

# Department of Environmental Quality

Kimberly D. Shelley Executive Director

DIVISION OF AIR QUALITY Bryce C. Bird Director

RN105550007

October 27, 2022

Al Haley Weir Minerals, Inc. 3459 S 700 W Salt Lake City, UT 84119 al.haley@mail.weir

Dear Al Haley,

Re: Engineer Review:

Minor Modification to Approval Order DAQE-AN105550006-18 to Add a Coating Process

Project Number: N105550007

The DAQ requests a company representative (Title V Responsible Official for enhanced Approval Order application) review and sign the attached Engineer Review (ER). This ER identifies all applicable elements of the New Source Review permitting program. Weir Minerals, Inc. should complete this review within 10 business days of receipt.

Weir Minerals, Inc. should contact **Tad Anderson** at (385) 306-6515 if there are questions or concerns with the review of the draft permit conditions. Upon resolution of your concerns, please email tdanderson@utah.gov the signed cover letter to Tad Anderson. Upon receipt of the signed cover letter, the DAQ will prepare an ITA for a 30-day public comment period. At the completion of the comment period, the DAQ will address any comments and will prepare an AO for signature by the DAQ Director.

If Weir Minerals, Inc. does not respond to this letter within **10 business days**, the project will move forward without source concurrence. If Weir Minerals, Inc. has concerns that cannot be resolved and the project becomes stagnant, the DAQ Director may issue an Order prohibiting construction.

Approval	Signature
	(Signature & Date)
T E	By (Title V responsible official) initialing this box and signing this document, this document
s	erves as an enhanced application and the public comment period will serve as the required
c	comment period for Title V purposes.

The Title V responsible official certifies: based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

# UTAH DIVISION OF AIR QUALITY ENGINEER REVIEW

#### **SOURCE INFORMATION**

Project Number N105550007

Owner Name Weir Minerals, Inc.
Mailing Address 3459 S 700 W

Salt Lake City, UT, 84119

Source Name Weir Minerals, Inc. Source Location 3459 S 700 W

Salt Lake City, UT 84119

UTM Projection 423,150 m Easting, 4,504,420 m Northing

UTM Datum NAD27 UTM Zone UTM Zone 12

SIC Code 3069 (Fabricated Rubber Products, NEC)

Source Contact Al Haley

Phone Number (801) 574-2100 Email al.haley@mail.weir

Project Engineer Tad Anderson, Engineer

Phone Number (385) 306-6515 Email tdanderson@utah.gov

Notice of Intent (NOI) Submitted January 25, 2019
Date of Accepted Application June 6, 2019

#### SOURCE DESCRIPTION

#### General Description

Weir Minerals, Inc. (Weir) operates a rubber products facility in Salt Lake City, Salt Lake County. This facility manufactures rubber products including linings and stand-alone rubber liners or belts. Production steps include taking entry products (raw materials) and forming rubber by heat and bonding, packing, crating and shipping. Raw materials go through a baghouse controlled banbury mixer or the carbon black mixer with baghouse control to mix components. Once mixed the materials are pressed and heated to form rubber. The rubber material is formed in molds or machines, which are all ducted to vents. The molds are cleaned in a solvent tank or rotoblast cleaners controlled with baghouses. The source has paint booths controlled by negative draw air and filter banks, and several natural gas-fired emission units. The HAPS from this operation are from the mixes and bonding solutions.

#### NSR Classification:

Minor Modification at Major Source

#### Source Classification

Located in, Salt Lake City UT PM<sub>2.5</sub> NAA, Salt Lake County SO<sub>2</sub> NAA, Salt Lake County Airs Source Size: A

#### Applicable Federal Standards

MACT (Part 63), A: General Provisions

MACT (Part 63), MMMM: National Emission Standards for Hazardous Air Pollutants for Surface Coating of Miscellaneous Metal Parts and Products

MACT (Part 63), ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

MACT (Part 63), DDDDD: National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters Title V (Part 70) Major Source

#### Project Proposal

Minor Modification to Approval Order DAQE-AN105550006-18 to Add a Coating Process

#### **Project Description**

Weir has requested a modification to Approver Order, DAQE-AN105550006-18, to add a ceramic coating (Cerasmooth) process to the Salt Lake Facility. The Cerasmooth material is a chemical, abrasion and heat resistant coating for wearable internal pump parts used for mining and power generation industries.

The Cerasmooth production process includes three different coatings (pre-coat, 1st coating-spray gun/hand, 2nd coating-spray gun/hand) to form a molded surface coating. The molded surface coating is then cured. The applications of the coatings will be conducted in the existing Handlay paint booth with charcoal filters and the Pappas Building. The curing of the parts will also be conducted in a curing oven located in the existing Handlay paint booth with charcoal filters.

The Pappas Building has been modified by installation of climate control HVAC system and the existing Handlay paint booth filters have been updated to accommodate the Cerasmooth process. The Cerasmooth production process emissions estimate is based upon usage of chemicals from

the Weir Georgia facility. This process involves a controlled 0.07 TPY VOC emissions increase from the use of chemicals.

EMISSION IMPACT ANALYSIS

Criteria and HAP emissions modeling is not required as per State rule R307-410-4 and R307-410-5. The emission rate from the Cerasmooth process is 0.07 TPY of VOC. [Last updated October 6, 2022]

## **SUMMARY OF EMISSIONS**

The emissions listed below are an estimate of the total potential emissions from the source. Some rounding of emissions is possible.

Criteria Pollutant	Change (TPY)	Total (TPY)
CO <sub>2</sub> Equivalent	0	23832.00
Carbon Monoxide	0	5.42
Nitrogen Oxides	0	19.86
Particulate Matter - PM <sub>10</sub>	0	3.65
Particulate Matter - PM <sub>2.5</sub>	0	3.65
Sulfur Dioxide	0	0.63
Volatile Organic Compounds	0.07	61.26

Hazardous Air Pollutant	Change (lbs/yr)	Total (lbs/yr)
2,4-Toluene Diisocyanate (CAS #584849)	0	19
Carbon Tetrachloride (CAS #56235)	0	1510
Hydrochloric Acid (Hydrogen Chloride) (CAS #7647010)	0	5200
Hydrogen Cyanide (Hydrocyanic Acid) (CAS #74908)	0	60
Hydrogen Fluoride (Hydrofluoric Acid) (CAS #7664393)	0	100
Lead (CAS #7439921)	0	3
Manganese (TSP) (CAS #7439965)	0	2
Methyl Isobutyl Ketone (Hexone) (CAS #108101)	0	11832
Methylene Chloride (Dichloromethane) (CAS #75092)	0	2000
Methylene Diphenyl Diisocyanate (MDI) (CAS #101688)	0	7780
Tetrachloroethylene (Perchloroethylene) (CAS #127184)	0	8612
Toluene (CAS #108883)	0	54613
Xylenes (Isomers And Mixture) (CAS #1330207)	0	18227
	Change (TPY)	Total (TPY)
Total HAPs	0	54.98

Note: Change in emissions indicates the difference between previous AO and proposed modification.

## **Review of BACT for New/Modified Emission Units**

#### 1. **BACT review regarding New Equipment**

BACT was conducted on the Cerasmooth process. The BACT analysis mainly focused on the VOC emissions and took the following control technologies into consideration: Flares, Thermal vapor incineration, Carbon Vapor Incinerator, Carbon adsorbers, and Condensers.

The cost of the additional fuel to control 0.13 TPY of VOC from the Handlay paint booth makes Flares, Thermal vapor incineration and Carbon Vapor Incineration economically infeasible. The remaining control technologies Carbon adsorbers, and Condensers, were still under consideration.

Weir has elected to use Carbon Adsorbers which have 95% control efficiency (which makes VOC emissions 0.07 TPY) that is the highest between the Carbon adsorbers, and Condensers. The use of the carbon adsorbers/carbon filters reduces the VOC emissions from 0.13 TPY to 0.07 TPY.

BACT for the control of VOC emissions is the use of carbon adsorption/charcoal filters in the Handlay paint booth and the tracking of VOC emissions.

Only one of the three coatings in the Cerasmooth process is mixed and applied in the Pappas Building and has minimal VOC emissions. The Pappas Building has been modified by installation of climate control HVAC system and the VOC emissions are being tracked in site wide VOC limit. [Last updated October 7, 2022]

#### **SECTION I: GENERAL PROVISIONS**

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. (New or Modified conditions are indicated as "New" in the Outline Label):

I.1	All definitions, terms, abbreviations, and references used in this AO conform to those used in the UAC R307 and 40 CFR. Unless noted otherwise, references cited in these AO conditions refer to those rules. [R307-101]
I.2	The limits set forth in this AO shall not be exceeded without prior approval. [R307-401]
I.3	Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be reviewed and approved. [R307-401-1]
I.4	All records referenced in this AO or in other applicable rules, which are required to be kept by the owner/operator, shall be made available to the Director or Director's representative upon request, and the records shall include the five-year period prior to the date of the request. Unless otherwise specified in this AO or in other applicable state and federal rules, records shall be kept for a minimum of five (5) years. [R307-401-8]

1.5	At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this AO, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Director which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded. [R307-401-4]
I.6	The owner/operator shall comply with UAC R307-107. General Requirements: Breakdowns. [R307-107]
I.7	The owner/operator shall comply with UAC R307-150 Series. Emission Inventories. [R307-150]

# **SECTION II: PERMITTED EQUIPMENT**

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. (New or Modified conditions are indicated as "New" in the Outline Label):

#### II.A THE APPROVED EQUIPMENT

II.A.1	Weir Minerals	
	Rubber Products Manu	facture
II.A.2	Two Paint Booths	
	Press Dept. Paint Booth Filter: Maximum Flow Rate: Stack: Handlay Dept. Paint Bo Booth Size: Filters: Charcoal Filters Quantity: Maximum Flow Rate: Stack:	8' x 17' 3,000 acfm 29' high x 24" dia.  both 25' W x 15' H x 52' L s (NEW)-5' W x 8' H 3

II.A.3	II.A.3 Two Cleaver-Brooks Boilers	
	North Boiler Rating: Fuel:	14.65 MM BTU/hr Natural Gas
	South Boiler Maximum rating: Fuel:	12.55 MMBTU/hr Natural Gas
II.A.4	Four Dust Collectors	
	Banbury Mixers/Carbo Manufacturer: Maximum flow rate:	n Black Baghouse Torit Donaldson 38,000 cfm
	Rotoblast, West Manufacturer: Maximum flow rate:	Pangborn 2,465 cfm
	Rotoblast, East Manufacturer: Maximum flow rate:	Pangborn 1,915 cfm
	Grit Blast Area Manufacturer: Maximum flow rate:	Torit Donaldson 22,000 cfm
II.A.5	One Polyurethane Curing Oven	
	Manufacturer: Maximum rating: Fuel:	Grieve Corporation 1.2 MMBTU/hr Natural gas
II.A.6	One Heat Cleaning Oven	
	Manufacturer: Maximum rating: Fuel:	Armature Coil Equipment, Inc. 1.85 MMBTU/hr Natural Gas
II.A.7	One parts cleaning vapor degreaser	
II.A.8	One Rubber Cement	Manufacturing Facility
	Three mixers	

II.A.9	Natural Gas- fired F	Emergency Generator
	Maximum rating:	8.0 kW

## **SECTION II: SPECIAL PROVISIONS**

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. (New or Modified conditions are indicated as "New" in the Outline Label):

#### II.B REQUIREMENTS AND LIMITATIONS

II.B.1	Sitewide Requirements
II.B.1.a	Visible emissions from any point or fugitive emission source associated with the operations listed in this AO shall not exceed the following values:  A. Steam Boilers-North and South-10% opacity B. Banbury Mixer/Carbon Black Baghouse-10% opacity C. Grit Blast Baghouse-10% opacity D. Heat Cleaning Oven-10% opacity E. Cure Oven-10% opacity F. Rotoblast Dust Collectors-East and West-10% opacity G. Press Paint Booth-10% opacity H. Natural gas-fired Emergency Generator-10% opacity I. All other points-20% opacity. [R307-401-8]
II.B.1.a.1	Opacity observations of emissions from stationary sources shall be conducted in accordance with 40 CFR 60, Appendix A, Method 9.  A. The readings shall be accurate to within plus or minus 25°F.  B. Certified thermocouples shall be used, or the instrument shall be calibrated against a primary standard at least once every 120 days. The primary standard shall be established by the company and shall be submitted to the Director for approval.  C. The operating temperature  [R307-401-8]
II.B.1.b	The plant-wide emissions from the paint booths, degreasers, rubber cement manufacturing facility and associated operations shall not exceed:  59.53 tons of VOC emissions per rolling 12-month period (minus combustion emissions).  [R307-401-8]

II.B.1.b.1	The VOC emissions shall be determined by maintaining a records of VOC emitting materials used each month. The record shall include the following data for each material used:	
	<ul> <li>A. Name of the VOC emitting material, such as: paint, adhesive, solvent, thinner, reducers, chemical compounds, toxics, isocyanates, etc.</li> <li>B. Density of each material used (pounds per gallon)</li> <li>C. Percent by weight of all VOC in each material used</li> <li>D. Gallons of each VOC emitting material used</li> <li>E. The amount of VOC emitted monthly by each material used shall be calculated by the following procedure:</li> </ul>	
	VOC = % VOC by Weight x [Density ( lb )] x Gal Consumed x 1 ton (100) (gal) 2000 lb	
	F. The amount of VOC emitted monthly from all materials used.	
	G. The amount of VOCs reclaimed for the month shall be similarly quantified and subtracted from the quantities calculated above to provide the monthly total VOC emissions. [R307-401-8]	
II.B.1.c	The Heat Cleaning Oven Afterburner shall be preheated to a minimum of 1,600 degrees F prior to operating the heat cleaning oven and the operating temperature shall not be less than 1,600 degrees F for more than six (6) minutes during any continuous 60-minute period. [R307-401]	
II.B.1.c.1	The Heat Cleaning Oven Afterburner temperature shall be continuously monitored. The readings shall be accurate to within 25 degrees F. [R307-401]	
II.B.1.c.2	The operating temperature of the Heat Cleaning Oven Afterburner shall be continuously recorded. [R307-401-8]	
II.B.1.d	The material throughput of the Heat Cleaning Oven shall not exceed 154,000 pounds of combustible material per 12-month period. [R307-401]	
II.B.1.d.1	Compliance with the limitation shall be demonstrated by recording the weight of the material fed to the oven, the weight of the core material exiting the oven, and the difference of these weights (weight of the material combusted). [R307-401]	
II.B.1.d.2	Compliance with the limitation shall be demonstrated on a rolling 12-month total. The calculation shall be based on the first day of each month. The new 12-month total shall be calculated using the previous 12 months. [R307-401]	
II.B.1.e	Weir shall only use natural gas as a primary fuel in the two (2) boilers, curing oven, and the heat cleaning oven. [R307-401]	
II.B.2	Stack Testing Requirements	

II.B.2.a	Emissions to the atmosphere at all times from the indicated emission point(s) shall not exceed the following rates and concentrations:
	A. North Boiler Stack Pollutant lb/hr ppmdv NO <sub>x</sub> 2.18 125
	B. South Boiler Stack Pollutant lb/hr ppmdv NO <sub>x</sub> 1.87 124
	C. Banbury Baghouse Stack Pollutant lb/hr grains/dscf PM <sub>10</sub> 22.51 0.016. [R307-401-8]
II.B.2.a.1	Standard Conditions & Emission Limit Parameters  A. Temperature - 68 degrees Fahrenheit (293 K)  B. Pressure - 29.92 in Hg (101.3 kPa)  C. Concentration (ppmdv) - 7% oxygen, dry basis  D. Averaging Time - As specified in the applicable test method. [R307-401-8]
II.B.2.a.2	The owner/operator shall conduct subsequent emission tests within five years after the date of the most recent emission test. The Director may require the owner/operator to perform an emission test at any time. [R307-401-8]
II.B.2.a.3	$PM_{10}$ $Total\ PM_{10} = Filterable\ PM_{10} + Condensable\ PM_{10}$
	Filterable PM <sub>10</sub> 40 CFR 60, Appendix A, Method 5; 40 CFR 51, Appendix M, Method 201; Method 201A; or other EPA-approved testing method as acceptable to the Director. If other approved testing methods are used which cannot measure the PM <sub>10</sub> fraction of the filterable particulate emissions, all of the filterable particulate emissions shall be considered PM <sub>10</sub> .
	Condensable PM <sub>10</sub> 40 CFR 51, Appendix M, Method 202 or other EPA-approved testing method as acceptable to the Director. [R307-401]
II.B.2.a.4	NO <sub>x</sub> 40 CFR 60, Appendix A, Method 7; Method 7E; or other EPA-approved testing method as acceptable to the Director.
	[R307-401]
II.B.3	Paint Booths Requirements
II.B.3.a	The paint spray booths shall be equipped with paint arrestor particulate filters. All air exiting the booths shall pass through the filters before being vented to the atmosphere. [R307-401-8]
II.B.3.a.1	A visual observation shall be made monthly for proper installation of the particulate filters. [R307-401]

II.B.3.a.2	A log shall be kept on the monthly visual observations of the paint arrestor particulate filter. [R307-401]

#### PERMIT HISTORY

When issued, the approval order shall supersede (if a modification) or will be based on the following documents:

Replaces AN105550006-18 dated June 11, 2018 Is Derived From Notice of Intent dated January 25, 2019

#### REVIEWER COMMENTS

#### 1. <u>Comment regarding Emission Estimates:</u>

The VOC emissions from the new Cerasmooth process were calculated using the annual chemical usage from the Georgian facility and multiplied by a factor of 2 for production. The emissions estimates used a mass balance with material VOC content from the chemicals used. The majority of the VOCs in the precursor chemicals are reacted during the mixing and application of chemicals which results in minimal VOC emission emitted in the process. To be conservative, Weir estimated that 1% of the VOC are unreacted. The unreacted VOC emissions then pass through a 95% Control of VOC emissions charcoal filters. The uncontrolled emission of 257 lbs/yr (0.13 TPY) and a controlled 135 lb/yr (0.07 TPY) of VOC. [Last updated October 6, 2022]

#### 2. Comment regarding HAP Major source:

Weir's, Salt Lake Facility is classified as a HAP major source with the PTE emissions of 27.31 TPY of toluene and 54.98 TPY of combined HAPs. [Last updated October 4, 2022]

#### 3. <u>Comment regarding VOC Emissions Limit Increase:</u>

The 0.07 TPY of VOC from the new Cerasmooth process will be added to the existing sitewide total VOC emissions limit of 59.46. The new sitewide VOC emissions limit is 59.53 total and does not include VOC emissions from combustion of natural gas. [Last updated October 6, 2022]

#### 4. Comment regarding VOC and HAP Emissions Reduction:

The new Cerasmooth process involves the addition of Charcoal filters to the Handlay paint booth to control VOC emissions. The Handlay paint booth has other permitted operations occurring inside. The entire VOC emissions reductions from the installation of the charcoal filter from all Handlay paint booth operations were not taken into consideration in this modification. [Last updated October 4, 2022]

#### 5. <u>Comment regarding Applicable Regulations:</u>

Weir, Salt Lake Facility is a major source of HAPs, and a Title V source subject to NESHAP-Subpart A (General Provisions), NESHAP 40 CFR 63-Subpart MMMM (Surface Coating of Miscellaneous Metal Parts and Products), NESHAP 40 CFR 63-Subpart ZZZZ (Stationary Reciprocating Internal Combustion Engines), NESHAP 40 CFR 63, Subpart DDDDD (Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters).

