %	Ti %	Ca %	As %	V %	Zr %	Al %	N %	B %
	0,074	0,019	0,009	1,629	0,948	0,143	0,006	0,027	0,031	0,008	0,012	0,001	0,003	0,003	0,000	0,002	0,006	0,001

SECTION 4. First aid measures.
4.1. Description of first aid measures.

Standard first aid measures should be taken.

First aid for fire: Wear full protective clothing, including eye protection, and use appropriate fire fighting equipment. Do not breathe combustion products (fumes of metallic oxides). Do not use water to extinguish the fire. Use dry powder or CO₂ extinguishers. If the fire is large, call the fire department.

First aid for inhalation: Move to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Seek medical attention.

First aid for skin contact: Remove contaminated clothing. Wash skin with plenty of water. If irritation occurs, seek medical attention.

First aid for eye contact: Flush eyes with plenty of water for at least 15 minutes. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

No evidence of damage to health attributable to the product have been reported.

4.3. Indication of any immediate medical attention and special treatment needed.
Information not available.

SECTION 5. Firefighting measures.
5.1. Extinguishing media.

SUITABLE EXTINGUISHING EQUIPMENT

Use extinguishers appropriate for the surrounding materials that caught fire.

UNSUITABLE EXTINGUISHING EQUIPMENT

None in particular. Molten metal may react violently with water.

5.2. Special hazards arising from the substance or mixture.

HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE

Do not breathe combustion products (fumes of metallic oxides).

5.3. Advice for firefighters.

GENERAL INFORMATION

In the form of wire the product is non-flammable and there is not a risk of explosion. Fine dust may ignite and pose a risk of explosion. During the combustion are produced dangerous fumes containing metal oxides.

Use jets of water to cool the containers to prevent product decomposition and the development of substances potentially hazardous for health. Always wear full fire prevention gear. Collect extinguishing water to prevent it from draining into the sewer system. Dispose of contaminated water used for extinction and the remains of the fire according to applicable regulations.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS

Normal fire fighting clothing i.e. fire kit (BS EN 469), gloves (BS EN 659) and boots (HO specification A29 and A30) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137).

SECTION 6. Accidental release measures.
6.1. Personal precautions, protective equipment and emergency procedures.

Use breathing equipment if fumes or powders are released into the air. These indications apply for both processing staff and those involved in emergency procedures.

6.2. Environmental precautions.

The product must not penetrate into the sewer system or come into contact with surface water or ground water.

6.3. Methods and material for containment and cleaning up.

Confine using earth or inert material. Collect as much material as possible and eliminate the rest using jets of water. Contaminated material should be disposed of in compliance with the provisions set forth in point 13.

6.4. Reference to other sections.

Any information on personal protection and disposal is given in sections 8 and 13.

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SECTION 7. Handling and storage.

- 7.1. Precautions for safe handling.**
Ensure an accurate localized ventilation / aspiration in the workplace during welding. Do not eat, drink or smoke during use. Before handling the product, consult all the other sections of this Information Sheet. Avoid leakage of the product into the environment. Keep the workplace clean by avoiding dust build-up.
- 7.2. Conditions for safe storage, including any incompatibilities.**
Keep the product in clearly labelled containers. Keep containers away from any incompatible materials, see section 10 for details.
- 7.3. Specific end use(s).**
No other use than specified in Section 1.2 of this Information Sheet.

SEZIONE 8. Exposure controls/personal protection.

8.1. Control parameters. Occupational exposure limits

Description	Type	Status	TWA/8h		STEL/15min
			mg/m3	ppm	mg/m3
IRON, SOLUBLE SALTS AS Fe	TLV-ACGIH		1		
IRON OXIDE (Fe2O3)	TLV-ACGIH		5 respirable fraction		
ALUMINUM METAL insoluble compounds	TLV-ACGIH		1	0,9	
ALUMINIUM POWDER	WEL	UK	4 (respirable) 10 (total)		
	TLV	CH	3		
	OSHA - PEL		5 (respirable) 15 (total)		
NICKEL	TLV-ACGIH		1,5		
	TLV	CH	0,5		
	WEL	UK	0,1		
	OSHA - PEL		0,015		
Insoluble inorganic Nickel compounds	TLV-ACGIH		0,2 A1, inhalable fraction		
Soluble inorganic Nickel compounds	TLV-ACGIH		0,1 A4, inhalable fraction		
LEAD	TLV-ACGIH		0,05		
	OEL	EU	0,15		
Chromium and Cr (II) and Cr (III) compounds (not soluble)	OEL	EU	2		
		IT	0,5		
	WEL	UK	0,5		
	TLV-ACGIH		0,5		
SILICON, POWDER	OSHA - PEL		5 (respirable) 15 (total)		
TIN AND INORGANIC COMPOUNDS (EXPRESSED AS TIN)	OEL	EU	2		
	TLV-ACGIH		2		
MANGANESE element and inorganic compounds (as Mn)	TLV-ACGIH		0,2		
Molybdenum metal and insoluble compounds (as Mo)	TLV-ACGIH		10 (inhalable fraction note 3)		
			3 (respirable fraction note 4)		
ARSENIC and inorganic compounds (As)	TLV-ACGIH		0,01		

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SEZIONE 8. Exposure controls/personal protection.

Antimony and compounds (as Sb)	TLV-ACGIH	0,5
COPPER	OSHA - PEL	1 (dust / mist) 0.1 (fumes)

8.2. Exposure controls.

Observance of safety measures used in handling chemical substances. As the use of adequate technical equipment must always take priority over personal protection equipment, ensure good ventilation at the workplace through effective local aspiration. If these steps do not keep the concentration of the product below the exposure limit values in the workplace, wear suitable protection for the respiratory tract

SKIN PROTECTION

Cover exposed areas with appropriate clothing.

HAND PROTECTION

Use gloves for welders

BODY PROTECTION

Not required.

EYE PROTECTION

Use masks with UV protection suitable for your application.

RESPIRATORY PROTECTION

In case of exceeding the threshold value of one or more of the substances present in the preparation for daily exposure in workplace environment or to a fraction established by the company's prevention and protection, wear a half-mask with filter type combined FFA1P2 suitable to protect from dust and welding fumes and vapors (ref. EN 141 standard).

The use of means of respiratory protection is necessary in the absence of technical measures to limit worker exposure. The protection provided by masks is in any case limited.

THERMAL HAZARDS

Use appropriate personal protective equipment during welding to protect from heat and possible liquid metal (CEN standards).

SECTION 9. Physical and chemical properties.

9.1. Information on basic physical and chemical properties.

Appearance	Solid (wire in massive form)
Colour	bright copper
Odour	odourless
Odour threshold.	Not available.
pH.	Not available.
Melting point / freezing point.	1500°C
Initial boiling point.	Not applicable.
Boiling range.	Not available.
Flash point.	Not applicable.
Evaporation Rate	Not available.
Flammability of solids and gases	Not available.
Lower inflammability limit.	Not available.
Upper inflammability limit.	Not available.
Lower explosive limit.	Not available.
Upper explosive limit.	Not available.
Vapour pressure.	Not available.
Vapour density	Not available.
Relative density.	Not available.
Solubility	7,96 kg/dm ³
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature.	Not available.
Decomposition temperature.	Not available.
Viscosity	Not available.
Explosive properties	Not available.
Oxidising properties	Not available.

SECTION 10. Stability and reactivity.

10.1. Reactivity.

There are no particular risks of reaction with other substances in normal conditions of use.

10.2. Chemical stability.

The product is stable in normal conditions of use and storage.

10.3. Possibility of hazardous reactions.

No hazardous reactions are foreseeable in normal conditions of use and storage.

10.4. Conditions to avoid.

None in particular. The wire is made from metals in massive form and is stable and non-reactive under normal conditions of use. However the usual precautions used for chemical products should be respected.

10.5. Incompatible materials.

Avoid contact with acids.

10.6. Hazardous decomposition products.

But thermal decomposition products are not hazardous.

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SECTION 11. Toxicological Information.

According to currently available data, this product has not yet produced health damages. Anyway, it must be handled carefully according to good industrial practices. This product may have slight health effects on sensitive people, by inhalation and/or cutaneous absorption and/or contact with eyes and/or ingestion.

11.1. Information on toxicological effects.

Information on the product not available.

Long-term exposure to welding fumes may result in dizziness, fainting, nausea, tiredness, irritation to the respiratory tract and eyes, metal fume fever. Chronic exposure can reduce lung function. Exposure to fumes containing manganese can lead to damage to the nervous system and respiratory tract.

The IARC classifies welding fumes as possibly carcinogenic to humans (2B), the target organ is the lung and it is assumed that the risk is limited to the welding of stainless steel as containing Cr and Ni. However, the currently available epidemiological data on mortality and incidence of lung cancer do not provide clear evidence that nickel and hexavalent chromium compounds are the most important risk factor (Sjogren and Langard, 2004). The ACGIH does not provide a classification of the carcinogenicity of welding fumes. The carcinogenic role of welding fumes is still debated, especially for little evidence derived from epidemiological studies and by the few and not conclusive experimental studies on animals.

SECTION 12. Ecological Information.

Use this product according to good working practices. Avoid littering. Inform the competent authorities, should the product reach waterways or sewers or contaminate soil or vegetation. No acute or chronic classification is assigned to Iron Alloys in massive form.

12.1. Toxicity.	Information not available.
12.2. Persistence and degradability.	Information not available.
12.3. Bioaccumulative potential.	Information not available.
12.4. Mobility in soil.	Information not available.
12.5. Results of PBT and vPvB assessment.	On the basis of available data, the product does not contain any PBT or vPvB in percentage greater than 0,1%.
12.6. Other adverse effects.	Information not available.

SECTION 13. Disposal considerations.

13.1. Waste treatment methods.

Reuse, when possible. The hazard level of waste containing this product must be evaluated according to applicable regulations.

Disposal must be performed through an authorised waste management firm, in compliance with national and local regulations.

Solid residues may be suitable for disposal in an authorised landfill site.

CONTAMINATED PACKAGING

Contaminated packaging must be recovered or disposed of in compliance with national waste management regulations.

SECTION 14. Transport information.