The Weir, Salt Lake Facility is also subject to State Rules R307-335-5 Open Top Vapor Degreasers. [Last updated October 4, 2022]

#### 6. Comment regarding Title V Alignment:

This permit modification involves aligning AO requirements with the Title V permit requirements. This update keeps both permits consistent with the requirements. 40 CFR 63 Subpart T (National

Emission Standards for Halogenated Solvent Cleaning) was removed to be consistent with Title V. [Last updated October 27, 2022]

#### 7. <u>Comment regarding Cerasmooth Process:</u>

The Cerasmooth process is not specifically called out within the AO, but the equipment list has been updated to include charcoal filters to the equipment list for the Handlay paint booth and the increase in sitewide VOC emissions limit being tracked. [Last updated October 4, 2022]

#### 8. Comment regarding Sitewide VOC Limit Discrepancy:

The existing AO had a sitewide VOC limit of 60.22 TPY of VOCs but was unclear if the sitewide limit included VOC emissions from combustion sources. The existing AO has a total PTE VOC emission of 61.19 TPY of VOC emissions. The Title V permit has an aggerated VOC limit of 59.46 TPY of VOC emissions without specifically specifying the exclusion of combustion emissions. The new AO sitewide VOC emission used the aggerated VOC limit from the Title V permit and included the Cerasmooth emissions of 0.07 TPY of VOC. It was specified in the new AO limit that VOC combustion emissions are excluded from the new sitewide VOC emissions limit. [Last updated October 4, 2022]

#### 9. <u>Comment regarding Initial Compliance Inspection:</u>

The new Cerasmooth operation involves the installation of charcoal filters into an existing paint booth and updated HVAC system in the existing Pappas Building. There is no need to have an initial compliance inspection for this modification since no new equipment is being constructed. [Last updated October 4, 2022]

#### 10. <u>Comment regarding Removed Equipment:</u>

The source had requested to remove the Packer Department Paint Booth and the Packer Sandblast Dust Collector. The equipment and the associated requirements have been removed from the AO. [Last updated October 27, 2022]

#### **ACRONYMS**

The following lists commonly used acronyms and associated translations as they apply to this document:

40 CFR Title 40 of the Code of Federal Regulations

AO Approval Order

BACT Best Available Control Technology

CAA Clean Air Act

CAAA Clean Air Act Amendments

CDS Classification Data System (used by EPA to classify sources by size/type)

CEM Continuous emissions monitor

CEMS Continuous emissions monitoring system

CFR Code of Federal Regulations
CMS Continuous monitoring system

CO Carbon monoxide CO<sub>2</sub> Carbon Dioxide

CO<sub>2</sub>e Carbon Dioxide Equivalent - 40 CFR Part 98, Subpart A, Table A-1

COM Continuous opacity monitor DAQ/UDAQ Division of Air Quality

DAQE This is a document tracking code for internal UDAQ use

EPA Environmental Protection Agency

FDCP Fugitive dust control plan

GHG Greenhouse Gas(es) - 40 CFR 52.21 (b)(49)(i)

GWP Global Warming Potential - 40 CFR Part 86.1818-12(a)

HAP or HAPs Hazardous air pollutant(s)

ITA Intent to Approve LB/HR Pounds per hour LB/YR Pounds per year

MACT Maximum Achievable Control Technology

MMBTU Million British Thermal Units

NAA Nonattainment Area

NAAQS National Ambient Air Quality Standards

NESHAP National Emission Standards for Hazardous Air Pollutants

NOI Notice of Intent NO<sub>x</sub> Oxides of nitrogen

NSPS New Source Performance Standard

NSR New Source Review

 $PM_{10}$  Particulate matter less than 10 microns in size  $PM_{2.5}$  Particulate matter less than 2.5 microns in size

PSD Prevention of Significant Deterioration

PTE Potential to Emit R307 Rules Series 307

R307-401 Rules Series 307 - Section 401

SO<sub>2</sub> Sulfur dioxide

Title IV Title IV of the Clean Air Act
Title V Title V of the Clean Air Act

TPY Tons per year

UAC Utah Administrative Code VOC Volatile organic compounds Source: Weir

Site: Salt Lake Facility
Project #: N10555-0007

AN105550006

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	AN105550006-18	permit	new	TP'	Υ
		change	AO	boilers 0.7	725
	TPY	TPY	TPY	curing oven 0.0	007
PM10 Total	3.59	0.00	3.59	cleaning oven 0.0	024
PM10 point	3.59	0.00	3.59	Plantwide VOC 60	).22
PM10 fugtive	0.00	0.00	0.00	9.06	976
PM2.5 Total	3.59	0.00	3.59		
NOx	19.86	0.00	19.86		
CO	5.42	0.00	5.42		
SOx	49.53	0.00	49.53	HAP Summary Sheet	
VOC Total	61.19	0.07	61.26	Existing Change New	
VOC point	61.19	0.07	61.26	TPY TPY TPY	
VOC Fugtive	0.00	0.00	0.00	54.98 0 54.98	
HAPs	54.98	0.00	54.98		
GHGs	23832.00	0.00	23832.00		

	New limit	59.53	
	additional process	0.07	
II.B.2.a.H II.B.2.a.H II.B.2.a.H II.B.2.a	Aggregated VOC	59.46	II.B.a.1
	_	VOC TPY	
5-18		Title V	

Source: Weir

Site: Salt Lake Facility
Project #: N10555-0007

 Existing TPY
 Change TPY
 New TPY

 HAPs Totals
 54.97900
 0.00000
 54.97900

НАР	Existing TPY	Change TPY	New TPY	Existing Change lb/yr lb/yr
2,4-Toluene Diisocyanate	0.0095	0.00000	0.00950	19.00
Carbon Tetrachloride	0.7550	0.00000	0.75500	1510.00
Hydrochloric Acid	2.6000	0.00000	2.60000	5200.00
Hydrogen Cyanide	0.0300	0.00000	0.03000	60.00
Hydrogen Fluoride	0.0500	0.00000	0.05000	100.00
Lead	0.0015	0.00000	0.00150	3.00
Manganese	0.0010	0.00000	0.00100	2.00
Methyl Isobutyl Ketone	5.9160	0.00000	5.91600	11832.00
Methylene Chloride	1.0000	0.00000	1.00000	2000.00
Methylene Diphenyl Diisocyanate	3.8900	0.00000	3.89000	7780.00
Tetrachloroethylene	4.3060	0.00000	4.30600	8612.00
Toluene	27.3065	0.00000	27.30650	54613.00
Xylene	9.1135	0.00000	9.11350	18227.00
Total	54.97900	0.00000	54.97900	

HAP's Modeling	Existing	Increase	New			
	Source	Source	Source		Vert. Restr	icted (lb/hr)
HAP	lb/hr	lb/hr	lb/hr	<20m	20-50	50-100
2,2,4-Trimethylpentane						
Acetaldehyde				1.71155	2.29709	4.14376
Acrolein				0.00871	0.01169	0.02109
Benzene				0.02720	0.03510	0.06550
Cobalt				0.00100	0.00130	0.00250
Ethylbenzene				22.14000	28.66000	53.41000
Formaldehyde				0.01400	0.01880	0.03390
Hex. Chromium				0.00020	0.00020	0.00040
n-Hexane				8.98810	11.63166	21.67718
Methanol				14.20074	18.37742	34.24883
Naphthalene				2.67000	3.46000	6.45000
Nickel				0.00170	0.00220	0.00410
2,4-Toluene Diisocyanate	0.00217					
Carbon Tetrachloride	0.17237			0.53482	0.69212	1.28987
Hydrochloric Acid	0.59361					
Hydrogen Cyanide	0.00685			0.19745	0.26499	0.47803
Hydrogen Fluoride	0.01142			0.06220	0.08348	0.15059
Lead	0.00034					
Manganese	0.00023			0.01020	0.01320	0.02460
Methyl Isobutyl Ketone	1.35068			4.76417	6.16540	11.49006

Methylene Chloride	0.22831	8.85773	11.46294	21.36276
Methylene Diphenyl Diisocyanate	0.88813	0.00261	0.00338	0.00629
Tetrachloroethylene	0.98311	8.64601	11.18896	20.85215
Toluene	6.23436	3.84000	4.97000	9.27000
Xylene	2.08071	22.14000	28.66000	53.41000

New lb/yr	Existing lb/hr	Change lb/hr	hr/yr=	
	0.0022			
	0.1724			
	0.5936			
	0.0068			
	0.0114			
	0.0003			
	0.0002			
	1.3507			
	0.2283			
	0.8881			
	0.9831			
	6.2344			
	2.0807			

	Vert. Unrestricted (lb/hr)		Modeling	
>100	<50	50-100	>100	Required
8.10736	6.93630	10.08916	13.96268	
0.04127	0.03531	0.05136	0.07108	
0.14380	0.10540	0.12940	0.19650	
0.00540	0.00400	0.00450	0.00740	
116.80000	85.97000	97.26000	159.78000	
0.06630	0.05670	0.08250	0.11420	
0.00090	0.00070	0.00080	0.00120	
47.40781	34.89497	39.47714	64.85530	
74.90192	55.13227	62.37186	102.46806	
14.10000	10.38000	11.74000	19.29000	
0.00900	0.00660	0.00810	0.01230	
2.83141	2.07637	2.54827	3.86960	
0.93527	0.80018	1.16389	1.61074	
0.29463	0.25207	0.36665	0.50741	
0.05380	0.03960	0.04880	0.07360	
25.12867	18.49620	22.79329	34.37677	

46.72018	34.38883	42.37816	63.91460
0.01377	0.01013	0.01249	0.01883
45.60348	33.56687	41.36524	62.38691
20.27000	14.92000	16.88000	27.73000
116.80000	85.97000	97.26000	159.78000

TV	TV	Old AO	Old AO	New AO
#	Limit	#	Limit	#
II.B.1.a	VOC emissions limit	II.B.2.a	VOC emissions limit	II.B.1.b
II.B.1.b	Maintenance			
II.B.1.c	Refrigerants			
II.B.1.d	Moto vehicle AC			
II.B.1.e	NESHAP MMMM			
II.B.2.a	Baghouse PM10 limit	II.B.1.e		II.B.2.a
II.B.2.b	Baghouse opacity	II.B.1.d		II.B.1.a
II.B.3.a	Packer Duct Collector Opacity			II.B.1.a
II.B.4.a	Packer Paint Booth filters			II.B.1.c
II.B.5.a	Heat Cleaning Oven temp.	II.B.1.a		II.B.1.d
II.B.5.b	H. C. Oven Mat. throughput	II.B.1.c		II.B.1.e
II.B.5.c	H. C. Oven Opacity	II.B.1.d		II.B.1.a
II.B.6.a	Degreasers R307-335-5	II.B.1.g		
II.B.7.a	Boiler North Nox Limit	II.B.1.e		II.B.2.a
II.B.7.b	Boiler North Opacity	II.B.1.d		II.B.1.a
II.B.7.c	NESHAP DDDDD			
II.B.8.a	Boiler South Nox limit	II.B.1.e		II.B.2.a
II.B.8.b	Boiler South Opacity	II.B.1.d		II.B.1.a
II.B.8.c	NESHAP DDDDD			
II.B.9.a	Rotoblast Dust Collector Opac.			II.B.1.a
II.B.10.a	Dust Collector W. Opacity			II.B.1.a
II.B.11.a	Press PB filters			II.B.3.a
II.B.12.a	Cure Oven Opacity	II.B.1.d		II.B.1.a
II.B.13.a	Paint Booth filters	II.B.1.i		II.B.3.a
II.B.14.a	Eme. Gen. Opacity			II.B.1.a
II.B.14.b	NESHAP ZZZZ			
II.B.15.a	Baghouuse Opacity	II.B.1.d		II.B.1.a
		II.B.3.a	N.G. primary fuel	II.B.1.f



#### Ana Williams <anawilliams@utah.gov>

# **Weir Minerals Air Quality Application Update**

1 message

Ana Williams <anawilliams@utah.gov> To: fderosso@rmec.net

Thu, Jun 6, 2019 at 4:11 PM

Hi Frank,

Tad Anderson forwarded your email to me for a status update on Weir Minerals. I wanted to let you know that I am the project engineer for the AO modification. Everything in the NOI looks good, but I did want clarification on one item:

• With the addition of the charcoal filters to the Handlay Paint Booth, all emissions of VOCs and HAPs will be controlled, not just those from the new Cerasmooth process, as addressed in the NOI. However, I wanted more clarification on if Weir was intending on using this change in control to increase production through the paint booth? Or if they just didn't want to take a reduction in their VOC limit to take the new control into consideration?

Please let me know if you have any questions.

Thank you,

#### Ana Williams | Environmental Engineer | NSR Major Source

Phone: 801.536.4153



Website | Blog | Twitter | Facebook | LinkedIn



# Utah Division of Air Quality New Source Review Section

# Form 1 Notice of Intent (NOI)

Date 1/25/2019 UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

JAN 2 5 2019

## **DIVISION OF AIR QUALITY**

Application for:

☐Initial Approval Order

APPROVAL ORDER MUST BE ISSUED BEFORE ANY CONSTRUCTION OR INSTALLATION CAN BEGIN. This is not a stand alone document; please refer to UAC R307-401and the publish requirements of the specified information below. Please print or type all informat requested must be accurate and completed before DAQ can determine that ar review can be initiated. If you have any questions, contact the Division of Air speak with a New Source Review Engineer. Written inquiries may be addressed Review Section, P.O. Box 144820, Salt Lake City, Utah 84114-4820.

General Owner and	Facility Informatio
1. Filing Fee Paid*	2. Application Fee Paid*
3. Company name and address: Weir Minerals, Inc 3459 South 700 West Salt Lake City, UT	4. Company** contact for environmental matters:  Al Haley
Phone No.: 801–574–2100  Fax No.: 801–891–5020  5. Facility name and address (if different from above):	Phone no.: 801-574-2100 Email: al.haley@mail.weir ** Company contact only; consultant or independent contractor contact information can be provided in a cover letter  6. Owners name and address: Weir Minerals - Madison 2701 S. Stoughton Rd. Madison, WI 53716
Phone no.: Fax no.:	,
	Phone no.: 608-221-2261 Fax no.: 608-221-5810
<ol> <li>Property Universal Transverse Mercator coordinates (UTM), including System and Datum: Easting: 423, 150</li> </ol>	8. County where the facility is located in:  Salt Lake
Northing: 4,504,420 System: UTM Zone 12	9. Standard Industrial Classification Code: 3069
Datum: NAD27	

SL Co Ozone Maint Area  SL Co PM2.5 NAA SL Co PM10 NAA  11. If request for modification, AO# to be modified: DAQE#  Date:	
SL Co PM2.5 NAA SL Co PM10 NAA  11. If request for modification, AO# to be modified: DAQE# Date:  12. Identify any current Approval Order(s) for the facility not being modified with this request:  AO# Date AO# Date AO# Date AO# Date AO# Date Image of permit operating without permit Permanent site for Portable Approval Order Change of permit condition Permanent site for Portable Approval Order Change of permit condition Estimated start date:1/1/19 Estimated completion date:2/30/19 15. Does this application contain justifiable confidential data? Yes No  16. Current Title V (Operating Permit) Identification: 3500210005 Date1/9/19 Requesting an enhanced Title V permit with this AO modification 17. Brief (50 words or less) description of project to post on DAQ web for public awareness Weir is adding a ceramic coating process to their Salt Lake City rubber manufacturing fracility. The process involves mixing several chemicals with a silicon carbide grit in a climate controlled paint booth to form an durable epoxy vinyl ester coating. This coating is extremely resistant to heat, chemicals, and oxidation. The coating is then applied by spray gun or by hand to internal pump parts used in mining and power operations to impart chemical and heat resistance to the components.  Process Information  18. Appendix A: Detailed description of project including process flow diagram (See Forms 2-23) Process Information  18. Appendix A: Detailed description of project including process flow diagram (See Forms 2-23) Process Information  18. Appendix B: Site plan of facility with all emission points and elevations, building dimensions, stack parameters	10. Designation of facility in an attainment, maintenance, or nonattainment area(s):
St. Co PM10 NAA  11. If request for modification, AO# to be modified: DAQE#	SL Co Ozone Maint Area
12. Identify any current Approval Order(s) for the facility not being modified with this request:  AO# Date  AO# Date  AO# Date  AO# Date  AO# Date  AO# Date  13. Application for:  New construction Existing equipment operating without permit Permanent site for Portable Approval Order  Change of permit condition  14. Construction or modification estimated start date:1/1/19 Estimated completion date:2/30/19  15. Does this application contain justifiable confidential data? Yes No  16. Current Title V (Operating Permit) Identification: 3500210005 Date1/9/19  Requesting an enhanced Title V permit with this AO modification  17. Brief (50 words or less) description of project to post on DAQ web for public awareness  Weir is adding a ceramic coating process to their Salt Lake City rubber manufacturing facility. The process involves mixing several chemicals with a silicon carbide grit in a climate controlled paint booth to form an durable epoxy vinyl ester coating. This coating is extremely resistant to heat, chemicals, and oxidation. The coating is then applied by spray gun or by hand to internal pump parts used in mining and power operations to impart chemical and heat resistance to the components.  Process Information  18. Appendix A: Detailed description of project including process (if applicable) Stack parameters  Production rates (including daily/seasonal variances)  R307-401-5(2)(s)  19. Appendix B: Site plan of facility with all emission points and elevations, building dimensions, stack parameters	
AO# Date  13. Application for:    New construction	11. If request for modification, AO# to be modified: DAQE# Date:
Modification   Permanent site for Portable Approval Order   Change of permit condition   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Papproval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Permanent site for Portable Approval Order   Change of location   Papproval Order   Pappr	AO# Date AO# Date
15. Does this application contain justifiable confidential data?     Syes	☑New construction ☐ Modification ☐ Modification ☐ New construction ☐ Permanent site for Portable Approval Order ☐ New Construction
16. Current Title V (Operating Permit) Identification: 3500210005    Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with this AO modification   Requesting an enhanced Title V permit with a lake City and Lake City	14. Construction or modification estimated start date:1/1/19 Estimated completion date:2/30/19 R307-401-5(2)(h)
Requesting an enhanced Title V permit with this AO modification  17. Brief (50 words or less) description of project to post on DAQ web for public awareness   Weir is adding a ceramic coating process to their Salt Lake City rubber manufacturing facility. The process involves mixing several chemicals with a silicon carbide grit in a climate controlled paint booth to form an durable epoxy vinyl ester coating. This coating is extremely resistant to heat, chemicals, and oxidation. The coating is then applied by spray gun or by hand to internal pump parts used in mining and power operations to impart chemical and heat resistance to the components.    Process Information	15. Does this application contain justifiable confidential data? ☐ No
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☐ Fuels and their use ☐ Raw materials used ☐ Description of changes to process ☐ Gescription of changes to process (if applicable) ☐ Stack parameters ☐ Operation schedules ☐ Production rates (including daily/seasonal variances)  19. Appendix B: Site plan of facility with all emission points and elevations, building dimensions, stack parameters	Process Information
	□ Fuels and their use □ Equipment used in process □ Description of process □ Raw materials used □ Description of changes to process (if applicable) □ Stack parameters □ Operation schedules □ Production rates (including daily/seasonal variances)

	Emissions Information
	20. Appendix C: Emission Calculations that must include:  ☐ Emissions per new/modified unit for each of the following: PM₁0, PM₂5, NO₂, SO₂, CO, VOC, and HAPs ☐ Designation of fugitive and non fugitive emissions ☐ Major GHG Sources: Emissions per new/modified unit for GHGs (in CO₂e short tons per year) ☐ References/assumptions for each Emission Factor used in calculating Criteria pollutant, HAP, and GHG emissions ☐ HAP emissions (in pounds per hour and tons per year) broken out by specific pollutant and summed as a total
	21. Appendix D: DAQ Form 1a or equivalent (comparison of existing emissions to proposed emission and resulting new total emissions)
	22. Appendix E: Source Size determination (Minor, Synthetic Minor, Major, or PSD)  [] If an Existing Major Source: Determination of Minor, Major or PSD modification
	23. Appendix F: Offset requirements (nonattainment/maintenance areas)  []Acquired required offsets  R307-401-420 & R307-401-421
	Air Pollution Control Equipment Information
	24. Appendix G: Best Available Control Technology (BACT) analysis for the proposed source or modification
	25. Appendix H: Detailed information on all new/modified equipment controls. It is strongly recommended using DAQ forms as they outline required information, but something equivalent to the DAQ forms is acceptable.
	R307-401-5(2)(c) 26. Appendix I: Discussion of Federal/State requirement applicability (NAAQS, SIP, NSPS, NESHAP, etc)
	Modeling Information
2	27. Appendix J: Emissions Impact Analysis (if applicable) R307-410-4
	Electronic NOI
2	8. A complete and accurate electronic NOI submitted
	nereby certify that the information and data submitted in and with this application is completely true, accurate and omplete, based on reasonable inquiry made by me and to the best of my knowledge and belief.  Granture:  Title:Director of Operations
	Name (print)  801-574-2184 Telephone Number:  1/31/19 Date:

<sup>\*</sup>with the exception of Federal Agencies who will be billed at completion of the project

# Appendix A Project and Process Information

#### A. PROJECT NARRATIVE

Weir Minerals, Inc. is located at 3459 South 700 West in Salt Lake City, Utah. Weir manufactures rubber products used in the mining, oil and gas production industries. These products include custom molded products (gaskets and seals), lined rubber products, hand lay and urethane molded products. Weir is adding a ceramic coating (Cerasmooth) process to their Salt Lake facility. The Cerasmooth material is a chemical, abrasion and heat resistant coating for wearable internal pump parts used in the mining and power generation industries. This process was previously performed at a Weir facility in Georgia. However, the Georgia facility is closing and the process is being moved to Salt Lake.

#### B. PROCESS NARRATIVE

## General Process Overview

The Cerasmooth production process involves mixing several chemicals with a silicon carbide grit to form a durable and chemical-resistant epoxy vinyl ester coating. Three different Cerasmooth coating products will be produced at Weir: P400, P460, and P470. The P400 product is applied to molds and forms a molded surface coating. The P460 is a hand applied surface material (typically by spray gun) and the P470 product is a primer or pre-coat that is applied to the substrates before the P400 or P460 products.

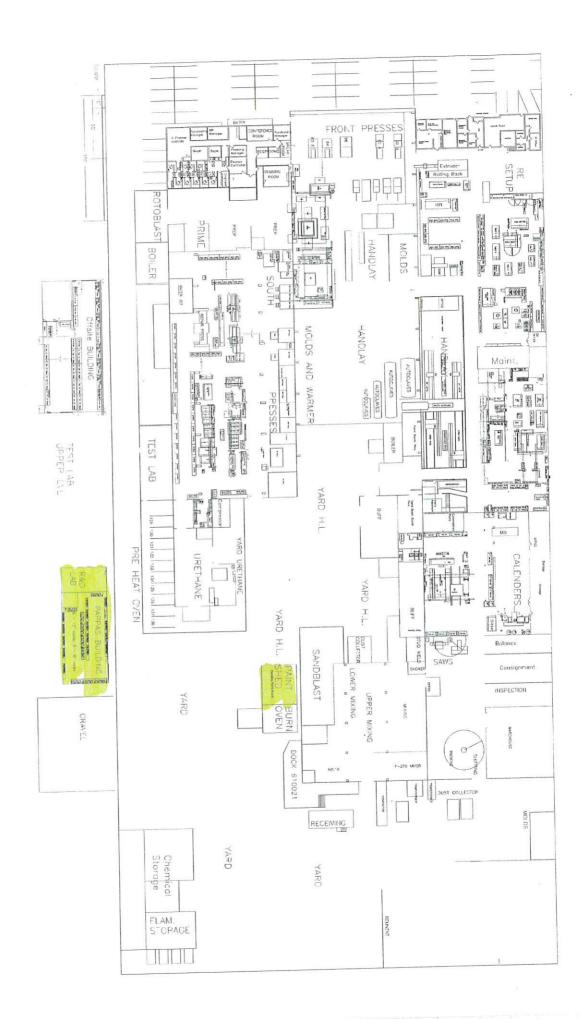
Each of the coatings is produced by adding various chemicals in specific quantities and in a specific sequence. All three of the coatings are mixed and prepared in the relatively same fashion as per the specific formulation. The coating process begins by preparing the substrate for the application of the coating. The substrate is prepared by cleaning, acclimation and the application of the P470 pre-coat. Once the substrate is prepared, a mold is added to the substrate for the application of the P400 product. The P460 product is applied by hand, usually with a spray gun. Once the coatings are applied, the substrate is further cured with heat for a specified amount of time. The mixing /application of the P400 coating will be performed in a climate controlled environment in the Pappas Building at the Weir site. The building is being modified to support the new process by the installation of a climate control HVAC system. The final curing of the P400 molded product will take place in the Handlay Paint Booth on site. The P460 and P470 coatings will also be mixed, applied and cured in the Handlay Paint Booth. This paint booth will also be modified by the addition of charcoal filters to the exhaust duct. The location of the Pappas Building and Handlay Paint Booth are shown by the highlighted areas on the site plan in Appendix B. The equipment that will be used to modify the Pappas Building and the Handlay Paint Booth are contained in Appendix E.

The following table was provided by the Weir Georgia facility and lists the chemicals used in the production of the P400, P460 and P470 ceramic coatings. The table also contains the annual usage of the various chemicals at the Georgia plant. Available Safety Data Sheets (SDSs) for the chemicals are attached in Appendix F. The exact mixing sequence is proprietary information and therefore this information is not provided in this NOI. The annual usage levels listed in the table were doubled to calculate potential emissions from the mixing and application of the various coatings when the process is moved to the Weir Salt Lake City location. These emission estimates are described in the Emissions Information section in Appendix C.

		Ordering Notes	Monthly Usage (lbs.)	Annual Usage (lbs.)	
Description	U.O.M.	<b>机设施100分型分别是对外国际外国际的企业的基本的。</b>	12	144	
BYK-A 555	LB	40#/PAIL	33.75	405	
BYK-A 560	LB	40#/PAIL	10	120	
Cab-O-Sil	LB	10 lb bag	67.92	815.04	
EPON - 828	LB	45#/Pail (\$464.79)	2,260	27120	
Derakane Resin	LB	452 lbs per drum	56.25	675	
Colbalt 6%	LB	35 lb pail		124.92	
2,4 Pent	LB	35 lb pail	10.41	384	
MEKP-925H	LB	8 lbs per Gallon	32	402	
Norox CHP	LB	8 lbs per Gallon	33.5	24	
CHL GL MOLD CLEANER EZ	A SECURE	1 Gallon	2	24	
CHL GL 15 SEALER EZ		1 Gallon	2		
		1 Gallon	4	48	
CHL 5075 REL AGENT	N/A	55 Gal. Drum / 358 lb	2	24	
55 GL DRUM ACETONE		1 Gal at 8 lbs / \$70.24	6.75	81	
PUR GL DIMETHYLANILINE,N,N-	LB	40#/PAIL	1	12	
BYKW966		35 lb pail	135.6	1627.2	
Hypro 1300x8	LB		<b>建筑的地位的</b>	04200	
4% A174 Coated Grain	LB	3 PARTS - 1 PART 36 GRIT, 1 PART 54 GRITAND 1 PART 100 GRIT SIC A-174	7,850	94200	
Chesterton Arc 897	EA	ARC897- 5 LTR.	2	24	
1/2" Fiberglass		50# Box @ \$95.00	20	240	

. 2

# Appendix B Site Plan



# Appendix C Emissions Information

## **Emission Estimates**

The following table provides an estimate of the uncontrolled and controlled emissions from the ceramic coating process. Annual chemical usage was obtained from the Georgia facility personnel and multiplied by a factor of 2 to include possible increased production at the Salt Lake facility. The percent of VOC in each of the chemical components was obtained from the Safety Data Sheet (SDS) for that chemical. Based on information provided by the Weir chemist who developed the Cerasmooth process, virtually all of the VOCs in the precursor chemicals are reacted during the mixing and application of the chemicals and virtually no VOC emissions will result from the process. However, to be conservative, the emission estimates in the table assume that 1% of the VOCs in each the precursor chemicals are unreacted and emitted to the atmosphere. Approximately 50% of the chemical mixing and application will take place in the Pappas building at the Weir site which will not have any emission controls. The remainder of the chemical mixing and application and all of the ceramic coating curing processes will take place in the modified Handlay Paint Booth. Since this paint booth will be equipped with charcoal filters, it has an estimated 95% efficiency rating for capture of the VOC emissions. Therefore, the emission estimates in the table assume that half of the overall VOC emissions from the Cerasmooth processes performed at Weir will be released to the outside air from the P400 mixing and application in the Pappas Building with no controls. 95% of the remaining emissions will be removed by the charcoal filters in the Handlay Paint Booth, resulting in an overall VOC emission estimate of 135 lbs./year from all of the Cerasmooth processes.

# **Annual Emissions from the Ceramic Process**

Chemical Component	Annual Usage (lbs)	% VOC	Uncontrolled Emissions (lbs)	Controlled Emissions (lbs)
Cifetinical Component				
BYK-A-555	288	63	1.8144	-
BYK-A-560	810	84	6.804	_
EPON-828	1630	0	0	5
Derakane 8084 Resin	54,240	40	216.96	-
Cobalt 6%	1350	65	8.775	-
2,4 Pentadione Peroxide	250	100	2.5	
MEKP-925H	768	100	7.68	-
Norox CHP	804	100	8.04	-
CHL GL Mold Cleaner EZ	48	100	0.48	-
CHL GL 15 Sealer EZ	48	95	0.456	-
CHL 5075 REL Agent	96	100	0.96	-
Acetone	48	NA	NA	-
PUR GL Dimethylanaline	162	98	1.5876	_
BYKW966	24	60	0.144	-
Hypro 1300X8	3256	1.5	0.4884	-
Chesterton Arc 897	48	24	0.1152	-
	Totals		257	135

# Appendix D Form 1a



# Utah Division of Air Quality New Source Review Section

# Form 1a **Emissions Information**

Company	Weir Minerals	
Site/Sour	ce	
Date Jai	nuary 31, 2019	

Please print neatly or type all information requested. All information must be truthful, accurate and complete before we can process your application. If you have any questions, call (801) 536-4000 and ask to speak with a New Source Review engineer. Written inquiries may be addressed to: Division of Air Quality, NSR Section, P.O. Box 144820, Salt Lake City, Utah 84114-4820.

			osed Emissions		Proposed	<b>Emissions</b>
Pollutants	Permitted Emissions (tons/year)		Emissions Increases (tons/year)		Proposed Emissions (tons/year)	
Criteria Pollutants						17
PM <sub>10</sub>	3.	59	0		0.17	
PM <sub>2.5</sub>	3.	.59	0		0.17	
NO <sub>x</sub>	19	0.86	0		0.29	
	0	.63	0			).01
SO <sub>2</sub>	1000	.42	0		0.18	
CO			0.07		61.26	
VOC	61	1.19			Mass basis	CO <sub>2</sub> e
Greenhouse Gases	Mass basis	<u>CO<sub>2</sub>e</u>	Mass basis	<u>CO₂e</u>	Wass Dasis	
Carbon dioxide (CO <sub>2</sub> )		-		-		
Methane (CH <sub>4</sub> )						
Nitrous oxide (N <sub>2</sub> O)						
Hydrofluorocarbons (HFCs)						
Perfluorocarbons (PFCs)						
Sulfur hexafluoride (SF <sub>6</sub> )						
Total Hazardous Air Pollutants						
Hazardous Air Pollutants (list individually) (attach additional sheet if needed)	ollutants See attached emission calculation sheets for annual estimated HAP emissions.					
Total HAPs	54.98		0.05 (mostly styrene)			55.03
Tom III o						
			_			

Use additional sheets for other pollutants if needed.

# Utah Division of Air Quality Approval Order Application Form 1d Emissions Information

Table 2. Controlled and Uncontrolled Emissions

Table 2	2. Controlled and Uncontrolled Emiss	ions
Pollutant	Controlled Emissions (tons/year)	Uncontrolled Emissions (tons/year)
Criteria Pollutants		
PM <sub>10</sub>		3.59
PM <sub>2.5</sub>		3.59
$NO_x$		19.86
SO <sub>2</sub>		0.63
СО		5.42
VOC	0.003	61.257
Greenhouse Gases (GHGs)	Mass basis CO2e	Mass basis CO2e
Carbon dioxide (CO <sub>2</sub> )	-	
Methane (CH <sub>4</sub> )		
Nitrous oxide (N <sub>2</sub> O)		
Hydrofluorocarbons (HFCs)		
Perfluorocarbons (PFCs)		
Sulfur hexafluoride (SF <sub>6</sub> )		
Total GHG Emissions		
Total Hazardous		
Air Pollutants	9	
Hazardous Air Pollutants (list individually) (attach additional sheet if needed)	See attached emission calculation sheets for emissions are uncontrolled.	annual estimated HAP emissions. All HAP
Total HAPs	0.05 (mostly styrene)	54.98
,		

Use additional sheets for other pollutants if needed

# Utah Division of Air Quality Approval Order Application Form 1d **Emissions Information**

Table 3. Hourly HAP Emissions

Table 3. Houri	Maximum emission rate (lbs/hour)
Table 3. Hourl Hazardous Air Pollutants (list individually)	Maximum emission rate (ibs/noti)
- No. 40. Society (sp. 40.8 Society and comments)	
	2
Hourly emission rates are based on annual estimated emission	ons divided by 2080 working hours/year
itomi, omiocomo and and an analysis and an ana	

### Utah Division of Air Quality Approval Order Application Form 1d Emissions Information

#### Instructions

#### Table 1.

Fill out the table. Attach additional sheets if necessary. Provide potential emissions from your entire facility in units of tons per year, expressed to at least two decimal places. Emissions of individual Hazardous Air Pollutants may require more precision; contact a New Source Review Engineer. If you do not now have an Approval Order and you are applying for your first Approval Order, the emissions in "Existing Emissions" column will be zero and the "Emissions Increases" will be equal to the "Proposed "Emissions. If you do have an Approval Order, the emissions in the "Existing Emissions" column will be the emissions listed in your Approval Order. All emissions should be those emissions occurring after any air pollution control devices. Provide emissions that would result if you operated 24 hours per day, 8760 hours per year, unless you are also proposing operating hour limits. If you are proposing operating hour limits, state what these limits are and provide emissions based on these limits. Provide emissions that would result from your potential production or potential raw material consumption, unless you are also proposing production or raw material consumption limits. If you are proposing production or raw material consumption limits, state what these limits are and provide emissions based on these limits. Attach additional sheets with detailed calculations or stack testing information showing how all of the above emission numbers were determined.