The product is not dangerous under current provisions of the Code of International Carriage of Dangerous Goods by Road (ADR) and by Rail (RID), of the International Maritime Dangerous Goods Code (IMDG), and of the International Air Transport Association (IATA) regulations.

SECTION 15. Regulatory information.

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture.

Seveso Category:	None
Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006.	None
Substances in Candidate List (Art. 59 REACH).	None
Substances subject to authorisation (Annex XIV REACH).	None
Substances subject to exportation reporting pursuant to (EC) Reg. 689/2008.	None
Substances subject to the Rotterdam Convention:	None
Substances subject to the Stockholm Convention:	None
Healthcare controls.	Information not available.

15.2. Chemical safety assessment.

The welding wire PROSTAR S-6 is considered an article and not a substance or a mixture according to the REACH Regulation.

No chemical safety assessment has been processed for the article.

At the time of writing the exposure scenario of substance Iron (Registration number: 01-2119462838-24-0067-XXXX) was not available.

SECTION 16. Other information.
Training for workers:

Worker training should include content, updates and duration as a function of the risk profiles assigned to work areas to which they belong, in the manner prescribed by applicable national and local regulations.

LEGEND:

- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- CAS NUMBER: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE NUMBER: Identifier in ESIS (European archive of existing substances)
- CLP: EC Regulation 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX NUMBER: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as Reach Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: EC Regulation 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA STEL: Short-term exposure limit
- TWA: Time-weighted average exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation.

GENERAL BIBLIOGRAPHY

1. Directive 1999/45/EC and following amendments
2. Directive 67/548/EEC and following amendments and adjustments
3. Regulation (EC) 1907/2006 (REACH) of the European Parliament
4. Regulation (EC) 1272/2008 (CLP) of the European Parliament
5. Regulation (EC) 790/2009 (I Atp. CLP) of the European Parliament
6. Regulation (EC) 453/2010 of the European Parliament
7. Regulation (EC) 286/2011 (II Atp. CLP) of the European Parliament
8. The Merck Index. - 10th Edition
9. Handling Chemical Safety
10. NIOSH - Registry of Toxic Effects of Chemical Substances
11. INRS - Fiche Toxicologique (toxicological sheet)
12. Patty - Industrial Hygiene and Toxicology
13. N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
14. ECHA website

Note for users:

The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product.

This document must not be regarded as a guarantee on any specific product property.

The use of this product is not subject to our direct control; therefore, users must, under their own responsibility, comply with the current health and safety laws and regulations. The producer is relieved from any liability arising from improper uses.

Provide appointed staff with adequate training on how to use chemical products.

Note for users:

The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product.

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Provide appointed staff with adequate training on how to use chemical products.



Vesuvius USA
Foundry
20200 Sheldon Road, Cleveland, Ohio 44142

Safety Data Sheet

ISOMOL® 780	SDS Number SDS-11501 Revision: 11 Legacy Number:
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Preparation Information:

Site: All	Contact Julie Pyle at (440) 826-4548 for further product information or medical emergency during normal business hours.
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Section 1: Product and Company Identification

Product Name: ISOMOL® 780	Chemical Name: N/A	Formula: MIXTURE	CAS Number: N/A
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Product Use: Refractory coating.
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Supplier Information:

Supplier Name: Foseco	Supplier Phone: (440) 826-4548
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Supplier Address:

20200 Sheldon Rd. Cleveland, OH 44142 USA

Manufacturer Information:

Manufacturer Name: Foseco	Manufacturer Phone: (440) 826-4548
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Manufacturer Address:

20200 Sheldon Rd. Cleveland, OH 44142 USA

Emergency Contact Information:

CHEMTREC (800) 424-9300 (USA) CANUTEC (613) 996-6666 (CANADA)
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Section 2: Hazard(s) Identification

Hazard Classification: Serious Eye Damage/Eye Irritation - Category 2 Carcinogenicity - Category 1A Specific Target Organ Toxicity, Single Exposure - Category 3 Specific Target Organ Toxicity, Repeated or Prolonged Exposure - Category 1 Flammable Liquids - Category 2			
Signal Word: Danger			
Hazard Statement(s): Highly flammable liquid and vapor. Causes serious eye irritation. May cause drowsiness or dizziness. May cause cancer by inhalation. Causes damage to lungs (silicosis) through prolonged or repeated exposure by inhalation of respirable crystalline silica.			
Pictograms: 			
Precautionary Statement(s):			
Prevention Keep away from heat/sparks/open flames. No smoking. Keep container tightly closed. Use explosion-proof equipment and non-sparking tools. Take precautionary measures against static discharge. Wear protective gloves and eye protection. Wash hands thoroughly after handling. Do not handle until all safety precautions have been read and understood. Do not breathe dust or vapor. Use personal protective equipment as required to prevent inhalation of crystalline silica.	Response In case of fire: Use CO2, dry chemical or foam to extinguish. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF IN 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. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention if you feel unwell.	Storage Store in a well-ventilated place. Keep cool. Keep container tightly closed.	Disposal Dispose of contents/container in accordance with local, state and federal regulations.

SDS for ISOMOL® 780

Use only outdoors or in a well-ventilated area.

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

Hazards not Otherwise Classified:

None

Percentage of the mixture consisting of ingredients of unknown toxicity:

72%

Section 3: Composition/Information on Ingredients

Ingredient:	CAS No. / Other Identifiers:	% Weight:
Isopropanol	67-63-0	15-40
Olivine	1317-71-1	30-60
Magnesium Oxide	1309-48-4	7-13
Crystalline Silica (Quartz)	14808-60-7	0.1-1
n-Heptane	142-82-5	3-7

Section 4: First Aid Measures

Emergency Overview:

N/A

Potential Health Effects:

May cause skin and mucous membrane irritation. Inhalation of organic solvent vapors will produce nausea, headaches, dizziness and eventually narcosis. A moderate eye irritant. Can cause defatting of skin, dermatitis and corneal burns.

Chronic Health Hazards:

Prolonged exposure to vapors may cause pulmonary damage and CNS depression. Prolonged and/or repeated inhalation of dust from dried product may cause pulmonary damage, including silicosis.

Medical Conditions Generally Aggravated by Exposure:

Pre-existing skin, eye and respiratory disorders.

Routes of Entry:

Eyes?	Skin?	Inhalation?	Ingestion?	Other?
Yes	Yes	Yes	Yes	N/A

Carcinogenicity:

NTP?	IARC?	OSHA?	WHMIS?	Other?
Yes	Yes	N/A	N/A	N/A

Details:

IARC has determined there is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica and so is categorized as a Group 1 carcinogen. NTP has classified respirable crystalline silica as a known human carcinogen and ACGIH has classified it as a suspected human carcinogen.

Eye Contact:

Flush with copious amounts of water. Consult physician if irritation persists.

Skin Contact:

Wash with soap and water. Consult physician if irritation persists.

SDS for ISOMOL® 780

Inhalation:

Remove person to fresh air, perform artificial respiration. Consult physician as soon as possible.

Ingestion:

Do not induce vomiting. Guard against aspiration into lungs. Consult physician immediately.

Section 5: Fire-Fighting Measures

Flash Point: < 1 Deg. C Closed Cup	Auto-Ignition: 455.6 Deg. C	LEL: 1.0%	UEL: 12%
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NFPA Hazard Classification:

Health: 2	Flammable: 3	Reactivity: 1	Special Hazard: N/A
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HMIS Hazard Classification:

Health: 2	Flammable: 3	Reactivity: 1	PPE: J
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Extinguishing Media:

Flammable liquid, use CO2, foam, or dry chemical.

Special Fire Fighting Procedures:

Do not use water. May spread fire. May react vigorously with oxidizing materials. Wear self-contained breathing apparatus when fighting fires.

Unusual Fire and Explosion Hazards:

SENSITIVITY TO MECHANICAL IMPACT: N/A

SENSITIVITY TO STATIC DISCHARGE: N/A

OTHER: Sealed drum will generate high pressure internally when exposed to heat or fire. At temperatures above the flash point emits flammable vapors which, when mixed with air, can burn or be explosive.

Section 6: Accidental Release Measures

Ventilate area. Remove sources of ignition. Absorb with sand or other inert material.

Section 7: Handling and Storage

Store in ambient temperature below 100 Deg. F. Keep away from flames and excessive heat. Replace lid tightly after use. Open container carefully due to possibility of internal pressure build up.

Section 8: Exposure Controls/Personal Protection

Exposure Limits Ingredient	PEL-OSHA	TLV-ACGIH	Other
Isopropanol	400 ppm	200 ppm TWA 400 ppm STEL	N/A
Olivine	15 mg/M3 (total)	10 mg/M3	N/A
Magnesium Oxide	15 mg/M3 (as fume)	10 mg/M3 (inhalable)	N/A
n-Heptane	500 ppm	400 ppm TWA 500 ppm STEL	
Crystalline Silica (Quartz)	0.05 mg/M3 (respirable)	0.025 mg/M3 (respirable)	N/A

Details:

N/A

Respiratory Protection:

If PEL/TLV is exceeded, use NIOSH approved air supplied respirator for organic solvent vapors.

Ventilation

LOCAL: Required in area product being applied.

SPECIAL: N/A

MECHANICAL: As required to maintain levels below the listed PEL/TLVs.

ENGINEERING CONTROLS: N/A

Protective Equipment:

GLOVES: Rubber, PVC or Impervious

EYE: Safety goggles

CLOTHING: As required to prevent prolonged exposure to skin.