There are six greenhouse gases currently regulated. USEPA has established a Global Warming Potential (GWP) for each of the six compounds:  $CO_2$  - 1,  $CH_4$  - 21,  $N_2O$  - 310, HFCs - 12 - 11,700, PFCs - 6,500 - 9,200, and  $SF_6$  - 23,900. The Carbon Dioxide Equivalent ( $CO_2e$ ) is determined by multiplying the mass based emission rate in tpy by the GWP. The total  $CO_2e$  for all six compounds becomes the  $CO_2e$  at the source.

#### Table 2.

Fill out the table. Attach additional sheets if necessary. Provide potential emissions from your entire facility in units of tons per year, expressed to at least two decimal places. Emissions of individual Hazardous Air Pollutants may require more precision; contact a New Source Review Engineer. The Hazardous Air Pollutants should be the same Hazardous Air Pollutants listed in Table 1. The emissions in the "Controlled Emissions" column should be those emissions occurring after any air pollution control devices. The emissions in the "Uncontrolled Emissions" should be those emissions occurring before any air pollution control devices (in other words, emissions that would result if you did not have any air pollution control devices at all. Provide emissions that would result if you operated 24 hours per day, 8760 hours per year, unless you are also proposing operating hour limits. If you are proposing operating hour limits, state what these limits are and provide emissions based on these limits. Provide emissions that would result from your potential production or potential raw material consumption, unless you are also proposing production or raw material consumption limits. If you are proposing production or raw material consumption limits, state what these limits are and provide emissions based on these limits. Attach additional sheets with detailed calculations or stack testing information showing how all of the above emission numbers were determined.

For GHG emission calculations, refer to the instructions to Table 1.

#### Table 3.

List all Hazardous Air Pollutants emitted by your facility. They should be the same Hazardous Air Pollutants listed in tables 1 and 2. For each HAP provide its maximum emission rate in units of pounds per hour. The emission rates should be those rates occurring after any air pollution control devices. Attach additional sheets with detailed calculations or stack testing information showing how all of the above emission numbers were determined.

Depending on other conditions unique to each facility, additional emissions information may be required.

f:\SECTION\Forms\Form01a Emission Information.doc Revised 5/16/11

# Appendix E Emission Control Information

# **Emission Controls**

The chemical mixing and application of the P400 coating to molded parts will take place in the Pappas Building at the Weir facility. The location of the Pappas Building is shown on the site plan in Appendix B. The building will be modified by the addition of a Carrier 62D Outdoor Air Unit to provide a climate controlled environment in the building. The P460 and P470 coatings will be mixed and applied in the existing Handlay paint booth at Weir that will also be modified to accommodate the process. The booth will be equipped with Poly-Sorb activated charcoal pleated filters in addition to the existing particulate filters to capture any VOC emissions from the mixing, application and curing of the coating chemicals. Curing of the P400 molded coatings will also be performed in the Handlay Paint Booth. Specifications for the Carrier unit and the Poly-Sorb charcoal filters are attached in Appendix G.

The addition of the Poly-Sorb activated charcoal filters to the Handlay Paint Booth will also serve to reduce VOC and HAP emissions from other painting processes that are performed in the booth since previous painting operations in the booth did not have these VOC emission controls. Therefore, overall VOC emissions from the Weir facility will likely decrease after the Handlay Booth is modified for the Cerasmooth operation since the routine VOC emissions from other painting operations in the Handlay Paint Booth will now be controlled. The exact reduction in VOC/HAP emissions resulting from the modification of the Handlay Paint Booth was not assessed and the emission estimates in Table 1a (Appendix D) do not reflect the reduction in VOC/HAP emissions from other painting operations in the booth that are now being controlled.

# Appendix F Safety Data Sheets for Process Chemicals

# borchers

# SAFETY DATA SHEET

### 1. Identification

Product identifier

6% Cobalt Hex-Cem®

Other means of identification

None.

Recommended use

Drier

Recommended restrictions

None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company Name

OMG Americas, Inc.

Address

240 Two Mile Run Road

Venango County

Franklin, PA 16323 USA

Telephone

814-432-2125 (Customer Service, R&D and Sales: 440-899-2950)

Website

www.omgi.com

E-mail

SDS@borchers.com

Emergency phone number

CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887)

# 2. Hazard(s) identification

Physical hazards

Flammable liquids

Category 4

Health hazards

Serious eye damage/eye irritation

Category 2

Sensitization, skin

Category 1

Reproductive toxicity (fertility)

Category 2

Hazardous to the aquatic environment, acute

Category 1

Not classified.

Hazardous to the aquatic environment, long-term hazard

Category 3

OSHA defined hazards

**Environmental hazards** 

Label elements



Signal word

Warning

Hazard statement

Combustible liquid. May cause an allergic skin reaction. Causes serious eye irritation. Suspected of damaging fertility. Very 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 flames and hot surfaces-No smoking. Avoid breathing mist or vapor. Wash thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response

If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed or concerned: Get medical advice/attention. If skin irritation or rash occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Wash contaminated clothing before reuse. In case of fire: Use appropriate media to extinguish. Collect spillage.

Storage

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

None known.

classified (HNOC)

Supplemental information

67% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 67% 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	
Naphtha (Petroleum), Hydrotreate	d	CAS number	%
Heavy	ea,	64742-48-9	60-70
Cobalt bis(2-ethylhexanoate)			
- )		136-52-7	30-40

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

### 4. First-aid measures

Inhalation

Skin contact

Eye contact

Ingestion Most important

symptoms/effects, acute and delayed

Indication of immediate medical attention and special treatment needed

General information

Move to fresh air. Call a physician if symptoms develop or persist.

Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions.

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 if irritation develops and persists.

Rinse mouth. Get medical attention if symptoms occur.

Dizziness. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause an allergic skin reaction. Dermatitis. Rash.

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

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 Unsuitable extinguishing media

Specific hazards arising from

the chemical Special protective equipment

and precautions for firefighters Fire fighting

equipment/instructions Specific methods

General fire hazards

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

Do not use water jet as an extinguisher, as this will spread the fire.

The product is combustible, and heating may generate vapors which may form explosive vapor/air mixtures. During fire, gases hazardous to health may be formed.

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.

Use standard firefighting procedures and consider the hazards of other involved materials.

Combustible liquid.

# 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. Avoid breathing mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. 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

Use water spray to reduce vapors or divert vapor cloud drift. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways.

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. 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.

# **Environmental precautions**

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. 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. Keep away from open flames, hot surfaces and sources of ignition. When using do not smoke. Avoid breathing mist or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Provide adequate ventilation. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices. Cobalt carboxylates may cause the ignition of rags or paper goods or other oxidizable

### Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat, sparks and open flame. 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

# 8. Exposure controls/personal protection

# Occupational exposure limits

U.S OSHA Components	Туре	Value	
Cobalt bis(2-ethylhexanoate) (CAS 136-52-7)	PEL	0.1 mg/m3	
Comments: For metal (	dust and fume, as Co Contaminants (29 CFR 1910.1000) Type	Value	
Naphtha (Petroleum), Hydrotreated, Heavy (CAS	PEL	400 mg/m3	
64742-48-9)		100 ppm	

# **Biological limit values**

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

#### 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. Provide evewash station.

# Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles).

Skin protection

Other

Thermal hazards

Hand protection

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

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

Chemical respirator with organic vapor cartridge and full facepiece.

Respiratory protection

Wear appropriate thermal protective clothing, when necessary.

Material name: 6% Cobalt Hex-Cem®

SDS US

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. Contaminated work clothing should not be allowed out of the workplace.

# 9. Physical and chemical properties

Appearance

Physical state

Liquid.

Form Color

Liquid. Purple

Odor

Not available

Odor threshold

Not available.

рН

Not available.

Melting point/freezing point

Not available.

Initial boiling point and boiling

320 - 464 °F (160 - 240 °C) Reference Substance: Solvent

range

> 141.8 °F (> 61.0 °C) Pensky-Martens Closed Cup

Flash point **Evaporation rate** 

< 1(Ether = 1)

Flammability (solid, gas)

Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower

0.6 % Reference Substance: Solvent

(%)

Flammability limit - upper

7 % Reference Substance: Solvent

(%)

Explosive limit - lower (%)

Explosive limit - upper (%)

Not available Not available

Vapor pressure

0.54 mm Hg Reference Substance: Solvent

Vapor density

> 1 (Air = 1)

Relative density

Not available.

Solubility(ies)

Solubility (water)

Not available.

Partition coefficient

Not available.

(n-octanol/water)

Auto-ignition temperature

> 392 °F (> 200 °C) Reference Substance: Solvent

Decomposition temperature

Not available.

Viscosity

Not available.

Other information

**Explosive properties** 

Not explosive.

Flammability class

Combustible IIIA

Oxidizing properties Percent volatile

Not oxidizing. 70 % by Weight

Specific gravity

0.87 Temperature: 25 °C

# 10. Stability and reactivity

Reactivity

reactions

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

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.

Hazardous decomposition

No hazardous decomposition products are known.

products

Material name: 6% Cobalt Hex-Cem®

SDS US

# 11. Toxicological information

Information on likely routes of exposure

Inhalation

Prolonged inhalation may be harmful.

Skin contact

May cause an allergic skin reaction.

Eye contact

Causes serious eye irritation.

Ingestion

Expected to be a low ingestion hazard.

Symptoms related to the

physical, chemical and

Dizziness. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause an allergic skin reaction. Dermatitis. Rash.

toxicological characteristics

Information on toxicological effects

Acute toxicity

May cause an allergic skin reaction.

Components

**Test Results** Species

Cobalt bis(2-ethylhexanoate) (CAS 136-52-7)

Acute

Dermal

LD50

Rat

> 2000 mg/kg, 24 Hours

Oral

LD50

Rat

3129 mg/kg

Naphtha (Petroleum), Hydrotreated, Heavy (CAS 64742-48-9)

Acute

Inhalation

Vapor LC50

Rat

> 4980 mg/m3, 4 Hours

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

Skin corrosion/irritation

Prolonged skin contact may cause temporary irritation.

Serious eve damage/eye

irritation

Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization

Not a respiratory sensitizer.

Skin sensitization

May cause an allergic skin reaction.

Germ cell mutagenicity

No data available to indicate product or any components present at greater than 0.1% are

mutagenic or genotoxic.

Carcinogenicity

This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity

Suspected of damaging fertility.

Specific target organ

toxicity - single exposure

Not classified.

Specific target organ toxicity - repeated

Not classified.

exposure

Aspiration hazard

Not an aspiration hazard.

Chronic effects

Prolonged inhalation may be harmful.

12. Ecological information

**Ecotoxicity** 

Very toxic to aquatic life. Harmful to aquatic life with long lasting effects.

Material name: 6% Cobalt Hex-Cem® 15 Version #: 01 Issue date: 05-23-2016 Components Species **Test Results** 

Naphtha (Petroleum), Hydrotreated, Heavy (CAS 64742-48-9)

Aquatic

Crustacea Fish

EC50 LC50

Water flea (Daphnia pulex)

Rainbow trout.donaldson trout

2.7 - 5.1 mg/l, 48 hours 8.8 mg/l, 96 hours

(Oncorhynchus mykiss)

8.8 mg/l, 96 hours

Persistence and degradability

No data is available on the degradability of this product.

Bioaccumulative potential

No data available.

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

Transport hazard class(es)

Paint Related Material, MARINE POLLUTANT

Class

Combustible Liquid

Subsidiary risk

Ш

Packing group **Environmental hazards** 

Marine pollutant

Yes

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Under 49 CFR 171.4, Except when transporting aboard a vessel, the requirements of this subchapter specific to marine pollutants do not apply to non-bulk packagings transported by motor vehicles, rail cars, and aircraft. 49 CFR 173.150: This material may be reclassified as a combustible liquid. It can be shipped as a non-hazardous material if the container is under 120 gallons.

#### IATA

**UN** number

UN3082

UN proper shipping name Transport hazard class(es) Environmentally hazardous substance, liquid, n.o.s. (Cobalt bis(2-ethylhexanoate))

Class

9

Subsidiary risk

III

Packing group

**Environmental hazards** 

Yes

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Bulk containers will be classified as Paint Related Material, Combustible Liquid, UN1263, III, Environmentally hazardous

IMDG

**UN** number

UN3082

UN proper shipping name

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Cobalt

bis(2-ethylhexanoate)), MARINE POLLUTANT

<sup>\*</sup> Estimates for product may be based on additional component data not shown.

Transport hazard class(es)

Class

9

Subsidiary risk

Packing group

111

**Environmental hazards** 

Marine pollutant

Yes

**EmS** 

F-A, S-F Special precautions for user Read safety instructions, SDS and emergency procedures before handling. Bulk containers will be classified as Paint Related Material, Combustible Liquid, UN1263, III Marine Pollutant

Transport in bulk according to

Not established.

Annex II of MARPOL 73/78 and

the IBC Code

IATA; IMDG



Marine pollutant



**General information** 

IMDG Regulated Marine Pollutant. DOT Regulated Marine Pollutant.

# 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)

Cobalt bis(2-ethylhexanoate) (CAS 136-52-7)

Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

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

No

chemical

Material name: 6% Cobalt Hex-Cem® 15 Version #: 01 Issue date: 05-23-2016

# SARA 313 (TRI reporting)

Chemical name CAS number % by wt. Cobalt bis(2-ethylhexanoate) 136-52-7 30-40

#### Other federal regulations

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

Cobalt bis(2-ethylhexanoate) (CAS 136-52-7)

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

Not regulated

Safe Drinking Water Act

Not regulated.

(SDWA)

#### US state regulations

# US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100) Not listed.

# US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd.

(a))

Cobalt bis(2-ethylhexanoate) (CAS 136-52-7)

Naphtha (Petroleum), Hydrotreated, Heavy (CAS 64742-48-9)

# US. Massachusetts RTK - Substance List

Naphtha (Petroleum), Hydrotreated, Heavy (CAS 64742-48-9)

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

Cobalt bis(2-ethylhexanoate) (CAS 136-52-7)

Naphtha (Petroleum), Hydrotreated, Heavy (CAS 64742-48-9)

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

Naphtha (Petroleum), Hydrotreated, Heavy (CAS 64742-48-9)

### US. Rhode Island RTK

Cobalt bis(2-ethylhexanoate) (CAS 136-52-7)

### US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

#### International Inventories

Country(s) or region	Inventory name On inventory (ye	e/no\*
Australia	Australian Inventory of Chemical Substances (AICS)	
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	No Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	NI.
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	Yes
	(PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes
*A "Yes" indicates that all compor	nents of this product are listed on the inventory or exempt from listing on the inventory	res

nis product are listed on the inventory, 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

05-23-2016

Version #

01

Disclaimer

OMG AMERICAS, INC. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Material name: 6% Cobalt Hex-Cem®

SDS US

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

Davision	informatio	n
Revision	Illioilliano	11

This document has undergone significant changes and should be reviewed in its entirety.

# SAFETY DATA SHEET

Version 4.16 Revision Date 01/21/2015 Print Date 10/31/2016

# 1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name

3-(Trimethoxysilyl)propyl methacrylate

Product Number

Brand

440159 Aldrich

CAS-No.

2530-85-0

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

Identified uses

: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company

: Sigma-Aldrich

3050 Spruce Street SAINT LOUIS MO 63103

USA

Telephone

+1 800-325-5832

Fax

+1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #

: +1-703-527-3887 (CHEMTREC)

#### 2. HAZARDS IDENTIFICATION

# 2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 4), H227

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

none

Signal word

Warning

Hazard statement(s)

H227

Combustible liquid.

Precautionary statement(s)

P210 P280 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Wear protective gloves/ eye protection/ face protection.

P370 + P378

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for

extinction.

P403 + P235

Store in a well-ventilated place. Keep cool.

P501

Dispose of contents/ container to an approved waste disposal plant.

# 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

# 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms

[3-(Methacryloyloxy)propyl]trimethoxysilane

Formula

C<sub>10</sub>H<sub>20</sub>O<sub>5</sub>Si

Molecular weight

248.35 g/mol

CAS-No. EC-No.

2530-85-0 219-785-8

Hazardous components

lassification	Management of the same of the
lam. Liq. 4; H227	<= 100 %
	lam. Liq. 4; H227

For the full text of the H-Statements mentioned in this Section, see Section 16.

# 4. FIRST AID MEASURES

#### Description of first aid measures 4.1

#### General advice

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

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

### In case of skin contact

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

# In case of eye contact

Flush eyes with water as a precaution.

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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

No data available

# 5. FIREFIGHTING MEASURES

#### Extinguishing media 5.1

# Suitable extinguishing media

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

#### Special hazards arising from the substance or mixture 5.2

Carbon oxides, silicon oxides

#### Advice for firefighters 5.3

Wear self-contained breathing apparatus for firefighting if necessary.

#### **Further information** 5.4

Use water spray to cool unopened containers.

# 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions, protective equipment and emergency procedures 6.1

Use personal protective equipment. Avoid breathing vapours, mist or gas. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

#### **Environmental precautions** 6.2

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

#### Methods and materials for containment and cleaning up 6.3

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

# 6.4 Reference to other sections

For disposal see section 13.

# 7. HANDLING AND STORAGE

# 7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

# 7.2 Conditions for safe storage, including any incompatibilities

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

Moisture sensitive. Handle and store under inert gas. Heat sensitive. Storage class (TRGS 510): Combustible liquids

# 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

# 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### 8.1 Control parameters

# Components with workplace control parameters

Contains no substances with occupational exposure limit values.

# 8.2 Exposure controls

# Appropriate engineering controls

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

# Personal protective equipment

### Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

#### Skin protection

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

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm Break through time: > 480 min

Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm Break through time: > 480 min

Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

#### **Body Protection**

impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

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

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

# 9. PHYSICAL AND CHEMICAL PROPERTIES

#### Information on basic physical and chemical properties 9.1

a) Appearance

Form: liquid

Colour: colourless

b) Odour

No data available

c) Odour Threshold

No data available

d)

No data available

e) Melting point/freezing

Melting point/freezing point: < -19.99 °C (< -3.98 °F) at ca.1,013.0 hPa

(759.8 mmHg) - OECD Test Guideline 102

Initial boiling point and

boiling range

190 °C (374 °F) - lit.

Flash point g)

point

92 °C (198 °F) - closed cup

Evaporation rate

No data available

Flammability (solid, gas)

No data available

Upper/lower flammability or Upper explosion limit: 5.4 %(V) Lower explosion limit: 0.9 %(V)

explosive limits

13 hPa (10 mmHg) at 130 °C (266 °F)

0.023 hPa (0.017 mmHg) at 25 °C (77 °F) - OECD Test Guideline 104

Vapour density

k) Vapour pressure

8.57 - (Air = 1.0)

m) Relative density

1.045 g/cm3 at 25 °C (77 °F) - lit.

Water solubility

0.08262 g/l at 20 °C (68 °F) - OECD Test Guideline 105 - slightly soluble,

hydrolyses

Partition coefficient: noctanol/water

log Pow: 2.1 at 20 °C (68 °F) - OECD Test Guideline 107

Auto-ignition

275 °C (527 °F) at 1,013.5 - 1,030.7 hPa (760.2 - 773.1 mmHg)

temperature

Decomposition temperature

No data available

Viscosity

No data available

s) Explosive properties

No data available

Oxidizing properties

No data available

Other safety information 9.2

Relative vapour density

8.57 - (Air = 1.0)

# 10. STABILITY AND REACTIVITY

#### Reactivity 10.1

No data available

### Chemical stability

Stable under recommended storage conditions.

Aldrich - 440159

# 10.3 Possibility of hazardous reactions

No data available

#### 10.4 Conditions to avoid

Heat, flames and sparks.

# 10.5 Incompatible materials

Strong oxidizing agents, Strong acids, Strong bases

#### Hazardous decomposition products 10.6

Other decomposition products - No data available

In the event of fire: see section 5

# 11. TOXICOLOGICAL INFORMATION

# 11.1 Information on toxicological effects

#### Acute toxicity

LD50 Oral - Rat - male and female - > 2,000 mg/kg

(OECD Test Guideline 401)

LC50 Inhalation - Rat - male and female - 4 h - > 2.28 mg/l

(OECD Test Guideline 403)

LD50 Dermal - Rat - male and female - > 2,000 mg/kg

(OECD Test Guideline 402)

No data available

#### Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 4 h

(OECD Test Guideline 404)

# Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation

(OECD Test Guideline 405)

# Respiratory or skin sensitisation

Maximisation Test (GPMT) - Guinea pig

Result: Does not cause skin sensitisation.

(OECD Test Guideline 406)

# Germ cell mutagenicity

Ames test

S. typhimurium

Result: negative

Hamster

ovary

Result: negative

Mutagenicity (micronucleus test)

Mouse - male and female

Result: negative

#### Carcinogenicity

IARC:

No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

ACGIH:

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

NTP:

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

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.

### Reproductive toxicity

No data available

No data available

# Specific target organ toxicity - single exposure

No data available

# Specific target organ toxicity - repeated exposure

No data available

# Aspiration hazard

No data available

# Additional Information

RTECS: UC0230000

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

Stomach - Irregularities - Based on Human Evidence Stomach - Irregularities - Based on Human Evidence

# 12. ECOLOGICAL INFORMATION

#### Toxicity 12.1

Toxicity to fish

semi-static test LC50 - Danio rerio (zebra fish) - > 100 mg/l - 96 h

(Directive 67/548/EEC, Annex V, C.1.)

Toxicity to daphnia and

other aquatic

static test EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h

(Directive 67/548/EEC, Annex V, C.2.)

invertebrates Toxicity to algae

static test EC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h

(Directive 67/548/EEC, Annex V, C.3.)

Toxicity to bacteria

Respiration inhibition EC50 - Sludge Treatment - > 1,000 mg/l - 3 h

(OECD Test Guideline 209)

# 12.2 Persistence and degradability

Biodegradability

aerobic - Exposure time 28 d

Result: 69 % - Readily biodegradable

#### Bioaccumulative potential 12.3

No data available

#### Mobility in soil 12.4

No data available

# Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

#### Other adverse effects 12.6

No data available

# 13. DISPOSAL CONSIDERATIONS

#### Waste treatment methods 13.1

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

# Contaminated packaging

Dispose of as unused product.

# 14. TRANSPORT INFORMATION

DOT (US)

NA-Number: 1993

Class: NONF

Packing group: III

Proper shipping name: Combustible liquid, n.o.s. (3-Trimethoxysilylpropyl methacrylate)

Reportable Quantity (RQ):

Poison Inhalation Hazard: No

#### IMDG

Not dangerous goods

#### IATA

Not dangerous goods

#### 15. REGULATORY INFORMATION

#### SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

### SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

#### SARA 311/312 Hazards

Fire Hazard, Chronic Health Hazard

#### Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

#### Pennsylvania Right To Know Components

CAS-No.

Revision Date

3-Trimethoxysilylpropyl methacrylate

2530-85-0

New Jersey Right To Know Components

CAS-No.

Revision Date

3-Trimethoxysilylpropyl methacrylate

2530-85-0

#### California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

#### 16. OTHER INFORMATION

#### Full text of H-Statements referred to under sections 2 and 3.

Flam. Lia.

Flammable liquids

H227

Combustible liquid.

#### **HMIS Rating**

Health hazard:

1

Chronic Health Hazard:

Flammability:

2

Physical Hazard

0

NFPA Rating

Health hazard: Fire Hazard:

0

Reactivity Hazard:

2 0

### Further information

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# **Preparation Information**

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.16

Revision Date: 01/21/2015

Print Date: 10/31/2016

# SAFETY DATA SHEET

Version 5.6 Revision Date 03/27/2015 Print Date 03/03/2016

# 1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name

Acetylacetone

Product Number

: P7754

Brand Index-No.

: Sigma-Aldrich : 606-029-00-0

CAS-No.

123-54-6

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

Identified uses

: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company

Sigma-Aldrich 3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone

Fax

1.4

+1 800-325-5832 +1 800-325-5052

Emergency telephone number

Emergency Phone #

: (314) 776-6555

#### 2. HAZARDS IDENTIFICATION

# 2.1 Classification of the substance or mixture

# GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226 Acute toxicity, Oral (Category 4), H302 Acute toxicity, Inhalation (Category 3), H331 Acute toxicity, Dermal (Category 3), H311

For the full text of the H-Statements mentioned in this Section, see Section 16.

# 2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word

Danger

Hazard statement(s)

H226

Flammable liquid and vapour.

H302

Harmful if swallowed.

H311 + H331

Toxic in contact with skin or if inhaled.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P233 Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242 Use only non-sparking tools.

P243

Take precautionary measures against static discharge.

P261 P264 P270 P271 P280	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.  Wash skin thoroughly after handling.  Do not eat, drink or smoke when using this product.  Use only outdoors or in a well-ventilated area.  Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing.  Rinse skin with water/shower.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
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.  Dispose of contents/ container to an approved waste disposal plant.
P501	Dispose of contents/ container to all approved waste disposal plants

#### Hazards not otherwise classified (HNOC) or not covered by GHS - none 2.3

# 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substances

Synonyms

: 2.4-Pentanedione

Formula

: C<sub>5</sub>H<sub>8</sub>O<sub>2</sub>

Molecular weight

: 100.12 g/mol 123-54-6

CAS-No. EC-No.

204-634-0

Index-No.

606-029-00-0

Registration number

: 01-2119458968-15-XXXX

Hazardous components

Component	Classification	Concentration
Acetylacetone		
Acetylacetone	Flam. Liq. 3; Acute Tox. 4; Acute Tox. 3; H226, H302, H311 + H331	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

# 4. FIRST AID MEASURES

#### Description of first aid measures 4.1

## General advice

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

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

### In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

# In case of eye contact

Flush eyes with water as a precaution.

#### If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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# 4.3 Indication of any immediate medical attention and special treatment needed No data available

# 5. FIREFIGHTING MEASURES

### 5.1 Extinguishing media

# Suitable extinguishing media

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

# 5.2 Special hazards arising from the substance or mixture

Carbon oxides

# 5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

#### 5.4 Further information

Use water spray to cool unopened containers.

#### 6. ACCIDENTAL RELEASE MEASURES

# 6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

### 6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

# 6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

### 6.4 Reference to other sections

For disposal see section 13.

# 7. HANDLING AND STORAGE

# 7.1 Precautions for safe handling

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

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

# 7.2 Conditions for safe storage, including any incompatibilities

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

Storage class (TRGS 510): Flammable liquids

# 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

# 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### 8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Acetylacetone	lacetone 123-54-6 TW	TWA	25.000000 ppm	USA. ACGIH Threshold Limit Values
	Remarks	Neurotoxi	ervous System impai city f cutaneous absorptio	

#### **Exposure controls** 8.2

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

# Personal protective equipment

Eve/face protection

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

Skin protection

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

Splash contact Material: butyl-rubber

Minimum layer thickness: 0.3 mm Break through time: 120 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

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

**Body Protection** 

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

Respiratory protection

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

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

# 9. PHYSICAL AND CHEMICAL PROPERTIES

#### Information on basic physical and chemical properties 9.1

a) Appearance

Form: liquid

b) Odour

No data available

Odour Threshold c)

No data available

pH d)

6 at 200 g/l at 20 °C (68 °F)

Melting point/freezing

Melting point/range: -23 °C (-9 °F) - lit.

point Initial boiling point and

140.4 °C (284.7 °F) - lit.

boiling range Flash point

38 °C (100 °F) - closed cup

Evaporation rate h)

No data available

Flammability (solid, gas) No data available i)

g)

j) Upper/lower flammability or explosive limits

Upper explosion limit: 11.4 %(V) Lower explosion limit: 1.7 %(V)

k) Vapour pressure

No data available

I) Vapour density

3.46 - (Air = 1.0)

m) Relative density

0.975 g/cm3 at 25 °C (77 °F)

n) Water solubility

soluble

 Partition coefficient: noctanol/water

log Pow: 1.9

p) Auto-ignition temperature

No data available

q) Decomposition temperature

No data available

r) Viscosity

No data available

s) Explosive properties

No data available

t) Oxidizing properties

No data available

9.2 Other safety information

Surface tension

31.2 mN/m at 20 °C (68 °F)

Relative vapour density

3.46 - (Air = 1.0)

# 10. STABILITY AND REACTIVITY

#### 10.1 Reactivity

No data available

# 10.2 Chemical stability

Stable under recommended storage conditions.

# 10.3 Possibility of hazardous reactions

No data available

# 10.4 Conditions to avoid

Heat, flames and sparks.

# 10.5 Incompatible materials

Strong oxidizing agents, Reducing agents, Strong bases, Metals

# 10.6 Hazardous decomposition products

Other decomposition products - No data available In the event of fire: see section 5

# 11. TOXICOLOGICAL INFORMATION

# 11.1 Information on toxicological effects

## Acute toxicity

LD50 Oral - Rat - male - 760 mg/kg

LD50 Oral - Rat - female - 570 mg/kg

LC50 Inhalation - Rat - 4 h - 5.1 mg/l

LD50 Dermal - Rabbit - male - 790 mg/kg

LD50 Dermal - Rabbit - female - 1,370 mg/kg

No data available

# Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation

Sigma-Aldrich - P7754

# Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation

(Directive 67/548/EEC, Annex V, B.5.)

# Respiratory or skin sensitisation

No data available

# Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

Hamster

ovary

Mutation in mammalian somatic cells.

Rat

Result: negative Micronucleus test

# Carcinogenicity

IARC:

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

ACGIH:

No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by ACGIH.

NTP:

No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

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.

# Reproductive toxicity

Ingestion of excessive amounts by pregnant animals resulted in maternal and foetal toxicity. No data available

No data available

Developmental Toxicity - Rat - Inhalation

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

# Specific target organ toxicity - single exposure

No data available

# Specific target organ toxicity - repeated exposure

No data available

# Aspiration hazard

No data available

# **Additional Information**

RTECS: SA1925000

Inhalation may provoke the following symptoms:, Dizziness, Suffocation

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

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

# 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

Toxicity to fish

LC50 - other fish - 106 mg/l - 96 h

Toxicity to daphnia and

EC50 - Daphnia magna (Water flea) - 40 mg/l - 24 h

other aquatic

invertebrates

EC100 - Daphnia magna (Water flea) - 90 mg/l - 24 h

LC50 - Daphnia magna (Water flea) - 34,409 μg/l - 48 h

# 12.2 Persistence and degradability

No data available

# 12.3 Bioaccumulative potential

No data available

#### 12.4 Mobility in soil

No data available

# Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

# 12.6 Other adverse effects

No data available

# 13. DISPOSAL CONSIDERATIONS

# 13.1 Waste treatment methods

#### **Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

#### Contaminated packaging

Dispose of as unused product.

# 14. TRANSPORT INFORMATION

DOT (US)

UN number: 2310

Class: 3 (6.1)

Packing group: III

Proper shipping name: Pentane-2,4-dione

Reportable Quantity (RQ):

Poison Inhalation Hazard: No

**IMDG** 

UN number: 2310

Class: 3 (6.1)

Packing group: III

EMS-No: F-E, S-D

Proper shipping name: PENTANE-2,4-DIONE

IATA

UN number: 2310

Class: 3 (6.1)

Packing group: III

Proper shipping name: Pentane-2,4-dione

# 15. REGULATORY INFORMATION

# SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

# **SARA 313 Components**

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

# SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

# Massachusetts Right To Know Components

CAS-No.

Revision Date

Acetylacetone

123-54-6

1993-04-24

Pennsylvania Right To Know Components

CAS-No.

**Revision Date** 

Acetylacetone

123-54-6

1993-04-24

New Jersey Right To Know Components

CAS-No.

**Revision Date** 

Acetylacetone

123-54-6

1993-04-24

# California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

# 16. OTHER INFORMATION

# Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.

Acute toxicity

Flam. Liq.

Flammable liquids

H226

Flammable liquid and vapour.

H302

Harmful if swallowed.

H311

Toxic in contact with skin.

H311 + H331

Toxic in contact with skin or if inhaled.

H331

Toxic if inhaled.

#### **HMIS Rating**

Health hazard:

Chronic Health Hazard:

Flammability:

2

Physical Hazard

0

2

#### NFPA Rating

Health hazard:

Fire Hazard:

2

Reactivity Hazard:

2 0

# **Further information**

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### **Preparation Information**

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

Version: 5.6

Revision Date: 03/27/2015

Print Date: 03/03/2016

# Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Printing date: 11.04.2016

Revision: 11.04.2016

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

- 1.1 Product identifier
- · Trade name: Electrocarb Black Silicon Carbide Grain
- · CAS number:

409-21-2

- 1.2 Relevant identified uses of the substance or mixture and uses advised against No further relevant information available.
- · Application of the substance / the mixture: Industrial uses.
- 1.3 Details of the supplier of the Safety Data Sheet
- Manufacturer/Supplier:

Electro Abrasives LLC 701 Willet Road Buffalo, NY 14218

Phone: (716) 822-2500



# 1.4 Emergency telephone number:

ChemTel Inc.

+1 (800)255-3924, +1 (813)248-0585

# **SECTION 2: Hazards identification**

- · 2.1 Classification of the substance or mixture
- · Classification according to Regulation (EC) No 1272/2008

The product is not classified as hazardous according to OSHA GHS regulations within the United States. The substance is not classified as hazardous according to the CLP regulation.

- 2.2 Label elements
- · Labelling according to Regulation (EC) No 1272/2008

The product is not classified as hazardous according to OSHA GHS regulations within the United States. This product does not have a classification according to the CLP regulation.

- · Hazard pictograms Not Regulated
- · Signal word Not Regulated
- · Hazard-determining components of labelling: Not applicable.
- · Hazard statements Not Regulated
- · Precautionary statements Not Regulated.
- · Additional information:

Safety data sheet available on request.

· NFPA ratings (scale 0 - 4)



(Cont'd. on page 2)

# Safety Data Sheet

# according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Printing date: 11.04.2016

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Trade name: Electrocarb Black Silicon Carbide Grain

(Cont'd. from page 1)

· HMIS-ratings (scale 0 - 4)



- \* Indicates a long term health hazard from repeated or prolonged exposures.
- · 2.3 Other hazards There are no other hazards not otherwise classified that have been identified.
- · Results of PBT and vPvB assessment
- · PBT: Not applicable. · vPvB: Not applicable.

# **SECTION 3: Composition/information on ingredients**

- 3.1 Substances
- CAS No. Description 409-21-2 silicon carbide

# **SECTION 4: First aid measures**

- 4.1 Description of first aid measures
- · General information: No special measures required.
- After inhalation: Supply fresh air; consult doctor in case of complaints.
- · After skin contact:

Brush off loose particles from skin.

Clean with water and soap.

If skin irritation continues, consult a doctor.

· After eye contact:

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

After swallowing:

Rinse out mouth and then drink plenty of water.

Do not induce vomiting; call for medical help immediately.

4.2 Most important symptoms and effects, both acute and delayed

Gastric or intestinal disorders.

- · Hazards: No further relevant information available.
- 4.3 Indication of any immediate medical attention and special treatment needed No further relevant information available.

# **SECTION 5: Firefighting measures**

5.1 Extinguishing media

· Suitable extinguishing agents: Use fire extinguishing methods suitable to surrounding conditions.

(Cont'd. on page 3)

# Safety Data Sheet

# according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Printing date: 11.04.2016 Revision: 11.04.2016

Trade name: Electrocarb Black Silicon Carbide Grain

(Cont'd. from page 2)

- · For safety reasons unsuitable extinguishing agents: None.
- 5.2 Special hazards arising from the substance or mixture No further relevant information available.
- 5.3 Advice for firefighters
- · Protective equipment:

Wear self-contained respiratory protective device.

Wear fully protective suit.

· Additional information: No further relevant information available.