Personnel Sampling Procedure:

N/A

PPE Symbols Displayed:



Section 9: Physical and Chemical Properties

	Chemical Properties
Appearance (physical state, color, etc.):	Brown liquid
Odor:	Alcohol odor
Odor threshold:	N/AV
pH:	N/AV
Melting point/freezing point:	N/AV
Initial boiling point and boiling range:	80-100 Deg. C
Flash point:	<1 Deg. C Closed Cup
Evaporation rate:	Water = 1; Much greater than 1
Flammability (solid, gas):	Flammable Liquid - Category 2
Upper/lower flammability or explosive limits:	LEL 1%; UEL 12%
Vapor pressure:	33 mm/Hg @ 20 Deg. C (IPA)
Vapor density:	>1
Relative density:	1.8 g/cc
Solubility(ies):	Miscible in water
Partition coefficient: n-octanol/water:	N/AV
Auto ignition temperature:	455.6 Deg. C
Decomposition temperature:	N/AV
Viscosity:	N/AV
Other Relevant Properties:	N/A

Section 10: Stability and Reactivity

Stability: Stable	Avoid: N/A
Reactivity: Stable	Avoid: N/A
Other: N/A	
Incompatibility: Oxidizing materials and open flames.	
Hazardous Decomposition of By-products Oxides of carbon and formaldehyde.	
Polymerization: Will not occur.	Avoid: N/A

Section 11: Toxicological Information

Chemical Name	% Wt.	LD50	LC50	Route of Exposure:	Short / Long Term Exposure Effects:	Known Carcinogen:
Isopropanol	15-40	5045 mg/Kg - oral rat		Ingestion	N/AV	No
Isopropanol	15-40		16000 ppm/8H - rat	Inhalation	N/AV	No

Other Studies:

N/AV

Section 12: Ecological Information**Ecotoxicity:**

N/AV

Environmental Fate:

N/AV

Section 13: Disposal Considerations

Dispose of in accordance with local, state and federal regulations

Section 14: Transport Information**International**

UN1219, Isopropanol Solution, 3, PG II

United States

UN1219, Isopropanol Solution, 3, PG II

Canada

UN1219, Isopropanol Solution, 3, PG II

European Community

UN1219, Isopropanol Solution, 3, PG II

Section 15: Regulatory Information**US Federal Regulations****TSCA**

All components of this product are included on the EPA TSCA Chemical Substance Inventory.

SARA 311 and 312 Hazard Categories:

Immediate (Acute) Health Hazard:	Yes
Delayed (Chronic) Health Hazard:	Yes
Fire Hazard:	Yes
Reactivity:	No

SDS for ISOMOL® 780

Sudden Release of Pressure:

No

SARA Section 313 Notification:

This product contains no toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372, based upon our knowledge of the raw materials comprising this product.

Ozone Depleting Substances:

N/A

Volatile Organic Compounds (VOC):

507 gm/liter

US State Regulation:

N/A

Canadian Regulation:

WHMIS CLASSIFICATION: See Section 2 for GHS Hazard Classification

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

European Regulation:

N/A

Other Regulation:

N/A

MITI:

N/A

N/A is Not Applicable

N/K is Not Known

N/AV is Not Available

Section 16: Other Information

Document Revision History:

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Last Approval Date: 04/27/2016

Date of Last Revision: 04/27/2016

Document Author:

Jackie Gerber

Document Manager:

Julie Pyle

SDS Status:

Revised Section 8

Disclaimer

Information contained within this safety data sheet is based on the current state of knowledge and relates to such products, their intended usage and the required safety precautions. Although every effort has been made to ensure that this information is correct and gives adequate safety margins in line with current knowledge, it does not constitute a specification and no information for other purposes, particularly information regarding properties of the delivered materials, may be inferred. Determination of the technical suitability of each material and complying with any guidance relating to safe usage remain the sole responsibility of the user. Consequently, beyond any separately agreed contractual arrangements, the aforementioned manufacturer and its subsidiaries exclude any and all liability resulting from the use of the product. Unknown hazards may be inherent in all materials; therefore these materials shall be treated with caution. Although certain hazards are described herein, we are unable to guarantee that these are the only hazards.

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1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Stody 964-G, 964-O, ~~965-G~~, 965-O, 966-G
Product Type: Composite Wire for Open Arc, Gas Metal Arc, and Submerged Arc Welding
Classification: Not specified by AWS
Supplier: Stody Company, 5557 Nashville Road, Bowling Green, KY 42101, USA
Telephone No.: (270) 781-9777 or (800) 369-4864
Emergency No.: (800) 424-9300 (CHEMETREC), CHEMTREC (International): +1 703-527-3887
Website: www.stody.com
Date: April 13, 2016

2. HAZARDS IDENTIFICATION

Emergency Overview: This product is not considered hazardous as shipped. Gloves should be worn when handling to prevent contaminating hands with product dust. Avoid inhalation of dust and eye contact with this product. When this product is used with a welding machine in an arc welding process, the most important hazards are radiation, welding fumes, heat, and electrical shock.

Hazard Classifications: Not classifiable according to GHS.

Hazardous Decomposition Products – Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coating on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of work area, the quality and the amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and from the ingredients listed in Section 3. Fumes and gas decomposition products that evolve from welding activity and not the ingredients in the electrode, are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode. Also, new compounds not in the electrodes may form from welding activity. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 3, plus those from the base metal coatings, etc. as noted above.

Reasonably expected decomposition products from normal use of these products include a complex set of oxides of materials listed in Section 3, as well as carbon monoxide, carbon dioxide, ozone and nitrogen oxides. **The exposure limits for exposure to chromium, nickel, manganese, cobalt, and/or hexavalent chrome may be reached before the general limit for welding fumes (5 mg/m³) is reached.**

The recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet (if worn) or in the worker's breathing zone. See ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes" and "Characterization of Arc Welding Fume" available from the American Welding Society, 8669 NW 36 #130, Miami, FL 33166.



3. COMPOSITION/INFORMATION ON INGREDIENTS

[illegible]

C = Ceiling
STEL = Short Term Exposure Limit
IDLH = Immediately Dangerous to Life and Health
mpscf = million particles per cubic meter = particles per cc
Resp = Respirable

4. FIRST AID MEASURES

- Inhalation:** If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.
- Eye contact:** For radiation burns due to arc exposure, see physician. To remove foreign objects or for eye irritation, flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.
- Skin contact:** For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles, wash with mild soap and water.
- Electric shock:** Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.
- General:** Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Follow all Hot Work procedures. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation such as water, alcohol-resistant foam, dry chemical or carbon dioxide, etc.

Unsuitable Extinguishing Media: Not applicable.

Specific Hazards Arising from Fire: Welding arcs and sparks can ignite combustible and flammable materials. Welding activity can produce oxides, manganese and manganese oxides, and iron oxides. See American National Standard Z49.1: Safety in Welding and Cutting published by the American Welding Society.

Recommended Protective Equipment: Wear complete protective clothing and self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse. Ensure collected materials are placed in appropriate containers, particularly if still hot.

Personal precautions: Refer to Section 8.

Environmental precautions: Refer to Section 13.

7. HANDLING AND STORAGE

Handling: Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Storage: Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials, and dust.

Engineering measures: Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases away from welding operator breathing zone and generally occupied areas. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment: Use respirator or air supplied respirator when welding in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear, and body protection like welder's gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

EU Specification EN 12477: Gloves for Welders Type A. For eye protection, use a welder's helmet compliant to EN 379 with filter shade 9 or greater. Clothing should meet Class 2 requirements.

Use industrial hygiene monitoring equipment to ensure that human exposure does not exceed applicable published exposure limits. For information about welding fume analysis refer to Section 10.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Cored wire, color grey/black, with core containing solid metal and non-metal particles
Odor:	Odorless
Odor threshold:	Not available
pH:	Not available
Melting point:	>1000°F (>500°C)
Boiling point:	Not available
Flash point:	Not available
Evaporation rate:	Not available
Flammability:	Not available
Flammability limits:	Not available
Vapor pressure:	Not available
Vapor density:	Not available
Relative density:	0.18 – 0.33 lb/cu ft. (5 – 9 g/cc)
Solubility:	Insoluble in water
Octanol-water partition coefficient:	Not available
Bioconcentration factor:	Not available
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	Not available

10. STABILITY AND REACTIVITY

General: These products are only intended for normal welding purposes.

Chemical Stability: These products are stable under normal conditions. No stabilizers are required.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

Other: When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The rate of fumes generated from arc welding varies with wire size and welding process parameters but is generally no more than 10 g/min. Fumes from these products may contain compounds of the following chemical elements: Al, B, C, Ca, Co, Cr, Cu, F, Fe, K, Mn, Mo, N, Na, Nb, O, Si, Ti, V, W, and Zr.

Refer to applicable exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 3. A significant amount of the chromium in the fumes can be hexavalent chromium, which has a very low exposure limit in some countries. Manganese and nickel also have low exposure limits, in some countries that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

Fume Generation Analysis – Fume generation and fume analysis data, including hexavalent chrome content is available for a range of products and may be obtained by sending a request in writing or sending us an inquiry on the Stooddy Company web page (www.stooddy.com).

11. TOXICOLOGICAL INFORMATION

The wire product as sold and distributed is not expected to cause hazardous exposures. During welding activity, the likely routes of exposure could include ingestion, skin, eyes but most importantly by inhalation of welding fumes and dust. Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fume is difficult because of site specific factors such as varying base materials, coatings, air contamination, and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

- Acute toxicity:** Over exposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat, or eyes.
- Chronic Toxicity:** Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances, and spastic gait. Prolonged inhalation of titanium dioxide above safe exposure limits can cause cancer. Inhalable quartz is a respiratory carcinogen; however, the process of welding converts crystalline quartz to the amorphous form which is not considered to be a carcinogen.

12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade/weather into compounds originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or ground water.

Nickel powder is harmful for the environment, harmful to aquatic organisms, and may cause long term adverse effects in the aquatic environment. The biological concentration factors, BCF, of components of these wires that may be present are chromium 200; manganese 59052; and iron 140000.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with international, federal, and local regulations. Use recycling procedures if available.

USA RCRA: Unused products or product residue containing chromium could be considered hazardous waste if discarded. Assess for the applicability of RCRA ID characteristic Toxic Hazardous Waste D007 (TCLP).

Residues from welding consumables and processes could degrade and accumulate in soils and ground water. Welding slag from these products typically contain mainly the following components originating from these wires: Al, B, C, Ca, Co, Cr, Cu, F, Fe, K, Mn, Mo, N, Na, Nb, O, Si, Ti, V, W, and Zr.

14. TRANSPORT INFORMATION

UN #: Welding wires and rods are not classified as dangerous goods and have no UN number.

UN proper shipping name: There is no proper shipping name.