### SECTION 6: Accidental release measures

- 6.1 Personal precautions, protective equipment and emergency procedures Ensure adequate ventilation
- · 6.2 Environmental precautions No special measures required.
- 6.3 Methods and material for containment and cleaning up

Pick up mechanically.

Send for recovery or disposal in suitable receptacles.

Dispose contaminated material as waste according to section 13.

6.4 Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

# SECTION 7: Handling and storage

- · 7.1 Precautions for safe handling No special measures required.
- Information about fire and explosion protection: No special measures required.
- · 7.2 Conditions for safe storage, including any incompatibilities
- · Storage:
- · Requirements to be met by storerooms and receptacles: No special requirements.
- Information about storage in one common storage facility: No special requirements.
- Further information about storage conditions: No further relevant information available.
- · 7.3 Specific end use(s) No further relevant information available.

(Cont'd. on page 4)

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# Safety Data Sheet

# according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Printing date: 11.04.2016 Revision: 11.04.2016

Trade name: Electrocarb Black Silicon Carbide Grain

(Cont'd. from page 3)

# **SECTION 8: Exposure controls/personal protection**

## · 8.1 Control parameters

· Ingredients v	Ingredients with limit values that require monitoring at the workplace:	
409-21-2 silic	409-21-2 silicon carbide	
PEL (USA)	Long-term value: 15* 5** mg/m³ fibrous dust: *total dust **respirable fraction	
	Long-term value: 10* 5** mg/m³ *total dust **respirable fraction	
TLV (USA)	Long-term value: 10* 3** mg/m³ fibrous dust:0,1 f/cc; nonfibrous:*inh.,**resp.	
EL (Canada)	Long-term value: 10* 3** mg/m³ *inhalable;**respirable	
EV (Canada)	Long-term value: 10* 3** mg/m³, 0,1f/cc*** ppm nonfibrous: *inh.,**resp.; ***fibrous, resp.	

- DNELs: No further relevant information available.
- · PNECs: No further relevant information available.
- 8.2 Exposure controls
- Personal protective equipment:
- General protective and hygienic measures:

The usual precautionary measures are to be adhered to when handling chemicals.

Avoid contact with the eyes.

Avoid close or long term contact with the skin.

· Respiratory protection:

Not required under normal conditions of use.

Use suitable respiratory protective device in case of insufficient ventilation.

· Protection of hands:

Wear gloves for the protection against mechanical hazards according to NIOSH or EN 388.

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

· Eve protection:



Safety glasses

· Body protection:

Not required under normal conditions of use.

Protection may be required for spills.

- Limitation and supervision of exposure into the environment: No special requirements.
- · Risk management measures: No special requirements.

(Cont'd. on page 5)

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# Safety Data Sheet according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Printing date: 11.04.2016

Revision: 11.04.2016

Trade name: Electrocarb Black Silicon Carbide Grain

(Cont'd. from page 4)

SECTION 9: Physical and ch	emical properties	
9.1 Information on basic physic Appearance	是一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个	
Form:	Granulate	
Colour: · Odour:	Black	
Odour threshold:	Odourless Not determined.	
· pH-value:		
· Melting point/Melting range:	Neutral Not determined.	
· Boiling point/Boiling range:	Not determined. Not determined.	
· Flash point:	Not applicable.	
· Flammability (solid, gaseous):	Product is not flammable.	
· Auto/Self-ignition temperature:	Not determined.	
· Decomposition temperature:	4712 °F / 2600 °C (8514 °F / 4712 °F) (Sublimation)	
· Self-igniting:	Not determined.	
Danger of explosion:	Product does not present an explosion hazard.	
Explosion limits		
Lower:	Not determined.	
Upper:	Not determined.	
· Vapour pressure:	Not applicable.	
Density at 20 °C (68 °F):	3,20 g/cm³ (26,704 lbs/gal)	
· Relative density: · Vapour density:	Not determined.	
· Evaporation rate:	Not applicable.	
· Solubility in / Miscibility with	Not applicable.	
water:	Insoluble.	
· Partition coefficient (n-octanol/wate		
	FIJ. NOT determined.	
· Viscosity Dynamic:	Net - P - D	
Kinematic:	Not applicable.	
9.2 Other information	Not applicable.  No further relevant information available.	
	rvo raither relevant information available.	

## **SECTION 10: Stability and reactivity**

· 10.1 Reactivity No further relevant information available.

(Cont'd. on page 6)

### Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Printing date: 11.04.2016

Revision: 11.04.2016

Trade name: Electrocarb Black Silicon Carbide Grain

(Cont'd. from page 5)

10.2 Chemical stability

· Thermal decomposition / conditions to be avoided:

Avoid extreme heat.

To avoid thermal decomposition do not overheat.

- 10.3 Possibility of hazardous reactions No dangerous reactions known.
- · 10.4 Conditions to avoid Excessive heat and contact with oxidizers.
- · 10.5 Incompatible materials No further relevant information available.
- 10.6 Hazardous decomposition products Carbon monoxide and carbon dioxide

### **SECTION 11: Toxicological information**

- · 11.1 Information on toxicological effects
- · Acute toxicity: Based on available data, the classification criteria are not met.
- LD/LC50 values relevant for classification: None.
- · Primary irritant effect
- · Skin corrosion/irritation: Based on available data, the classification criteria are not met.
- Serious eye damage/irritation: Based on available data, the classification criteria are not met.
- Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.
- · Carcinogenic categories
- · IARC (International Agency for Research on Cancer):

Substance is not listed.

· NTP (National Toxicology Program):

Substance is not listed.

OSHA-Ca (Occupational Safety & Health Administration):

Substance is not listed.

- · Germ cell mutagenicity: Based on available data, the classification criteria are not met.
- Carcinogenicity: Based on available data, the classification criteria are not met.
- Reproductive toxicity: Based on available data, the classification criteria are not met.
- STOT-single exposure: Based on available data, the classification criteria are not met.
- STOT-repeated exposure: Based on available data, the classification criteria are not met.
- Aspiration hazard: Based on available data, the classification criteria are not met.

### **SECTION 12: Ecological information**

- · 12.1 Toxicity
- · Aquatic toxicity: Generally not hazardous for water
- 12.2 Persistence and degradability No further relevant information available.
- · 12.3 Bioaccumulative potential Does not accumulate in organisms.
- · 12.4 Mobility in soil No further relevant information available.

(Cont'd. on page 7)

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### Safety Data Sheet

# according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

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· Additional ecological information:

(Cont'd. from page 6)

· General notes:

Negative ecological effects are, according to the current state of knowledge, not expected.

- 12.5 Results of PBT and vPvB assessment
- · PBT: Not applicable.
- · vPvB: Not applicable.
- · 12.6 Other adverse effects No further relevant information available.

### **SECTION 13: Disposal considerations**

- · 13.1 Waste treatment methods
- Recommendation

Smaller quantities can be disposed of with household waste.

Can be reused after reprocessing.

Contact waste processors for recycling information.

The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.

· Uncleaned packaging:

· Recommendation: Disposal must be made according to official regulations.

14.1 UN-Number	*	
DOT, ADR, IMDG, IATA	Not Regulated	
14.2 UN proper shipping name		
DOT, ADR, IMDG, IATA	Not Regulated	
14.3 Transport hazard class(es)		
DOT, ADR, IMDG, IATA		
Class	Not Regulated	
14.4 Packing group		
DOT, ADR, IMDG, IATA	Not Regulated	
14.5 Environmental hazards:		
Marine pollutant:	No	
14.6 Special precautions for user	Not applicable.	

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### Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Printing date: 11.04.2016 Revision: 11.04.2016

Trade name: Electrocarb Black Silicon Carbide Grain

(Cont'd. from page 7)

14.7 Transport in bulk according to Annex II

of Marpol and the IBC Code

Not applicable.

### **SECTION 15: Regulatory information**

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
- United States (USA)
- SARA
- · Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

- · Proposition 65 (California):
- · Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is not listed.

- · Carcinogenic Categories
- · EPA (Environmental Protection Agency)

Substance is not listed.

· IARC (International Agency for Research on Cancer)

Substance is not listed.

NIOSH-Ca (National Institute for Occupational Safety and Health)

Substance is not listed.

- · Canada
- · Canadian Domestic Substances List (DSL)

Substance is listed.

(Cont'd. on page 9)

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### Safety Data Sheet

#### according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Printing date: 11.04.2016

Revision: 11.04.2016

Trade name: Electrocarb Black Silicon Carbide Grain

(Cont'd. from page 8)

- Other regulations, limitations and prohibitive regulations
- · Substances of very high concern (SVHC) according to REACH, Article 57

Substance is not listed.

· 15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

### **SECTION 16: Other information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Abbreviations and acronyms:

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

GHS: Globally Harmonised System of Classification and Labelling of Chemicals CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA) HMIS: Hazardous Materials Identification System (USA)

DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH) LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic SVHC: Substances of Very High Concern vPvB: very Persistent and very Bioaccumulative NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

Sources

Website, European Chemicals Agency (echa.europa.eu)

Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/

Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)

Patty's Industrial Hygiene, 6th ed., Rose, Vernon, ed. ISBN: 978-0-470-07488-6

Casarett and Doull's Toxicology: The Basic Science of Poisons, 8th Ed., Klaasen, Curtis D., ed., ISBN:

Safety Data Sheets, Individual Manufacturers

SDS Prepared by:

ChemTel Inc.

1305 North Florida Avenue

Tampa, Florida USA 33602-2902

Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573

Website: www.chemtelinc.com



Additives & Instruments

BYK-A 555

Version 5

Revision Date 06/15/2016

Print Date 11/10/2016

### **SECTION 1. IDENTIFICATION**

Product name

BYK-A 555

### Manufacturer or supplier's details

Company

BYK USA Inc.

524 South Cherry Street

Telephone

Wallingford CT 06492 (203) 265-2086

Visit our web site

www.byk.com

E-mail address

ehs.byk.usa@altana.com

Emergency telephone

203-265-2086; CHEMTREC 1-800-424-9300 / +1 703-527-

number

3887

# Recommended use of the chemical and restrictions on use

Recommended use

: Air Release Additive

Restrictions on use

: Refer to Section 15 for any restrictions that may apply

### SECTION 2. HAZARDS IDENTIFICATION

#### **GHS Classification**

Flammable liquids

: Category 3

Carcinogenicity

: Category 2

Specific target organ toxicity

- single exposure

: Category 3 (Respiratory system, Central nervous system)

#### **GHS** label elements

Hazard pictograms







Signal word

: Warning

Hazard statements

: H226 Flammable liquid and vapour. H335 May cause respiratory irritation. H336 May cause drowsiness or dizziness. H351 Suspected of causing 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.



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P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment. P241 Use explosion-proof electrical/ ventilating/ lighting/

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P271 Use only outdoors or in a well-ventilated area.

P280 Wear protective gloves/ eye protection/ face protection.

P281 Use personal protective equipment as required.

Response:

P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304 + P340 + P312 IF INHALED: 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. P308 + P313 IF exposed or concerned: Get medical advice/ attention.

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

Chemical nature

: Solution of foam destroying polymers, silicone free

#### Hazardous components

Component	CAS-No.	Concentration (%)
Solvent naphtha, petroleum, light aromatic	64742-95-6	>= 60 - < 61
Cumene	98-82-8	>= 1 -< 2

#### **SECTION 4. FIRST AID MEASURES**

If inhaled

: Remove to fresh air. Administer artificial respiration if

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necessary. Get medical aid as soon as possible.

In case of skin contact

: Remove contaminated clothing. Wash thoroughly with soap

and water.

In case of eye contact

: Immediately flush with plenty of water for at least 20 minutes.

Get medical aid.

If swallowed

: Do not induce vomiting. Dilute with 1-2 glasses of water. Get

medical aid.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

: No information available.

### SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media

Carbon dioxide (CO2)

Dry chemical

Unsuitable extinguishing media

: No information available.

Specific hazards during

firefighting

: Cool closed containers exposed to fire with water spray.

Will not explode on mechanical impact.

Hazardous combustion

products

: Carbon oxides

Further information

: Keep away from heat and sources of ignition.

Keep away from oxidizing agents.

for firefighters

Special protective equipment : In the event of fire, wear self-contained breathing apparatus.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: Eliminate all sources of ignition. Ventilate area if indoors. Wear self-contained breathing apparatus and full protective

clothing.

Environmental precautions

: Prevent spilled material from entering the ground, water

and/or air by using appropriate containment methods.

Methods and materials for containment and cleaning up : Stop leak. Dike and contain spill.

Pump into salvage tanks and/or absorb with suitable material.

Use sparkless shovels to remove material.



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#### SECTION 7. HANDLING AND STORAGE

Advice on safe handling

: Harmful in contact with skin.

Avoid contact with skin and eyes.

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

Handle as an industrial chemical. Keep container tightly closed.

Conditions for safe storage

: Keep in a dry, cool and well-ventilated place.

Keep product and empty container away from heat and

sources of ignition.

Take measures to prevent the build up of electrostatic charge.

Materials to avoid

: Keep away from strong acids. Keep away from oxidizing agents.

### SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Cumene	98-82-8	TWA	50 ppm	ACGIH
***************************************		TWA	50 ppm 245 mg/m3	OSHA Z-1
		TWA	50 ppm 245 mg/m3	OSHA P0

Engineering measures

: Use with local exhaust ventilation.

### Personal protective equipment

Respiratory protection

: Unless air monitoring demonstrates vapor/mist/dust levels are below the PEL/TLV wear a properly fitted respirator

(NIOSH approved) or dust mask during exposure.

Hand protection

Material

: Viton

Eye protection

: Safety Glasses

Goggles

Skin and body protection

: Choose body protection according to the amount and

concentration of the dangerous substance at the work place.

Hygiene measures

: Clean long legged, long sleeved work clothes.

Handle in accordance with good industrial hygiene and safety

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practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

: liquid

Colour

: light yellow

Odour

: aromatic

Odour Threshold

: No data available

рΗ

: No data available

Melting point/range

: < 32 °F (< 0 °C)

Method: see user defined free text

Initial boiling point

: 320.00 °F (160.00 °C)

Method: see user defined free text

Vapour pressure

: 5.0000000 hPa (68.00 °F (20.00 °C))

Method: calculated

Flash point

: 109.40 °F (43.00 °C)

Method: 48 (Abel-Pensky)

Upper explosion limit

: 7.50 %(V)

Lower explosion limit

: 1.00 %(V)

Evaporation rate

: No data available

Flammability (solid, gas)

: No data available

Relative vapour density

: No data available

Relative Density/Specific

: No data available

Gravity

Density

: 0.8800 g/cm3 (68.00 °F (20.00 °C))

Method: 4 (20°C oscillating U-tube)

Bulk density

: Not applicable

Solubility(ies)

Water solubility

: immiscible

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Additives & Instruments

# BYK-A 555

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Solubility in other solvents

: No data available

Partition coefficient: n-

: No data available

octanol/water

Auto-ignition temperature

: > 392 °F (> 200 °C)

Method: DIN 51 794/ DIN prEN 14 522

Thermal decomposition

: No data available

Viscosity

Viscosity, dynamic

: No data available

Viscosity, kinematic

: 27.000 mm2/s (68.00 °F (20.00 °C))

21.500 mm2/s (104.00 °F (40.00 °C))

Surface tension

: No data available

### SECTION 10. STABILITY AND REACTIVITY

Reactivity

: Not classified as a reactivity hazard.

Chemical stability

: Stable; polymerization will not occur

Possibility of hazardous

reactions

: No data available

Conditions to avoid

: None known,

Incompatible materials

: Acids

Strong oxidizing agents

Hazardous decomposition

products

: None expected

### SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Skin contact Skin absorption Inhalation Eyes

Ingestion

Acute toxicity

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Product:

Acute oral toxicity

: Remarks: No data available

Components:

64742-95-6 Solvent naphtha, petroleum, light aromatic:

Acute oral toxicity

: LD50 (Rat): > 4,000 mg/kg

Acute inhalation toxicity

: LC50 (Rat): 3670 ppm 1.

Exposure time: 4 h

Acute dermal toxicity

: LD50 (Rabbit): > 3,480 mg/kg

98-82-8 Cumene:

Acute oral toxicity

: LD50 (Rat): 1,400 mg/kg

Acute inhalation toxicity

: LC50 : Remarks: No data available

Acute dermal toxicity

: LD50 : Remarks: No data available

Skin corrosion/irritation

Product:

Remarks: No data available

Components:

64742-95-6 Solvent naphtha, petroleum, light aromatic:

Species: Rabbit

Result: Moderate skin irritation

Serious eye damage/eye irritation

Product:

Remarks: No data available

Components:

64742-95-6 Solvent naphtha, petroleum, light aromatic:

Species: Rabbit Result: Eye irritation

Respiratory or skin sensitisation

Product:

Remarks: No data available

Components:

64742-95-6 Solvent naphtha, petroleum, light aromatic:

Test Type: Maximisation Test

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Exposure routes: Dermal Species: Guinea pig

Method: OECD Test Guideline 406
Result: Does not cause skin sensitisation.

Carcinogenicity

IARC

Group 2B: Possibly carcinogenic to humans

Cumene

98-82-8

**ACGIH** 

No component of this product present at levels greater than or

equal to 0.1% is identified as a carcinogen or potential

carcinogen by ACGIH.

**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

Reasonably anticipated to be a human carcinogen

Cumene

98-82-8

#### Repeated dose toxicity

#### Product:

Remarks: Absorption of ingredients (solvents) by inhalation and/or repeated skin contact may cause injury to the liver/kidney.

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

Intentional misuse by deliberately concentrating and inhaling vapors may be harmful or fatal. Inhalation of Naphtha has caused fetotoxic effects at maternally toxic doses in laboratory animals.

Cumene is an IARC 2B and NTP Group 2 Carcinogen. Cumene has caused tumors in rats and mice (lung, liver and kidney). Proposed cancer causing mechanisms for lung and liver tumors are similar to human metabolic pathways. The relevance of kidney tumors in humans is uncertain.

#### Aspiration toxicity

#### Components:

### 64742-95-6 Solvent naphtha, petroleum, light aromatic:

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.

#### Experience with human exposure

#### Product:

Inhalation:



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Symptoms:

High concentrations of vapors may be irritating to the respiratory tract. May cause headaches, dizziness, nausea and vomiting. May cause CNS depression (drowsiness, loss of coordination and fatigue).

Skin contact:

Symptoms:

Contact will probably cause irritation.

Eye contact:

Symptoms:

Contact will probably cause irritation.

Ingestion:

Symptoms:

Ingestion may irritate the digestive tract; high dosages may cause CNS depression.

**Further information** 

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity** 

Product:

Toxicity to fish

Remarks: No data available

Persistence and degradability

Product:

Biodegradability

: Remarks: No data available

Bioaccumulative potential

Product:

Bioaccumulation

: Remarks: No data available

Mobility in soil

No data available

Other adverse effects

Product:

.)

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Results of PBT and vPvB

assessment

: This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or

very persistent and very bioaccumulative (vPvB) at levels of

0.1% or higher.

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, Šubpt. A, App.A + B).

Additional ecological

information

: There is no data available for this product.

### SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

**EPA Hazardous Waste** 

Code(s)

: D001: Ignitable

D018: Benzene

Waste from residues

: Dispose of in accordance with applicable local/municipal,

state/provincial and federal regulations.

### SECTION 14. TRANSPORT INFORMATION

#### International Regulation

IATA-DGR

UN/ID No.

: UN 1268

Proper shipping name

: Petroleum distillates, n.o.s.

Class

: 3

Packing group

: 111

Labels

: Flammable liquid

Packing instruction (cargo

aircraft)

Packing instruction

: 355

(passenger aircraft)

IMDG-Code

**UN** number

: UN 1268

Proper shipping name

: PETROLEUM DISTILLATES, N.O.S.

Class

: 3

Packing group

: 111

Labels

: 3

EmS Code

: F-E, S-E

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Revision Date 06/15/2016

Print Date 11/10/2016

Marine pollutant

yes

Remarks

IMDG Code segregation group - none

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

**National Regulations** 

49 CFR

UN/ID/NA number

: UN 1268

Proper shipping name

: Petroleum distillates, n.o.s.

Class

3

Packing group

: 111

Labels

: Flammable liquid

ERG Code

: 128

Marine pollutant

: no

Container sizes: 55 gallon drums, 5 or 6-gallon pails, 2oz/16oz samples

### SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

US. EPA CERCLA Hazardous Substances (40 CFR 302)

Calculated RQ exceeds reasonably attainable upper limit.

SARA 304 - Emergency Release Notification

This material does not contain any components with a section 304 EHS RQ.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)

This material does not contain any components with a SARA 302 RQ.

SARA 311/312 Hazards

: Acute Health Hazard

Fire Hazard

Chronic Health Hazard

SARA 302

: No chemicals in this material are subject to the reporting

requirements of SARA Title III, Section 302.

**SARA 313** 

: This product contains the following toxic chemical(s) 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.

1,2,4-Trimethylbenzene

95-63-6

22 %

Cumene

98-82-8

1.5 %

1



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Clean Air Act

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61): Cumene 98-82-8 1.5 %

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

Non-volatile (Wt)

: 36 - 40 %

Method: 22 (10min/150°C)

**DIN EN ISO 3251** 

Non-volatile information is not a specification.

Massachusetts Right To Know

Cumene

98-82-8

Pennsylvania Right To Know

Solvent naphtha, petroleum, light aromatic

64742-95-6

Polymer

Cumene

98-82-8

New Jersey Right To Know

Solvent naphtha, petroleum, light aromatic

64742-95-6

Polymer

Cumene

98-82-8

**New Jersey Trade Secret** 

Registry Number for the

product (NJ TSRN)

: 800963-5064

California Prop 65

WARNING! This product contains a chemical known to the

State of California to cause cancer.

Benzene

71-43-2

Cumene

98-82-8

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

harm.

Benzene

71-43-2

Toluene

108-88-3

CONEG Heavy Metal: We confirm that we use packaging and/or packaging components in which the sum of the incidental concentration levels of lead, mercury, cadmium and hexavalent chromium do not exceed 100 parts per million by weight.

The components of this product are reported in the following inventories:

**TSCA** 

: We certify that all of the components of this product are either

listed on the TSCA Inventory or are not subject to the notification requirements per 40 CFR 720 30(h).

Section 4 / 12(b)

: Not applicable

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DSL

: We certify that all of the components of this product are listed on the DSL.

### SECTION 16. OTHER INFORMATION

**Revision Date** 

: 06/15/2016

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



#### **BYK-A 560**

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#### SECTION 1. IDENTIFICATION

Product name

: BYK-A 560

#### Manufacturer or supplier's details

Company

BYK USA Inc.

524 South Cherry Street Wallingford CT 06492

Telephone

(203) 265-2086

Visit our web site

www.byk.com

E-mail address

ehs.byk.usa@altana.com

Emergency telephone

number

203-265-2086; CHEMTREC 1-800-424-9300 / +1 703-527-

3887

### Recommended use of the chemical and restrictions on use

Recommended use

: Air Release Additive

Restrictions on use

Refer to Section 15 for any restrictions that may apply

### SECTION 2. HAZARDS IDENTIFICATION

#### **GHS Classification**

Flammable liquids

: Category 3

Eye irritation

: Category 2A

Reproductive toxicity

: Category 2

Specific target organ toxicity

- single exposure

: Category 3 (Respiratory system, Central nervous system)

Aspiration hazard

: Category 1

#### Carcinogenicity

: Category 2

#### **GHS** label elements

Hazard pictograms







Signal word

: Danger

Hazard statements

: H226 Flammable liquid and vapour.

H304 May be fatal if swallowed and enters airways.

H319 Causes serious eye irritation. H335 May cause respiratory irritation. H336 May cause drowsiness or dizziness.



		/ Idditives of mistratives
BYK-A 560		
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	H361 Suspected of damaging fertilit H350 May cause cancer.	y or the unborn child.
Precautionary statements	Prevention: P201 Obtain special instructions be P202 Do not handle until all safety pand understood. P210 Keep away from heat/sparks/No smoking. P233 Keep container tightly closed. P240 Ground/bond container and re P241 Use explosion-proof electrica equipment. P242 Use only non-sparking tools. P243 Take precautionary measures P261 Avoid breathing dust/ fume/ general personal protective equipersonal protective gloves/ eye personal protective equipersonal prot	open flames/hot surfaces.  deceiving equipment. If ventilating/ lighting/ s against static discharge. gas/ mist/ vapours/ spray. andling. Il-ventilated area. protection/ face protection. pment as required. ter.  Immediately call a POISON (or hair): Remove/ Take off ing. Rinse skin with water/ streaming Remove viction to fresh air fortable for breathing. Call a ician if you feel unwell. Rinse cautiously with water act lenses, if present and easy erned: Get medical advice/ dry sand, dry chemical or on. lated place. Keep container

Other hazards

None known.

disposal plant.

**Disposal:**P501 Dispose of contents/ container to an approved waste



#### **BYK-A 560**

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### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature

: Solution of foam destroying polyacrylates and polymers,

silicone free

#### Hazardous components

Component	CAS-No.	Concentration (%)
Solvent naphtha, petroleum, light aromatic	64742-95-6	>= 75 - < 76
Naphtha, petroleum, hydrodesulfurized heavy	64742-82-1	>= 3 -< 4
Stoddard Solvent (Mineral spirits)	8052-41-3	>= 3 -< 4
1-Methoxy-2-propanol acetate	108-65-6	>= 2 -< 3
Hydroxy acetic acid butyl ester (Butyl glycolate)	7397-62-8	>= 0 -<1
Cumene	98-82-8	>= 1 -<2

#### **SECTION 4. FIRST AID MEASURES**

If inhaled

: Remove to fresh air. Administer artificial respiration if

necessary. Get medical aid as soon as possible.

In case of skin contact

: Remove contaminated clothing. Wash thoroughly with soap

and water.

In case of eye contact

Immediately flush with plenty of water for at least 20 minutes.

Get medical aid.

If swallowed

: Do not induce vomiting; aspiration hazard. Dilute with 1-2 glasses of water. Get medical aid. If vomiting occurs

spontaneously, keep head below hips to prevent aspiration of

liquid into lungs.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and

delayed

: No information available.

### SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media

Foam

Carbon dioxide (CO2)

Dry chemical

Unsuitable extinguishing

media

: No information available.



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Specific hazards during firefighting

: Cool closed containers exposed to fire with water spray.

Will not explode on mechanical impact.

Hazardous combustion products

: Carbon oxides

Further information

: Keep away from heat and sources of ignition.

Keep away from oxidizing agents.

Special protective equipment for firefighters

: In the event of fire, wear self-contained breathing apparatus.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: Eliminate all sources of ignition. Ventilate area if indoors. Wear self-contained breathing apparatus and full protective clothing.

Environmental precautions

: Prevent spilled material from entering the ground, water and/or air by using appropriate containment methods.

Methods and materials for containment and cleaning up Stop leak. Dike and contain spill.

Pump into salvage tanks and/or absorb with suitable material.

Use sparkless shovels to remove material.

### SECTION 7. HANDLING AND STORAGE

Advice on safe handling

: Harmful in contact with skin.

Avoid contact with skin and eyes.

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

Ensure all equipment is electrically grounded before beginning

transfer operations.

Containers should be grounded when being emptied. Vapours may travel to areas away from work site before

igniting/flashing back to Vapour source. Handle as an industrial chemical. Keep container tightly closed.

Conditions for safe storage

: Avoid exposure to excessive heat, light, and air for prolonged

periods of time.

Keep in a dry, cool and well-ventilated place.

Keep product and empty container away from heat and

sources of ignition.

Take measures to prevent the build up of electrostatic charge.

Materials to avoid

Keep away from strong acids. Keep away from strong bases. Keep away from oxidizing agents.



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### SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Stoddard Solvent (Mineral spirits)	8052-41-3	TWA	100 ppm	ACGIH
		TWA	500 ppm 2,900 mg/m3	OSHA Z-1
· · · · · · · · · · · · · · · · · · ·		TWA	100 ppm 525 mg/m3	OSHA P0
1-Methoxy-2-propanol acetate	108-65-6	TWA	50 ppm	US WEEL
	,	PEL	100 ppm 541 mg/m3	CAL PEL
		STEL	150 ppm 811 mg/m3	CAL PEL
Cumene	98-82-8	TWA	50 ppm	ACGIH
		TWA	50 ppm 245 mg/m3	OSHA Z-1
		TWA	50 ppm 245 mg/m3	OSHA P0

Engineering measures

: Use with local exhaust ventilation.

### Personal protective equipment

Respiratory protection

: Unless air monitoring demonstrates vapor/mist/dust levels are below the PEL/TLV wear a properly fitted respirator (NIOSH approved) or dust mask during exposure.

Hand protection

Material

: Nitrile rubber

Eye protection

: Safety Glasses

Goggles

Skin and body protection

: Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

: Clean long legged, long sleeved work clothes.

Handle in accordance with good industrial hygiene and safety

practice.



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### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

: liquid

Colour

: clear

Odour

: characteristic

Odour Threshold

: No data available

рΗ

: No data available

Melting point/range

: < 32 °F (< 0 °C)

Method: see user defined free text

Initial boiling point

: 291.20 °F (144.00 °C)

Method: see user defined free text

Vapour pressure

: 4.0000000 hPa (68.00 °F (20.00 °C))

Method: calculated

Flash point

: 109.40 °F (43.00 °C)

Method: 48 (Abel-Pensky)

Upper explosion limit

: 10.80 %(V)

Lower explosion limit

: 0.60 %(V)

Evaporation rate

: No data available

Flammability (solid, gas)

: No data available

Relative vapour density

: No data available

Relative Density/Specific

Gravity

: No data available

Density

: 0.8700 g/cm3 (68.00 °F (20.00 °C)) Method: 4 (20°C oscillating U-tube)

Bulk density

: Not applicable

Solubility(ies)

Water solubility

: immiscible

Solubility in other solvents

: No data available

Partition coefficient: n-

: No data available



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octanol/water

Auto-ignition temperature

: > 392 °F (> 200 °C)

Method: DIN 51794

Thermal decomposition

: No data available

Viscosity

Viscosity, kinematic

: 5 mm2/s (104.00 °F (40.00 °C))

Surface tension

: No data available

#### SECTION 10. STABILITY AND REACTIVITY

Reactivity

: Not classified as a reactivity hazard.

Chemical stability

: Stable; polymerization will not occur

Possibility of hazardous

reactions

: 1-Methoxy-2-propanol acetate may form peroxides of

unknown stability.

Conditions to avoid

: Prolonged heat/light/air exposure

Incompatible materials

: Acids

Strong oxidizing agents

Alkalis

Hazardous decomposition

products

: None expected

### SECTION 11. TOXICOLOGICAL INFORMATION

### Information on likely routes of exposure

Skin contact Skin absorption Inhalation Eyes Ingestion

#### Acute toxicity

#### Product:

Acute oral toxicity

: Acute toxicity estimate : > 5,000 mg/kg

Method: Calculation method

#### Components:

64742-95-6 Solvent naphtha, petroleum, light aromatic:



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Acute oral toxicity

: LD50 (Rat): > 4,000 mg/kg

Acute inhalation toxicity

: LC50 (Rat): 3670 ppm

Exposure time: 4 h

Acute dermal toxicity

: LD50 (Rabbit): > 3,480 mg/kg

64742-82-1 Naphtha, petroleum, hydrodesulfurized heavy:

Acute oral toxicity

: LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity

: LC50 (Rat): > 11.6 mg/l

Acute dermal toxicity

: LD50 (Rabbit): > 3,000 mg/kg

8052-41-3 Stoddard Solvent (Mineral spirits):

Acute oral toxicity

: LD50 (Rat): > 6,000 mg/kg

Acute inhalation toxicity

: LC50 (Rat): 5,500 mg/m3

Exposure time: 4 h

Acute dermal toxicity

: LD50 (Rabbit): > 3,000 mg/kg

108-65-6 1-Methoxy-2-propanol acetate:

Acute oral toxicity

: LD50 (Rat, female): 5,155 mg/kg

Acute inhalation toxicity

: LC50 (Rat): > 100 ppm Exposure time: 4 h

Acute dermal toxicity

: LD50 (Rabbit): > 5,000 mg/kg

7397-62-8 Hydroxy acetic acid butyl ester (Butyl glycolate):

Acute oral toxicity

: LD50 (Rat): 4,595 mg/kg

98-82-8 Cumene:

Acute oral toxicity

: LD50 (Rat): 1,400 mg/kg

Acute inhalation toxicity

: LC50 : Remarks: No data available

Acute dermal toxicity

: LD50 : Remarks: No data available

Skin corrosion/irritation

Product:

Remarks: No data available

Components:

64742-95-6 Solvent naphtha, petroleum, light aromatic:

Species: Rabbit

Result: Moderate skin irritation



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64742-82-1 Naphtha, petroleum, hydrodesulfurized heavy:

Species: Rabbit

Result: Moderate skin irritation

8052-41-3 Stoddard Solvent (Mineral spirits):

Species: Rabbit

Result: Moderate skin irritation

7397-62-8 Hydroxy acetic acid butyl ester (Butyl glycolate):

Species: Rabbit

Result: Moderate skin irritation

Serious eye damage/eye irritation

Product:

Remarks: No data available

Components:

64742-95-6 Solvent naphtha, petroleum, light aromatic:

Species: Rabbit Result: Eye irritation

64742-82-1 Naphtha, petroleum, hydrodesulfurized heavy:

Species: Rabbit Result: Eye irritation

8052-41-3 Stoddard Solvent (Mineral spirits):

Species: Rabbit Result: Eye irritation

7397-62-8 Hydroxy acetic acid butyl ester (Butyl glycolate):

Species: Rabbit

Result: Corrosive to eyes

Respiratory or skin sensitisation

Product:

Remarks: No data available

Components:

64742-95-6 Solvent naphtha, petroleum, light aromatic:

Test Type: Maximisation Test Exposure routes: Dermal Species: Guinea pig

Method: OECD Test Guideline 406 Result: Does not cause skin sensitisation.

7397-62-8 Hydroxy acetic acid butyl ester (Butyl glycolate):

Test Type: Maximisation Test



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Species: Guinea pig

Method: OECD Test Guideline 406

Result: Does not cause skin sensitisation.

GLP: yes

Carcinogenicity

**IARC** 

No component of this product present at levels greater than or

equal to 0.1% is identified as probable, possible or confirmed

human carcinogen by IARC.

**ACGIH** 

No component of this product present at levels greater than or

equal to 0.1% is identified as a carcinogen or potential

carcinogen by ACGIH.

**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

No component of this product present at levels greater than or

equal to 0.1% is identified as a known or anticipated carcinogen

by NTP.

#### Repeated dose toxicity

#### **Product:**

Remarks: Absorption of ingredients (solvents) by inhalation and/or repeated skin contact has caused injury to liver, kidney, brain, respiratory system, blood, and/or bone marrow in laboratory

animals Inhalation of Naphtha has caused fetotoxic effects at maternally toxic doses in laboratory

Cumene is an IARC 2B and NTP Group 2 Carcinogen. Cumene has caused tumors in rats and animals. mice (lung, liver and kidney). Proposed cancer causing mechanisms for lung and liver tumors are similar to human metabolic pathways. The relevance of kidney tumors in humans is uncertain.

#### Aspiration toxicity

### 64742-95-6 Solvent naphtha, petroleum, light aromatic:

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.

#### Experience with human exposure

#### Product:

Inhalation:

Symptoms:

High concentrations of vapors may be irritating to the respiratory tract. May cause



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CNS depression (drowsiness, loss of coordination and fatigue).

Skin contact:

Symptoms:

Contact will probably cause irritation.

Eye contact:

Symptoms:

Contact will probably cause irritation.

Ingestion:

Symptoms:

Ingestion will probably irritate the digestive tract; high dosages may cause CNS

depression.

### SECTION 12. ECOLOGICAL INFORMATION

#### **Ecotoxicity**

#### Product:

Toxicity to fish

Remarks: No data available

### Persistence and degradability

#### Product:

Biodegradability

: Remarks: No data available

#### Bioaccumulative potential

#### Product:

Bioaccumulation

: Remarks: No data available

### Mobility in soil

### No data available

### Other adverse effects

#### Product:

Results of PBT and vPvB

assessment

: This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of

0.1% or higher.