Transport hazard class: There is no transport hazard and are not classified as dangerous goods for transportation.

Packing Group #: Not applicable.

Environmental hazards: Welding rods and wire are not environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID and AND) and/or a marine pollutant to the IMDG Code.

Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable as transported in package form.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices, and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and **SPARKS** can injure eyes and burn skin.

Wear correct hand, head, eye, and body protection.

Canada: Not classifiable in product form.

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous.

These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health and Safety Code § 25249.5 et seq.)

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and or Threshold Planning Quantities (TPQs):

Product comprises of metallic and possibly non-metallic solid particles. Releases in excess of RQs are not considered feasible.

Section 311 Hazard Class

As shipped: Immediate In use: Immediate delayed

EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic constituents are listed in SARA 313 "Toxic Chemicals" and are potentially subject to annual SARA 313 reporting: Chromium, Manganese, Nickel. See Section 3 for weight percent.

16. OTHER INFORMATION

This Safety Data Sheet has been revised due to requirements of CLP/GHS Classification. This SDS supersedes any earlier created version.

Refer to ESAB "Welding and Cutting – Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:

USA: American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWS F3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 8669 NW 36th St #130, Miami, FL 33166. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Publishing Office, tel. 1-866-512-1800.

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 1330 Kemper Meadow Drive, Cincinnati, OH 45240, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by CPR.

Stoody requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- Notify its employees, agents, and contractors of the information on this SDS and any product hazards/safety information.
- Furnish this same information to each of its customers for these products.
- Request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that Stoody believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact Stoody for more information.



AN ESAB® BRAND

SAFETY DATA SHEET

WELDING WIRE, STOODY 965-G

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Stoody 964-G, 964-O, 965-G, 965-O, 966-G
Product Type: Composite Wire for Open Arc, Gas Metal Arc, and Submerged Arc Welding
Classification: Not specified by AWS
Supplier: Stoody Company, 5557 Nashville Road, Bowling Green, KY 42101, USA
Telephone No.: (270) 781-9777 or (800) 369-4864
Emergency No.: (800) 424-9300 (CHEMETREC), CHEMTREC (International): +1 703-527-3887
Website: www.stoody.com
Date: April 13, 2016

2. HAZARDS IDENTIFICATION

Emergency Overview: This product is not considered hazardous as shipped. Gloves should be worn when handling to prevent contaminating hands with product dust. Avoid inhalation of dust and eye contact with this product. When this product is used with a welding machine in an arc welding process, the most important hazards are radiation, welding fumes, heat, and electrical shock.

Hazard Classifications: Not classifiable according to GHS.

Hazardous Decomposition Products – Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coating on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of work area, the quality and the amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and from the ingredients listed in Section 3. Fumes and gas decomposition products that evolve from welding activity and not the ingredients in the electrode, are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode. Also, new compounds not in the electrodes may form from welding activity. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 3, plus those from the base metal coatings, etc. as noted above.

Reasonably expected decomposition products from normal use of these products include a complex set of oxides of materials listed in Section 3, as well as carbon monoxide, carbon dioxide, ozone and nitrogen oxides. The exposure limits for exposure to chromium, nickel, manganese, cobalt, and/or hexavalent chrome may be reached before the general limit for welding fumes (5 mg/m³) is reached.

The recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet (if worn) or in the worker's breathing zone. See ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes" and "Characterization of Arc Welding Fume" available from the American Welding Society, 8669 NW 36 #130, Miami, FL 33166.

SAFETY DATA SHEET

ON ON INGREDIENTS

Si	Cr	Mo	W	Fe	V	Nb	Cu	B	TiO ₂	Fluorides
0.4-2	4-10	0.1-1	--	Balance	--	--	--	--	<4	<4
0.4-2	4-10	0.1-1	--	Balance	--	--	--	--	--	--
0.2-2	2-15	0.6-6	--	Balance	0.1-2	0.1-6	0.1-2	0.1-2	--	--
0.2-2	2-15	0.6-6	--	Balance	0.1-2	0.1-6	0.1-2	0.1-2	<4	<4
0.2-2	2-15	0.6-6	0.1-8	Balance	0.1-4	0.1-6	--	0.1-2	--	--
7440-21-3 5 (resp) 15 (dust)	7440-47-3 0.5 0.6 µg/m³ (Cr VI)	7439-98-7 15 (dust)	7440-33-7 --	1309-37-1 10 (fume)	1314-62-1 (C) 0.1 (V₂O₅ fume) (C) 0.5 (V₂O₅ resp)	7440-03-1 --	7440-50-8 0.1 (fume) 1 (dust)	7440-42-8 15 (oxide dust)	13463-67-7 15 (dust)	7789-75-5 2.5
--	--	10 (inhalable) 3 (resp)	10 (soluble) 5 (insoluble)	5 (resp)	0.05 (inhalable)	--	0.2 (fume) 1 (dust)	10 (oxide fume)	10	2.5
10 (dust) 5 (resp)	0.5 (dust) IDLH 250	--	5 (dust) STEL 10	5 (dust) IDLH 2500	(C) 0.05 (fume & dust) (15 mins.) IDLH 35	--	0.1 (fume) 1 (dust) IDLH 100	10 (oxide dust)	--	2.5 (dust) IDLH 25

4. FIRST AID MEASURES

- Inhalation:** If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.
- Eye contact:** For radiation burns due to arc exposure, see physician. To remove foreign objects or for eye irritation, flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.
- Skin contact:** For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles, wash with mild soap and water.
- Electric shock:** Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.
- General:** Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Follow all Hot Work procedures. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation such as water, alcohol-resistant foam, dry chemical or carbon dioxide, etc.

Unsuitable Extinguishing Media: Not applicable.

Specific Hazards Arising from Fire: Welding arcs and sparks can ignite combustible and flammable materials. Welding activity can produce oxides, manganese and manganese oxides, and iron oxides. See American National Standard Z49.1: Safety in Welding and Cutting published by the American Welding Society.

Recommended Protective Equipment: Wear complete protective clothing and self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Spilled objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse. Ensure collected materials are placed in appropriate containers, particularly if still hot.

Personal precautions: Refer to Section 8.

Environmental precautions: Refer to Section 13.

7. HANDLING AND STORAGE

Handling: Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Storage: Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials, and dust.

Engineering measures: Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases away from welding operator breathing zone and generally occupied areas. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment: Use respirator or air supplied respirator when welding in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear, and body protection like welder's gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

EU Specification EN 12477: Gloves for Welders Type A. For eye protection, use a welder's helmet compliant to EN 379 with filter shade 9 or greater. Clothing should meet Class 2 requirements.

Use industrial hygiene monitoring equipment to ensure that human exposure does not exceed applicable published exposure limits. For information about welding fume analysis refer to Section 10.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Cored wire, color grey/black, with core containing solid metal and non-metal particles
Odor:	Odorless
Odor threshold:	Not available
pH:	Not available
Melting point:	>1000°F (>500°C)
Boiling point:	Not available
Flash point:	Not available
Evaporation rate:	Not available
Flammability:	Not available
Flammability limits:	Not available
Vapor pressure:	Not available
Vapor density:	Not available
Relative density:	0.18 – 0.33 lb/cu ft. (5 – 9 g/cc)
Solubility:	Insoluble in water
Octanol-water partition coefficient:	Not available
Bioconcentration factor:	Not available
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	Not available

10. STABILITY AND REACTIVITY

General: These products are only intended for normal welding purposes.

Chemical Stability: These products are stable under normal conditions. No stabilizers are required.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

Other: When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The rate of fumes generated from arc welding varies with wire size and welding process parameters but is generally no more than 10 g/min. Fumes from these products may contain compounds of the following chemical elements: Al, B, C, Ca, Co, Cr, Cu, F, Fe, K, Mn, Mo, N, Na, Nb, O, Si, Ti, V, W, and Zr.

Refer to applicable exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 3. A significant amount of the chromium in the fumes can be hexavalent chromium, which has a very low exposure limit in some countries. Manganese and nickel also have low exposure limits, in some countries that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

Fume Generation Analysis – Fume generation and fume analysis data, including hexavalent chrome content is available for a range of products and may be obtained by sending a request in writing or sending us an inquiry on the Stooddy Company web page (www.stooddy.com).

11. TOXICOLOGICAL INFORMATION

The wire product as sold and distributed is not expected to cause hazardous exposures. During welding activity, the likely routes of exposure could include ingestion, skin, eyes but most importantly by inhalation of welding fumes and dust. Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fume is difficult because of site specific factors such as varying base materials, coatings, air contamination, and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

- Acute toxicity:** Over exposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat, or eyes.
- Chronic Toxicity:** Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances, and spastic gait. Prolonged inhalation of titanium dioxide above safe exposure limits can cause cancer. Inhalable quartz is a respiratory carcinogen; however, the process of welding converts crystalline quartz to the amorphous form which is not considered to be a carcinogen.

12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade/weather into compounds originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or ground water.

Nickel powder is harmful for the environment, harmful to aquatic organisms, and may cause long term adverse effects in the aquatic environment. The biological concentration factors, BCF, of components of these wires that may be present are chromium 200; manganese 59052; and iron 140000.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with international, federal, and local regulations. Use recycling procedures if available.

USA RCRA: Unused products or product residue containing chromium could be considered hazardous waste if discarded. Assess for the applicability of RCRA ID characteristic Toxic Hazardous Waste D007 (TCLP).

Residues from welding consumables and processes could degrade and accumulate in soils and ground water. Welding slag from these products typically contain mainly the following components originating from these wires: Al, B, C, Ca, Co, Cr, Cu, F, Fe, K, Mn, Mo, N, Na, Nb, O, Si, Ti, V, W, and Zr.

14. TRANSPORT INFORMATION

UN #: Welding wires and rods are not classified as dangerous goods and have no UN number.

UN proper shipping name: There is no proper shipping name.

Transport hazard class: There is no transport hazard and are not classified as dangerous goods for transportation.

Packing Group #: Not applicable.

Environmental hazards: Welding rods and wire are not environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID and AND) and/or a marine pollutant to the IMDG Code.

Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): Not applicable as transported in package form.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices, and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and **SPARKS** can injure eyes and burn skin.

Wear correct hand, head, eye, and body protection.

Canada: Not classifiable in product form.

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous.

These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health and Safety Code § 25249.5 et seq.)

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and or Threshold Planning Quantities (TPQs):

Product comprises of metallic and possibly non-metallic solid particles. Releases in excess of RQs are not considered feasible.

Section 311 Hazard Class

As shipped: Immediate In use: immediate delayed

EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic constituents are listed in SARA 313 "Toxic Chemicals" and are potentially subject to annual SARA 313 reporting: Chromium, Manganese, Nickel. See Section 3 for weight percent.

16. OTHER INFORMATION

This Safety Data Sheet has been revised due to requirements of CLP/GHS Classification. This SDS supersedes any earlier created version.

Refer to ESAB "Welding and Cutting – Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:

USA: American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWS F3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 8669 NW 36th St #130, Miami, FL 33166. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Publishing Office, tel. 1-866-512-1800.

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 1330 Kemper Meadow Drive, Cincinnati, OH 45240, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by CPR.

Stoody requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- Notify its employees, agents, and contractors of the information on this SDS and any product hazards/safety information.
- Furnish this same information to each of its customers for these products.
- Request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that Stoody believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact Stoody for more information.

Safety Data Sheet

Polyurethane Clear Varnish

SDS Revision Date:

06/16/2015

1. Identification

1.1. Product identifier

Product Identity

Polyurethane Clear Varnish

Alternate Names

Polyurethane Clear Varnish

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

Intended use

See Technical Data Sheet.

Application Method

See Technical Data Sheet.

1.3. Details of the supplier of the safety data sheet

Company Name

Harris Paints Company
PO Box 364723
San Juan, P.R. 00936-4723

Emergency

CHEMTREC (USA)

(800) 424-9300

Customer Service: Harris Paints Company

787-798-1005

2. Hazard(s) identification

2.1. Classification of the substance or mixture

Flammable liquid, 2 H 225

Flammable liquid and vapor

Skin Irrit. 3;H316

Causes mild skin irritation. (Not adopted by US OSHA)

Eye Irrit, 1; H 318

Eye damage

Skin Sens. 1;H317

May cause an allergic skin reaction.

Carc. 2;H351

Suspected of causing cancer.

Repr. 2;H361D

Suspected of damaging the unborn child.

STOT RE 1;H372

Causes damage to organs through prolonged or repeated exposure. Specific Target Organs: (central nervous system)

2.2. Label elements

Using the Toxicity Data listed in section 11 and 12 the product is labeled as follows.



Danger

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H 226 Flammable liquid and vapor

H316 Causes mild skin irritation.

H317 May cause an allergic skin reaction.

H318 Eye damage

H351 Suspected of causing cancer.

H361d Suspected of damaging the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure.

[Prevention]:

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P261 Avoid breathing dust / fume / gas / mist / vapors / spray.

P262 Do not get in eyes, on skin, or on clothing.

P264 Wash thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P272 Contaminated work clothing should not be allowed out of the workplace.

P280 Wear protective gloves / eye protection / face protection.

[Response]:

P301+310 IF SWALLOWED: Immediately call a POISON CENTER or doctor / physician.

P302+352 IF ON SKIN: Wash with plenty of soap and water.

P308+313 IF exposed or concerned: Get medical advice / attention.

P314 Get Medical advice / attention if you feel unwell.

P321 Specific treatment (see information on this label).

P331 Do NOT induce vomiting.

P333+313 If skin irritation or a rash occurs: Get medical advice / attention.

P363 Wash contaminated clothing before reuse.

[Storage]:

P405 Store locked up.

[Disposal]:

P501 Dispose of contents / container in accordance with local / national regulations.

3. Composition/information on ingredients

This product contains the following substances that present a hazard within the meaning of the relevant State and Federal Hazardous Substances regulations.

Ingredient/Chemical Designations	Weight %	GHS Classification	Notes
Stoddard solvent CAS Number: 0008052-41-3	25 - 50	STOT RE 1;H372 Asp. Tox. 1;H304	[1][2]
Toluene CAS Number: 0000108-88-3	1.0 - 10	Flam. Liq. 2;H225 Repr. 2;H361d Asp. Tox. 1;H304 STOT RE 2;H373 Skin Irrit. 2;H315	[1][2]

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		STOT SE 3;H336	
Benzene, trimethyl- CAS Number: 0025551-13-7	1.0 - 10	Flam. Liq. 2;H225 Acute Tox. 4;H302 Acute Tox. 4;H312 Skin Irrit. 2;H315	[1]
Bis(pentamethyl-4-piperidyl)sebacate CAS Number: 0041556-26-7	0.10 - 1.0	Skin Sens. 1;H317 Aquatic Chronic 1;H410	[1]
Methyl pentamethyl-4-piperidyl sebacate CAS Number: 0082919-37-7	0.10 - 1.0	Skin Sens. 1;H317 Aquatic Chronic 1;H410	[1]
2-Butanone oxime CAS Number: 0000096-29-7	0.10 - 1.0	Carc. 2;H351 Acute Tox. 4;H312 Eye Dam. 1;H318 Skin Sens. 1;H317	[1]

In accordance with paragraph (i) of §1910.1200, the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

[1] Substance classified with a health or environmental hazard.

[2] Substance with a workplace exposure limit.

[3] PBT-substance or vPvB-substance.

*The full texts of the phrases are shown in Section 16.

4. First aid measures

4.1. Description of first aid measures

General	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.
Inhalation	Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious place in the recovery position and obtain immediate medical attention. Give nothing by mouth.
Eyes	Irrigate copiously with clean water for at least 15 minutes, holding the eyelids apart and seek medical attention.
Skin	Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognized skin cleanser.
Ingestion	If swallowed obtain immediate medical attention. Keep at rest. Do NOT induce vomiting.

4.2. Most important symptoms and effects, both acute and delayed

Overview	<p>Possible cancer hazard. Contains an ingredient which may cause cancer based on animal data (See Section 3 and Section 15 for each ingredient). Risk of cancer depends on duration and level of exposure.</p> <p>Exposure to solvent vapor concentrations from the component solvents in excess of the stated occupational exposure limits may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Symptoms include headache, nausea, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.</p> <p>Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin resulting in dryness, irritation and possible non-allergic contact dermatitis. Solvents may also be absorbed through the skin. Splashes of liquid in the eyes may cause irritation and soreness with possible reversible damage. See section 2 for further details.</p>
Skin	May cause an allergic skin reaction. Causes mild skin irritation.

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5. Fire-fighting measures

5.1. Extinguishing media

Recommended extinguishing media; alcohol resistant foam, CO₂, powder, water spray.

Do not use: water jet.

5.2. Special hazards arising from the substance or mixture

Hazardous decomposition: High temperatures and fires may produce such toxic substances as carbon monoxide and carbon dioxide.

Avoid breathing dust / fume / gas / mist / vapors / spray.

Do not get in eyes, on skin, or on clothing.

5.3. Advice for fire-fighters

Respiratory equipment should be worn to avoid inhalation of concentrated vapors. Water should not be used except as fog to keep nearby containers cool. Cool containers exposed to flames with water until well after the fire is out. Protective equipment for fire-fighters.

Due to pressure build-up, closed containers exposed to extreme heat may explode. During emergency conditions, over-exposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

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6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Put on appropriate personal protective equipment (see section 8).

6.2. Environmental precautions

Do not allow spills to enter drains or waterways.

Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

6.3. Methods and material for containment and cleaning up

Eliminate ignition sources, provide good ventilation, dike spill area and add absorbent earth or sawdust to spilled liquid. Thoroughly wet with water and mix.

Collect adsorbent/water/spilled liquid mixture into metal containers and add enough water to cover. Consult local state and federal hazardous regulation before disposing into approved hazardous waste landfills. Obey relevant law.

7. Handling and storage

7.1. Precautions for safe handling

Use non-sparking utensils when handling this material.

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See section 2 for further details. - [Prevention]:

7.2. Conditions for safe storage, including any incompatibilities

Handle containers carefully to prevent damage and spillage.

Incompatible materials: Strong oxidizing agents and acids.

Avoid hot metal surface. Keep away from excessive heat and open flames. KEEP OUT OF REACH OF CHILDREN.

See section 2 for further details. - [Storage]:

7.3. Specific end use(s)

No data available.

8. Exposure controls and personal protection

8.1. Control parameters

Exposure

CAS No.	Ingredient	Source	Value
0000096-29-7	2-Butanone oxime	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit
0000108-88-3	Toluene	OSHA	TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)STEL 150 ppm
		ACGIH	TWA: 20 ppmR
		NIOSH	TWA 100 ppm (375 mg/m3) ST 150 ppm (560 mg/m3)
		Supplier	No Established Limit
0008052-41-3	Stoddard solvent	OSHA	TWA 500 ppm (2900 mg/m3)
		ACGIH	TWA: 290 mg/m3STEL: 580 mg/m3
		NIOSH	TWA 350 mg/m3 C 1800 mg/m3 [15-minute]
		Supplier	No Established Limit
0025551-13-7	Benzene, trimethyl-	OSHA	No Established Limit
		ACGIH	TWA: 5 ppm STEL: 15 ppm
		NIOSH	No Established Limit
		Supplier	No Established Limit
0041556-26-7	Bis(pentamethyl-4-piperidyl)sebacate	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit
0082919-37-7	Methyl pentamethyl-4-piperidyl sebacate	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit

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Carcinogen Data

CAS No.	Ingredient	Source	Value
0000096-29-7	2-Butanone oxime	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0000108-88-3	Toluene	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: Yes; Group 4: No;
0008052-41-3	Stoddard solvent	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0025551-13-7	Benzene, trimethyl-	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0041556-26-7	Bis(pentamethyl-4-piperidyl)sebacate	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0082919-37-7	Methyl pentamethyl-4-piperidyl sebacate	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;

8.2. Exposure controls

Respiratory

When spraying this material use a NIOSH approved cartridge respirator or gasmask suitable to keep airborne mists and vapor concentration below threshold limit values. When using in poorly ventilated and confined spaces, use a fresh air supplying respirator or a self-contained breathing apparatus.

Eyes

Do not get in eyes. Safety eyewear with splash guards or sideshields is recommended to prevent contact.

Skin

Not Required

Engineering Controls

General mechanical ventilation or local exhaust should be suitable to keep vapor concentrations below TLV. Ventilation equipment must be explosion proof.

Other Work Practices

Ensure safety showers and eyewash stations are available. Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse. Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

See section 2 for further details. - [Prevention]:

9. Physical and chemical properties

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Appearance	Clear Liquid
Odor	Solvent Odor
Odor threshold	Not determined
pH	Not Measured
Melting point / freezing point	Not Measured
Initial boiling point and boiling range	230°F to 550°F
Flash Point	100°F
Evaporation rate (Ether = 1)	Slower than Ether
Flammability (solid, gas)	Not Applicable
Upper/lower flammability or explosive limits	Lower Explosive Limit: Not Measured Upper Explosive Limit: Not Measured
Vapor pressure (Pa)	Not Measured
Vapor Density	Heavier than Air
Specific Gravity	0.907
Solubility in Water	Insoluble
Partition coefficient n-octanol/water (Log Kow)	Not Measured
Auto-ignition temperature	Not Measured
Decomposition temperature	Not Measured
Viscosity (cSt)	Not Measured
VOC Content	3.75 lb/gal (theoretical), 3.42 lb/gal (as packaged)
weight/gallon	7.55 lb/gal
Percent Solids	47%
Finish Gloss	90% to 60°F

9.2. Other information

No other relevant information.

10. Stability and reactivity

10.1. Reactivity

Hazardous Polymerization will not occur.

10.2. Chemical stability

Stable under normal circumstances.

10.3. Possibility of hazardous reactions

No data available.

10.4. Conditions to avoid

Excessive heat and open flame.

10.5. Incompatible materials

Strong oxidizing agents and acids.

10.6. Hazardous decomposition products

High temperatures and fires may produce such toxic substances as carbon monoxide and carbon dioxide.

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11. Toxicological information

Acute toxicity

Exposure to solvent vapor concentrations from the component solvents in excess of the stated occupational exposure limits may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Symptoms include headache, nausea, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.

Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin resulting in dryness, irritation and possible non-allergic contact dermatitis. Solvents may also be absorbed through the skin. Splashes of liquid in the eyes may cause irritation and soreness with possible reversible damage.

2-butoxyethanol and its acetate are readily absorbed through the skin and will cause harmful effects on the blood.

Ingredient	Oral LD50, mg/kg	Skin LD50, mg/kg	Inhalation Vapor LC50, mg/L/4hr	Inhalation Dust/Mist LC50, mg/L/4hr	Inhalation Gas LC50, ppm
Stoddard solvent - (8052-41-3)	> 5,000.00, Rat - Category: NA	No data available	No data available	5.50, Rat - Category: NA	No data available
Toluene - (108-88-3)	636.00, Rat - Category: 4	8,400.00, Rabbit - Category: NA	No data available	No data available	No data available
Benzene, trimethyl- - (25551-13-7)	No data available	No data available	No data available	No data available	No data available
Bis(pentamethyl-4-piperidyl)sebacate - (41556-26-7)	2,615.00, Rat - Category: 5	No data available	No data available	No data available	No data available
Methyl pentamethyl-4-piperidyl sebacate - (82919-37-7)	No data available	No data available	No data available	No data available	No data available
2-Butanone oxime - (96-29-7)	930.00, Rat - Category: 4	2,000.00, Rabbit - Category: 4	20.00, Rat - Category: 4	No data available	5,000.00, Rat - Category: 4

Note: When no route specific LD50 data is available for an acute toxin, the converted acute toxicity point estimate was used in the calculation of the product's ATE (Acute Toxicity Estimate).

Classification	Category	Hazard Description
Acute toxicity (oral)	---	Not Applicable
Acute toxicity (dermal)	---	Not Applicable
Acute toxicity (inhalation)	---	Not Applicable
Skin corrosion/irritation	3	Causes mild skin irritation. (Not adopted by US OSHA)
Serious eye damage/irritation	1	Not Applicable
Respiratory sensitization	---	Not Applicable
Skin sensitization	1	May cause an allergic skin reaction.
Germ cell mutagenicity	---	Not Applicable
Carcinogenicity	2	Suspected of causing cancer.

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Reproductive toxicity	2	Suspected of damaging the unborn child.
STOT-single exposure	---	Not Applicable
STOT-repeated exposure	1	Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard	---	Not Applicable

12. Ecological information

12.1. Toxicity

The preparation has been assessed following the conventional method of the Dangerous Preparations Directive 1999/45/EC and GHS and is not classified as dangerous for the environment, but contains substance(s) dangerous for the environment. See section 3 for details

Aquatic Ecotoxicity

Ingredient	96 hr LC50 fish, mg/l	48 hr EC50 crustacea, mg/l	ErC50 algae, mg/l
Stoddard solvent - (8052-41-3)	Not Available	Not Available	Not Available
Toluene - (108-88-3)	5.80, Oncorhynchus mykiss	19.60, Daphnia magna	Not Available
Benzene, trimethyl- - (25551-13-7)	Not Available	5.60, Palaemonetes pugio	Not Available
Bis(pentamethyl-4-piperidyl)sebacate - (41556-26-7)	1.00, Lepomis macrochirus	20.00, Daphnia magna	Not Available
Methyl pentamethyl-4-piperidyl sebacate - (82919-37-7)	Not Available	Not Available	Not Available
2-Butanone oxime - (96-29-7)	320.00, Leuciscus idus	500.00, Daphnia magna	83.00 (72 hr), Scenedesmus subspicatus

12.2. Persistence and degradability

There is no data available on the preparation itself.

12.3. Bioaccumulative potential

Not Measured

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

This product contains no PBT/vPvB chemicals.

12.6. Other adverse effects

No data available.

13. Disposal considerations

13.1. Waste treatment methods

Observe all federal, state and local regulations when disposing of this substance.

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14. Transport information

	DOT (Domestic Surface Transportation)	IMO / IMDG (Ocean Transportation)	ICAO/IATA
14.1. UN number	UN1263	UN1263	UN1263
14.2. UN proper shipping name	UN1263, Paint, 3, III	Paint	Paint
14.3. Transport hazard class(es)	DOT Hazard Class: 3	IMDG: 3 Sub Class: Not Applicable	Air Class: 3
14.4. Packing group	III	III	III
14.5. Environmental hazards			
IMDG	Marine Pollutant: No		
14.6. Special precautions for user	No further information		

15. Regulatory information

Regulatory Overview	The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.
Toxic Substance Control Act (TSCA)	All components of this material are either listed or exempt from listing on the TSCA Inventory.
WHMIS Classification	D2A
US EPA Tier II Hazards	Fire: No Sudden Release of Pressure: No Reactive: No Immediate (Acute): Yes Delayed (Chronic): Yes
EPCRA 311/312 Chemicals and RQs (lbs):	
	Toluene (1,000.00)
EPCRA 302 Extremely Hazardous:	
	To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.
EPCRA 313 Toxic Chemicals:	
	Cobalt 2-Ethyl Hexanoate Toluene
Proposition 65 - Carcinogens (>0.0%):	
	To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.
Proposition 65 - Developmental Toxins (>0.0%):	
	Toluene
Proposition 65 - Female Repro Toxins (>0.0%):	
	To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

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Proposition 65 - Male Repro Toxins (>0.0%):

To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

New Jersey RTK Substances (>1%):

Stoddard solvent

Toluene

Benzene, trimethyl-

Pennsylvania RTK Substances (>1%):

Stoddard solvent

Toluene

Benzene, trimethyl-

16. Other information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

The full text of the phrases appearing in section 3 is:

H225 Highly flammable liquid and vapor.

H302 Harmful if swallowed.

H304 May be fatal if swallowed and enters airways.

H312 Harmful in contact with skin.

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H318 Causes serious eye damage.

H336 May cause drowsiness and dizziness.

H351 Suspected of causing cancer.

H361d Suspected of damaging the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure.

H373 May cause damage to organs through prolonged or repeated exposure.

H410 Very toxic to aquatic life with long lasting effects.

This is the first version in the GHS SDS format. Listings of changes from previous versions in other formats are not applicable.

To the best of our knowledge, the information contained here is accurate, obtained from sources believed to be accurate. We neither guarantee that any hazards mentioned are the only ones which exist. The manner of that use and whether there is any infringement of patents is the sole responsibility of the user.

End of Document



Mold Wash - Z

Safety Data Sheet

VELVACOAT™ ST 803 COATING

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SECTION 1. IDENTIFICATION

Product name : VELVACOAT™ ST 803 COATING
Material : 839876
Manufacturer or supplier's details
Company : ASK CHEMICALS LLC
Address : 495 Metro Place South Suite 250
Dublin, OH 43017
United States of America
Emergency telephone number : 1-855-ASK4YOU (1-855-275-4968)
E-mail address : EHSRequests.usa@ask-chemicals.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 2
Eye irritation : Category 2A
Skin sensitisation : Category 1
Carcinogenicity : Category 1A
Specific target organ toxicity - single exposure : Category 3 (Central nervous system)
Aspiration hazard : Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.
H350 May cause cancer.

Precautionary statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.



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P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P272 Contaminated work clothing should not be allowed out of the workplace.

P280 Wear protective gloves/ eye protection/ face protection.

P281 Use personal protective equipment as required.

Response:

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.

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 victim to fresh air and keep at rest in a position 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.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P331 Do NOT induce vomiting.

P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.

P337 + P313 If eye irritation persists: Get medical advice/ attention.

P363 Wash contaminated clothing before reuse.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P403 + P235 Store in a well-ventilated place. Keep cool.

P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration (%)
BAUXITE	1318-16-7	>= 70 - < 90
ISOPROPANOL	67-63-0	>= 20 - < 30
ATTAPULGITE	12174-11-7	>= 1 - < 5
CRISTOBALITE	14464-46-1	>= 0.1 - < 1
QUARTZ / SAND	14808-60-7	>= 0.1 - < 1



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SECTION 4. FIRST AID MEASURES

- | | |
|---|---|
| General advice | : Do not leave the victim unattended. |
| If inhaled | : If unconscious place in recovery position and seek medical advice.
If symptoms persist, call a physician. |
| In case of skin contact | : Flush skin with large amounts of water. If irritation develops and persists, get medical attention. |
| In case of eye contact | : Remove contact lenses.
Protect unharmed eye.
If eye irritation persists, consult a specialist. |
| If swallowed | : Keep respiratory tract clear.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician. |
| Most important symptoms and effects, both acute and delayed | : None known. |

SECTION 5. FIREFIGHTING MEASURES

- | | |
|---|---|
| Suitable extinguishing media | : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. |
| Further information | : Standard procedure for chemical fires.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Special protective equipment for firefighters | : Wear self contained breathing apparatus for fire fighting if necessary. |

SECTION 6. ACCIDENTAL RELEASE MEASURES

- | | |
|---|--|
| Methods and materials for containment and cleaning up | : Wipe up with absorbent material (e.g. cloth, fleece).
Keep in suitable, closed containers for disposal. |
|---|--|

SECTION 7. HANDLING AND STORAGE

- | | |
|---|--|
| Advice on protection against fire and explosion | : Normal measures for preventive fire protection. |
| Advice on safe handling | : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area. |
| Conditions for safe storage | : Electrical installations / working materials must comply with |



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the technological safety standards.

Materials to avoid : No materials to be especially mentioned.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
ISOPROPANOL	67-63-0	TWA	200 ppm	ACGIH
		STEL	400 ppm	ACGIH
		TWA	400 ppm 980 mg/m3	NIOSH REL
		ST	500 ppm 1,225 mg/m3	NIOSH REL
		TWA	400 ppm 980 mg/m3	OSHA Z-1
		TWA	400 ppm 980 mg/m3	OSHA P0
		STEL	500 ppm 1,225 mg/m3	OSHA P0
		PEL	400 ppm 980 mg/m3	CAL PEL
		STEL	500 ppm 1,225 mg/m3	CAL PEL
CRISTOBALITE	14464-46-1	TWA (Respirable fraction)	0.025 mg/m3	ACGIH
		TWA (Respirable fraction)	0.05 mg/m3	OSHA P0
		TWA (Respirable dust)	0.05 mg/m3	OSHA Z-1
		PEL (Respirable dust)	0.05 mg/m3	CAL PEL
		TWA (respirable dust fraction)	0.05 mg/m3	OSHA P0
		TWA (Respirable fraction)	0.025 mg/m3 (Silica)	ACGIH
		TWA (Respirable dust)	0.05 mg/m3 (Silica)	NIOSH REL
QUARTZ / SAND	14808-60-7	TWA (Respirable fraction)	0.025 mg/m3	ACGIH
		TWA (total dust)	30 mg/m3/%SiO2+2	OSHA Z-3
		TWA (respirable)	10 mg/m3/%SiO2+2	OSHA Z-3
		TWA (respirable)	250 mppcf/%SiO2+5	OSHA Z-3



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		TWA (Respirable dust)	0.05 mg/m3	NIOSH REL
		TWA (Respirable fraction)	0.1 mg/m3	OSHA P0
		TWA (Respirable dust)	0.05 mg/m3	OSHA Z-1
		PEL (Respirable dust)	0.05 mg/m3	CAL PEL
		TWA (respirable dust fraction)	0.1 mg/m3	OSHA P0
		TWA (Respirable fraction)	0.025 mg/m3 (Silica)	ACGIH
		TWA (Respirable dust)	0.05 mg/m3 (Silica)	NIOSH REL

Personal protective equipment

Respiratory protection : No personal respiratory protective equipment normally required.

Eye protection : Safety glasses

Skin and body protection : Protective suit

Hygiene measures : General industrial hygiene practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Colour : no data available

Odour : no data available

Odour Threshold : no data available

pH : no data available

Melting point : no data available

Boiling point : no data available

Flash point : 11.6 °C
Method: Seta closed cup

Evaporation rate : no data available

Flammability (solid, gas) : no data available

Burning rate : no data available

Upper explosion limit : no data available



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Lower explosion limit	: no data available
Vapour pressure	: no data available
Relative vapour density	: no data available
Relative density	: no data available
Density	: 1.857 g/cm ³ (25 °C)
Bulk density	: no data available
Solubility(ies)	
Water solubility	: no data available
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Decomposition temperature	: no data available
Viscosity	
Viscosity, dynamic	: no data available
Viscosity, kinematic	: no data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: No decomposition if stored and applied as directed.
Chemical stability	: No decomposition if stored and applied as directed.
Possibility of hazardous reactions	: Stable under recommended storage conditions. No hazards to be specially mentioned.
Conditions to avoid	: no data available

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Skin absorption
Skin contact
Eye Contact
Ingestion

Acute toxicity

Product:

Acute oral toxicity : Acute toxicity estimate: > 5,000 mg/kg



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Method: Calculation method

Components:

ISOPROPANOL:

Acute oral toxicity : LD50 (rat): 5,045 mg/kg

LD50 (rat): 5,840 mg/kg

Acute inhalation toxicity : LC50 (rat): 16000 ppm
Exposure time: 4 h
Test atmosphere: vapour

Skin corrosion/irritation

Components:

BAUXITE:

Assessment: No skin irritation
Result: No skin irritation

ISOPROPANOL:

Assessment: Mild skin irritation
Result: Mild skin irritation

ATTAPULGITE:

Assessment: Irritating to skin.
Result: Irritating to skin.

CRISTOBALITE:

Assessment: Irritating to skin.
Result: Irritating to skin.

QUARTZ / SAND:

Assessment: Irritating to skin.
Result: Irritating to skin.

Serious eye damage/eye irritation

Components:

BAUXITE:

Result: Irritating to eyes.
Assessment: Irritating to eyes.

ISOPROPANOL:

Result: Irritating to eyes.
Assessment: Irritating to eyes.

ATTAPULGITE:

Result: Irritating to eyes.
Assessment: Irritating to eyes.

CRISTOBALITE:

Result: Irritating to eyes.
Assessment: Irritating to eyes.

QUARTZ / SAND:



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Result: Irritating to eyes.
Assessment: Irritating to eyes.

Carcinogenicity

Components:

ATTAPULGITE:

Carcinogenicity - Assessment : Limited evidence of a carcinogenic effect.

CRISTOBALITE:

Carcinogenicity - Assessment : Human carcinogen.

QUARTZ / SAND:

Carcinogenicity - Assessment : Human carcinogen.

IARC

Group 1: Carcinogenic to humans

CRISTOBALITE 14464-46-1

QUARTZ / SAND 14808-60-7

Group 2B: Possibly carcinogenic to humans

ATTAPULGITE 12174-11-7

OSHA

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

NTP

Known to be human carcinogen

CRISTOBALITE 14464-46-1

QUARTZ / SAND 14808-60-7

Aspiration toxicity

Product:

The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

Further information

Product:

Remarks: no data available

Components:

ISOPROPANOL:

Remarks: Central nervous system

CRISTOBALITE:



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Remarks: Lungs

QUARTZ / SAND:

Remarks: Lungs

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

ISOPROPANOL:

Toxicity to fish : LC 50 (Fathead minnow (*Pimephales promelas*)): 5,770 - 7,450 mg/l
Exposure time: 96 h
Method: Flow through
Remarks: Mortality

Toxicity to daphnia and other aquatic invertebrates : LC 50 (Water flea (*Daphnia magna*)): > 10,000 mg/l
Exposure time: 24 h
Test Type: static test
Method: Static
Remarks: Mortality

Persistence and degradability

No data available

Bioaccumulative potential

Components:

ISOPROPANOL:

Partition coefficient: n-octanol/water : log Pow: 0.05

Mobility in soil

No data available

Other adverse effects

Product:

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information : no data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods



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- | | |
|------------------------|--|
| Waste from residues | : Dispose of in accordance with all applicable local, state and federal regulations. |
| Contaminated packaging | : Empty containers should be taken to an approved waste handling site for recycling or disposal. |

SECTION 14. TRANSPORT INFORMATION

REGULATION

U.S. DOT - ROAD

- | | |
|----------------------|---------------------|
| UN/ID/NA number | : UN1139 |
| Proper shipping name | : Coating solution |
| Class | : 3 |
| Subsidiary risk | : no data available |
| Packing group | : II |
| Flash point | : 11.6 °C |
| Marine pollutant | : no data available |

U.S. DOT - RAIL

- | | |
|----------------------|---------------------|
| UN/ID/NA number | : UN1139 |
| Proper shipping name | : Coating solution |
| Class | : 3 |
| Subsidiary risk | : no data available |
| Packing group | : II |
| Flash point | : 11.6 °C |
| Marine pollutant | : no data available |

U.S. DOT - INLAND WATERWAYS

- | | |
|----------------------|---------------------|
| UN/ID/NA number | : UN1139 |
| Proper shipping name | : Coating solution |
| Class | : 3 |
| Subsidiary risk | : no data available |
| Packing group | : II |
| Flash point | : 11.6 °C |
| Marine pollutant | : no data available |

TRANSPORT CANADA - ROAD

- | | |
|----------------------|---------------------|
| UN/ID/NA number | : UN1139 |
| Proper shipping name | : COATING SOLUTION |
| Class | : 3 |
| Subsidiary risk | : no data available |
| Packing group | : II |
| Flash point | : 11.6 °C |
| Marine pollutant | : no data available |

TRANSPORT CANADA - RAIL



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UN/ID/NA number	: UN1139
Proper shipping name	: COATING SOLUTION
Class	: 3
Subsidiary risk	: no data available
Packing group	: II
Flash point	: 11.6 °C
Marine pollutant	: no data available

TRANSPORT CANADA - INLAND WATERWAYS

UN/ID/NA number	: UN1139
Proper shipping name	: COATING SOLUTION
Class	: 3
Subsidiary risk	: no data available
Packing group	: II
Flash point	: 11.6 °C
Marine pollutant	: no data available

MEXICAN REGULATION FOR THE LAND TRANSPORT OF HAZARDOUS MATERIALS AND WASTES

UN/ID/NA number	: UN1139
Proper shipping name	: SOLUCIONES PARA REVESTIMIENTOS
Class	: 3
Subsidiary risk	: no data available
Packing group	: II
Flash point	: 11.6 °C
Marine pollutant	: no data available

INTERNATIONAL MARITIME DANGEROUS GOODS

UN/ID/NA number	: UN1139
Proper shipping name	: COATING SOLUTION
Class	: 3
Subsidiary risk	: no data available
Packing group	: II
Flash point	: 11.6 °C
Marine pollutant	: no data available

INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

UN/ID/NA number	: UN1139
Proper shipping name	: Coating solution
Class	: 3
Subsidiary risk	: no data available
Packing group	: II
Flash point	: 11.6 °C
Marine pollutant	: no data available

*ORM = ORM-D, CBL = COMBUSTIBLE LIQUID



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

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards	: Flammable (gases, aerosols, liquids, or solids) Serious eye damage or eye irritation Respiratory or skin sensitisation Carcinogenicity Specific target organ toxicity (single or repeated exposure) Aspiration hazard
SARA 302	: This material does not contain any components with a section 302 EHS TPQ.
SARA 313	: The following components are subject to reporting levels established by SARA Title III, Section 313:
	ISOPROPANOL 67-63-0 >= 20 - < 30 %

California Prop 65

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

ATTAPULGITE	12174-11-7
CRISTOBALITE	14464-46-1
QUARTZ / SAND	14808-60-7

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

METHYL CHLORIDE	74-87-3
-----------------	---------

The components of this product are reported in the following inventories:

TSCA	: On TSCA Inventory
DSL	: All components of this product are on the Canadian DSL.
AUSTR	: On the inventory, or in compliance with the inventory
ENCS	: Not in compliance with the inventory
KOREA	: On the inventory, or in compliance with the inventory
PHIL	: On the inventory, or in compliance with the inventory
CHINA	: On the inventory, or in compliance with the inventory

Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)



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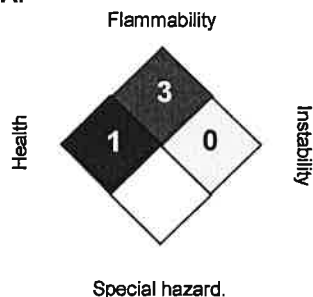
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SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS III:

HEALTH	1*
FLAMMABILITY	3
PHYSICAL HAZARD	0

0 = not significant, 1 = Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by ASK's Environmental Health and Safety Department-- EHSrequests.USA@ask-chemicals.com.

Revision Date

: 01/25/2019

ATTACHMENT D

PROCESS FLOW DIAGRAM



Filepath: \\Projects\8006.43 Steel River LLP- Eagle Foundry\01- Eagle Foundry CAO Permitting Support\Draft Documents\Process Flow Diagrams
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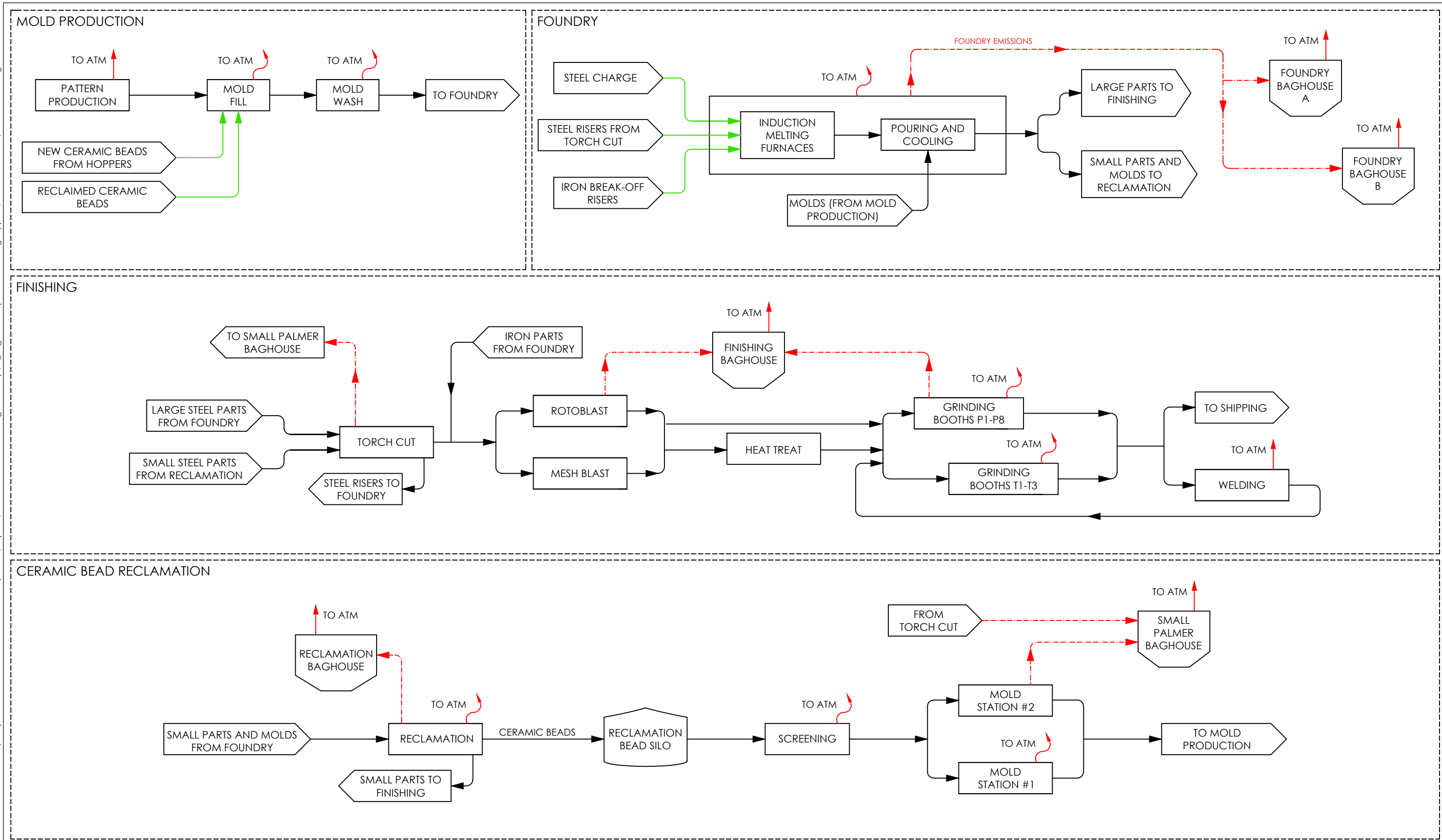


Figure 1
Process Flow Diagram
Eagle Foundry
Eagle Creek, Oregon

ATTACHMENT E

CATEGORICALLY EXEMPT THRESHOLD ANALYSIS



Table 1
Categorically Exempt Analysis
Eagle Foundry Company

TAC Summary	CAS	Toxic Air Contaminant ⁽¹⁾	Total Annual Usage Estimate (lb/yr)	Reporting Threshold (lb/yr)
Summary	75-00-3	Chloroethane	3.8E-03	>1,000
	1330-20-7	Xylene	15.4	>1,000
	100-41-4	Ethylbenzene	4.61	>10
	67-56-1	Methyl Alcohol	3.84	>1,000
	98-82-8	Cumene	0.12	>1,000
	108-88-3	Toluene	0.12	>1,000
	67-63-0	2-propanol	18.3	>1,000
	67-64-1	Acetone	25.7	>1,000

Product ⁽²⁾	CAS	Pollutant ⁽²⁾	Weight Percentage ⁽³⁾ (%)	Specific Gravity ⁽²⁾	Product Density ^(a) (lb/gal)	Annual Product Usage ⁽⁵⁾	Annual Emissions/Usage Estimate ^(b) (lb/yr)
JUMP Starting Fluid	426260-76-6	Heptane, branched, cyclic and linear	75.0	0.70	5.84	0.13 (gal)	0.56
	60-29-7	Diethyl ether	15.0				0.11
	124-38-9	Carbon dioxide	7.50				0.056
	64-17-5	Ethanol	0.75				5.6E-03
	75-00-3	Chloroethane	0.50				3.8E-03
	64742-47-8	Distillates (petroleum), hydrotreated light	0.50				3.8E-03
3M Brake Cleaner	591-76-4	2-Methylhexane	20.0	0.78	6.51	11.8 (gal)	15.4
	589-34-4	3-Methylhexane	20.0				15.4
	426260-76-6	Heptane, branched, cyclic and linear	20.0				15.4
	1330-20-7	Xylene	20.0				15.4
	100-41-4	Ethylbenzene	6.00				4.61
	67-56-1	Methyl Alcohol	5.00				3.84
	124-38-9	Carbon dioxide	3.00				2.31
	142-82-5	Heptane	1.50				1.15
	2532-58-3	Dimethylcyclopentane	1.00				0.77
	98-82-8	Cumene	0.15				0.12
Fastenal TALON Cable/Chain Lubricant	108-88-3	Toluene	0.15	0.71	5.92	12.4 (gal)	0.12
	74-98-6	Propane	9.00				6.60
	106-97-8	Butane	21.0				15.4
	142-82-5	Heptane	5.00				3.67
	64742-88-7	Mineral Spirits	2.00				1.47
	67-63-0	2-propanol	25.0				18.3
	67-64-1	Acetone	35.0				25.7
	1317-33-5	Molybdenum disulfide	2.00				1.47

NOTES:

TAC = Toxic Air Contaminant

(a) Product density (lb/gal) = (specific gravity) x (density of water [lb/gal])

Density of water (lb/gal) = 8.345 (4)

(b) Annual emissions estimate (lb/yr) = (weight percentage [%]/100) x (product density [lb/gal]) x (annual product usage [gal/yr])

REFERENCES:

- (1) Summary only includes reportable TACs.
- (2) Information from product SDS.
- (3) Information from product SDS. Value represents average of the listed range.
- (4) Density of water at 4 degrees Celsius.
- (5) Information provided by Eagle Foundry. Value represents 1.5 times the total purchases for each product in 2021.