Regulation

40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances



**BYK-A 560** 

Version 6

Revision Date 06/15/2016

Print Date 06/17/2016

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

: There is no data available for this product.

### SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

EPA Hazardous Waste

: D001: Ignitable

Code(s)

D018: Benzene

Waste from residues

: Dispose of in accordance with applicable local/municipal,

state/provincial and federal regulations.

### SECTION 14. TRANSPORT INFORMATION

#### International Regulation

IATA-DGR

UN/ID No.

: UN 1268

Proper shipping name

: Petroleum distillates, n.o.s.

Class

: 3

Packing group

: 111

Labels

: Flammable liquid

Packing instruction (cargo

: 366

aircraft)

Packing instruction

: 355

(passenger aircraft)

IMDG-Code

UN number

: UN 1268

Proper shipping name

: PETROLEUM DISTILLATES, N.O.S.

Class

: 3

Packing group

: 111

Labels

3

EmS Code

F-E, S-E

Marine pollutant

yes

Remarks

IMDG Code segregation group - none

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

**National Regulations** 

49 CFR



#### **BYK-A 560**

Version 6

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Print Date 06/17/2016

UN/ID/NA number

: UN 1268

Proper shipping name

: Petroleum distillates, n.o.s.

Class

: 3

Packing group

: 111

Labels

: Flammable liquid

**ERG** Code

Marine pollutant

: no

Container sizes: 55 gallon drums, 5 or 6-gallon pails, 2oz/16oz samples

#### SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

US. EPA CERCLA Hazardous Substances (40 CFR 302)

Calculated RQ exceeds reasonably attainable upper limit.

SARA 304 - Emergency Release Notification

This material does not contain any components with a section 304 EHS RQ.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)

This material does not contain any components with a SARA 302 RQ.

SARA 311/312 Hazards

: Acute Health Hazard

Chronic Health Hazard

Fire Hazard

**SARA 302** 

: No chemicals in this material are subject to the reporting

requirements of SARA Title III, Section 302.

**SARA 313** 

: This product contains the following toxic chemical(s) 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.

1,2,4-Trimethylbenzene

95-63-6

27 %

Cumene

98-82-8

1.9 %

#### Clean Air Act

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61): Cumene 98-82-8

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).



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Non-volatile (Wt)

10 - 14 %

Method: 22 (10min/150°C)

**DIN EN ISO 3251** 

Non-volatile information is not a specification.

Massachusetts Right To Know

Cumene

98-82-8

Pennsylvania Right To Know

Solvent naphtha, petroleum, light aromatic

64742-95-6

Naphtha, petroleum, hydrodesulfurized

64742-82-1

heavy

Polymer Cumene

98-82-8

**New Jersey Right To Know** 

Solvent naphtha, petroleum, light aromatic

64742-95-6

Naphtha, petroleum, hydrodesulfurized

64742-82-1

heavy

Polymer

Polyacrylate

108-65-6

1-Methoxy-2-propanol acetate

Cumene

98-82-8

**New Jersey Trade Secret** 

Registry Number for the

California Prop 65

product (NJ TSRN)

: 800963-5264

State of California to cause birth defects or other reproductive harm.

Benzene

71-43-2

Toluene

108-88-3

WARNING! This product contains a chemical known to the

WARNING: This product contains a chemical known to the

State of California to cause cancer.

Benzene

71-43-2 91-20-3

Naphthalene Ethylbenzene

100-41-4 123-91-1

1,4-Dioxane Cumene

98-82-8

CONEG Heavy Metal: We confirm that we use packaging and/or packaging components in which the sum of the incidental concentration levels of lead, mercury, cadmium and hexavalent chromium do not exceed 100 parts per million by weight.

The components of this product are reported in the following inventories:

**TSCA** 

: We certify that all of the components of this product are either listed on the TSCA Inventory or are not subject to the

notification requirements per 40 CFR 720 30(h).



### **BYK-A 560**

Version 6

Revision Date 06/15/2016

Print Date 06/17/2016

Section 4 / 12(b)

: Not applicable

DSL

We certify that all of the components of this product are listed

on the DSL.

#### **SECTION 16. OTHER INFORMATION**

**Revision Date** 

: 06/15/2016

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

### Material Safety Data Sheet



#### **BYK-W 966**

Version 3

Revision Date 02/15/2010

Print Date 02/15/2010

#### SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name

**BYK-W 966** 

Product Use Description

Wetting & Dispersing Additive

Company

BYK USA Inc.

524 South Cherry Street Wallingford CT 06492

Prepared by

J.Nole, Safety; M.McCutcheon, Regulatory

Telephone

(203) 265-2086

Visit our web site

www.byk.com

E-mail address

ehs.byk.usa@altana.com

Emergency telephone

CHEMTREC 800-424-9300

### SECTION 2. HAZARDS IDENTIFICATION

#### **Emergency Overview**

Form

: liquid

Colour

: light brown

Odour

: amine-like

#### **OSHA Regulatory Status**

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR1910.1200)

#### Potential Health Effects

Eyes

: Contact will probably cause irritation.

Skin

: Contact will probably cause irritation.

Ingestion

: Ingestion may irritate the digestive tract; high dosages may

cause CNS depression.

Inhalation

: High concentrations of vapors may be irritating to the

respiratory tract. May cause headaches, dizziness, nausea and vomiting. May cause CNS depression (drowsiness, loss

of coordination and fatigue).

Chronic Exposure

: Absorption of ingredients (solvents) by inhalation and/or repeated skin contact may cause injury to the liver/kidney.

Inhalation of Naphtha has caused fetotoxic effects at

maternally toxic doses in laboratory animals. Reports have associated repeated and prolonged

occupational exposure to solvents with permanent brain and

nervous system damage.

Intentional misuse by deliberately concentrating and inhaling

vapors may be harmful or fatal.

### Material Safety Data Sheet



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Aggravated Medical

Condition

: May be aggravating to some

skin conditions

asthma-type conditions

pre-existing liver and/or kidney disorders

Primary Routes of Entry

: Skin contact Skin absorption Inhalation Eyes Ingestion

#### Carcinogenicity:

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

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.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

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

#### **Environmental Effects**

**Environmental Effects** 

: No information available.

### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### Chemical nature

Solution of a salt of unsaturated fatty acid polyamine amides and acidic polyesters

#### Hazardous components

HMIRC# 7762 Filing Date 12/07/2009

The specific chemical identity/weight percent of proprietary ingredient(s) is a trade secret

Component	CAS-No.	Weight percent
Polyamine amide salt		30.00 - 60.00
Naphtha, petroleum, heavy alkylate	64741-65-7	30.00 - 60.00

### Material Safety Data Sheet



### **BYK-W 966**

Version 3

Revision Date 02/15/2010

Print Date 02/15/2010

#### SECTION 4. FIRST AID MEASURES

#### First aid procedures

Inhalation

: Remove to fresh air. Administer artificial respiration if necessary. Get medical aid as soon as possible.

Skin contact

Remove contaminated clothing. Wash thoroughly with soap

and water.

Eye contact

Immediately flush with plenty of water for at least 20 minutes.

Get medical aid.

Ingestion

Do not induce vomiting. Dilute with 1-2 glasses of water. Get

medical aid. Never give anything by mouth to an unconscious

person.

Notes to physician

Risks

: No information available.

#### SECTION 5. FIRE-FIGHTING MEASURES

#### Flammable properties

Flash point

: 38 °C (100.40 °F)

Method: 48 (Abel-Pensky)

Ignition temperature

: 240 °C (464.00 °F)

Method: calculated

Lower explosion limit

: 0.60 %(V)

Upper explosion limit

: 7.00 %(V)

Suitable extinguishing

: Foam

media

Carbon dioxide (CO2)

Dry chemical

Unsuitable extinguishing

: No information available.

media Special protective

equipment for fire-fighters Specific hazards during fire In the event of fire, wear self-contained breathing apparatus.

fighting

Cool closed containers exposed to fire with water spray.

Will not explode on mechanical impact.

Hazardous decomposition products due to incomplete Carbon oxides

nitrogen oxides (NOx)



### **BYK-W 966**

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combustion.

Further information

: Keep away from heat and sources of ignition.

Take precautionary measures against static discharges.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions

: Eliminate all sources of ignition. Ventilate area if indoors. Wear self-contained breathing apparatus and full protective clothing.

Environmental precautions

Prevent spilled material from entering the ground, water and/or

air by using appropriate containment methods.

Methods for containment

: Stop leak. Dike and contain spill.

Methods for cleaning up

Pump into salvage tanks and/or absorb with suitable material.

Use sparkless shovels to remove material.

Additional advice

: No further information is available.

### **SECTION 7. HANDLING AND STORAGE**

### Handling

Handling

: Harmful in contact with skin.

Avoid contact with skin and eyes.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Handle as an industrial chemical. Keep container tightly closed. Keep away from oxidizing agents.

#### Storage

Advice on common storage

Keep product and empty container away from heat and

sources of ignition.

Take precautionary measures against static discharges.

Keep in a dry, cool and well-ventilated place.

### SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### **Exposure Guidelines**

### Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Naphtha, petroleum, heavy alkylate	64741-65-7	TWA	5 mg/m3	1993-3-1	OSHA P1



### **BYK-W 966**

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### **Engineering measures**

Engineering measures

: Use with local exhaust ventilation.

### Personal protective equipment

Eve protection

: Safety Glasses

Goggles

Hand protection

: Viton

Skin and body protection

: Choose body protection according to the amount and

concentration of the dangerous substance at the work place.

Respiratory protection

: Unless air monitoring demonstrates vapor/mist/dust levels are

below the PEL/TLV wear a properly fitted respirator (NIOSH

approved) or dust mask during exposure.

Hygiene measures

: Clean long legged, long sleeved work clothes.

Handle in accordance with good industrial hygiene and safety

practice.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form

: liquid

Colour Odour

: light brown

: amine-like

Odor Threshold

: no data available

Flash point

: 38 °C (100.40 °F) Method: 48 (Abel-Pensky)

Ignition temperature

: 240 °C (464.00 °F)

Method: calculated

Lower explosion limit

: 0.60 %(V)

Upper explosion limit

: 7.00 %(V)

: no data available

Freezing point

: no data available

Initial boiling point

: 153 ℃ (307.40 ℉)

Vapour pressure

: 13.0000000 hPa

at 20 °C (68.00 °F) Method: calculated

Evaporation rate

: no data available

Density

: 0.8650 g/cm3

at 20 °C (68.00 °F)Method: DIN EN ISO 2811-3



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Bulk density

: not applicable

Water solubility

: immiscible

Partition coefficient: n-

: no data available

octanol/water

Viscosity, kinematic

: 199.000 mm2/s

at 20 °C (68.00 °F)

> 7.000 mm2/sat 40 °C (104.00 °F)

Relative vapour density

: no data available

### SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid

: None known.

Materials to avoid

: Strong oxidizing agents

Hazardous decomposition

products

: None expected

Chemical stability

: Stable; polymerization will not occur

### SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity (Product) : LD50 rat

Dose: > 46,400.000000 mg/kg

Method: OECD Test Guideline 401

active ingredient

Acute oral toxicity

(Component)

: Component: 64741-65-7 Naphtha, petroleum, heavy alkylate

LD50 rat

Dose: 34,600 mg/kg

Acute dermal toxicity

(Component)

: Component: 64741-65-7 Naphtha, petroleum, heavy alkylate

LD50 rabbit

Dose: 15,400 mg/kg

Acute inhalation toxicity

(Component)

: Component: 64741-65-7 Naphtha, petroleum, heavy alkylate

LC50 rat

Dose: > 3684 ppm Exposure time: 4 h

Skin irritation (Product)

: rabbit

Result: Moderate skin irritation



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Skin irritation (Component)

Component: 64741-65-7 Naphtha, petroleum, heavy alkylate

rabbit

Result: slight irritation

Eye irritation (Product)

rabbit

Result: Eye irritation

Method: OECD Test Guideline 405

active ingredient

Eye irritation(Component)

Component: 64741-65-7 Naphtha, petroleum, heavy alkylate

rabbi

Result: Mild eye irritation

Sensitisation (Product)

: no data available

### SECTION 12. ECOLOGICAL INFORMATION

Toxicity to fish (Product)

: LC50

Species: Leuciscus idus (Golden orfe)

Dose: 70.00 mg/l Exposure time: 48.0 h active ingredient

Additional ecological

information (Product)

There is no data available for this product.

## SECTION 13. DISPOSAL CONSIDERATIONS

Further information

Dispose of in accordance with applicable local/municipal,

state/provincial and federal regulations.

### SECTION 14. TRANSPORT INFORMATION

Container sizes: 55 gallon drums, 5 or 6-gallon pails, 2oz/16oz samples)

DOT

**UN Number** 

3295

Proper shipping name

HYDROCARBONS, LIQUID, N.O.S.

Class

: 3

Packing group

: 111

Emergency Response

: 128

Guidebook Number

IATA

**UN Number** 

: 3295

Description of the goods

: HYDROCARBONS, LIQUID, N.O.S.

Class

: 3

Packing group

: 111

ICAO-Labels

: 3



### **BYK-W 966**

**IMDG** 

Version 3

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Print Date 02/15/2010

Packing instruction (cargo

aircraft)

Packing instruction

: 310 : 309

(passenger aircraft) Package Instruction (Limited: Y309

**UN Number** 

quantity)

: UN 3295

Description of the goods

: HYDROCARBONS, LIQUID, N.O.S.

Class Packing group IMDG-Labels

: 3 : 111 3

EmSNumber1 EmSNumber2 Marine pollutant

: F-E : S-D : no

### **SECTION 15. REGULATORY INFORMATION**

**HMIS Classification** 

: Health hazard: 2

Chronic Health Hazard: \*

Flammability: 2 Reactivity: 0 PPI:B

**National Fire Protection** Association (NFPA) Class

: 11

Emergency Planning Community Right-To-Know (EPCRA)

SARA 302 Components

: Not applicable

If listed below, this product contains toxic chemical(s) 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.

SARA 311/312 Hazards

: Acute Health Hazard

Chronic Health Hazard

Fire Hazard

Toxic Substances Control Act (TSCA)

**TSCA Status** 

: We certify that all of the components of this product are either

listed on the TSCA Inventory or are not subject to the

notification requirements (exempt)

Section 4 / 12(b)

: Not applicable

Clean Air Act & Related Information

Non-volatile (Wt)

: 50 - 54 %



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Method: 22 (10min/150°C) DIN EN ISO 3251

Ozone Depleting Substances : Not applicable.

Non-volatile information is not a specification.

Hazardous Air Pollutants

If not listed above, this product does not contain HAPs at 1% or 0.1% or greater. Refer to Section 3 for HAP weight percentage.

Resource Conservation and Recovery Act

**EPA Hazardous Waste** 

: D001

Ignitable

Code(s)

D018

Benzene

State Laws

Massachusetts Right To Know Components : No components are subject to the Massachusetts Right to Know

Act.

Pennsylvania Right To Know Components : Naphtha, petroleum, heavy

Naphtha, petroleum, heavy

64741-65-7

alkylate

Polyamine amide salt

\_

New Jersey Right To Know Components : Polyamine amide salt

64741-65-7

alkylate

New Jersey Trade Secret Registry Number for the

product (NJ TSRN)

: 800963-5042

California Prop. 65 Components : WARNING! This product contains a chemical known to the

State of California to cause cancer.

Benzene

71-43-2

WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive

harm.

Benzene

71-43-2

CONEG Heavy Metal: We certify that this product does not contain Lead, Mercury, Cadmium or hexavalent chromium in the sum concentration of 100 ppm by weight or greater.



### **BYK-W 966**

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## Canadian Environmental Protection Act

Domestic Substances List

**DSL Status** 

: We certify that all of the components of this product are listed

on the DSL.

WHMIS Classification

: B3

D<sub>2</sub>B

### SECTION 16. OTHER INFORMATION

#### Further information

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## SAFETY DATA SHEET



Chemlease® 15 Sealer

## Section 1. Identification

Product name

: Chemlease® 15 Sealer

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

Mold Sealer

Supplier's details

: Chem-Trend LP

1445 W McPherson Park Dr

PO Box 860, Howell MI 48844-0860

517-546-4520



Emergency telephone number and Telephone number : +1 517 546 4520

## Section 2. Hazards identification

OSHA/HCS status

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

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3

ACUTE TOXICITY (inhalation) - Category 4 SKIN CORROSION/IRRITATION - Category 2

SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A

CARCINOGENICITY - Category 2

TOXIC TO REPRODUCTION (Fertility) - Category 2
TOXIC TO REPRODUCTION (Unborn child) - Category 2

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract

irritation) - Category 3

Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 28.3%

**GHS label elements** 

Hazard pictograms







Signal word

: Warning

Hazard statements

: Flammable liquid and vapor.

Harmful if inhaled.

Causes serious eye irritation.

Causes skin irritation.

Suspected of damaging fertility or the unborn child.

Suspected of causing cancer. May cause respiratory irritation.

Precautionary statements

## Section 2. Hazards identification

#### Prevention

: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Wash hands thoroughly after handling.

#### Response

: IF exposed or concerned: Get medical attention. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs: Get medical attention. 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 attention.

### Storage Disposal

- : Store locked up. Store in a well-ventilated place. Keep cool.
- : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified

: None known.

## Section 3. Composition/information on ingredients

Substance/mixture : Mixture		
Ingredient name	%	CAS number
o-xylene Solvent naphtha (petroleum), light arom. 1,2,4-trimethylbenzene mesitylene diethylbenzene cumene toluene	≥44 - <50 ≥10 - <25 ≥16 - <25 ≥3 - <5 ≥1 - <3 ≥1 - <3 ≥0.3 - <1	95-47-6 64742-95-6 95-63-6 108-67-8 25340-17-4 98-82-8 108-88-3

## Section 4. First aid measures

### Description of necessary first aid measures

### Eye contact

: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

#### Inhalation

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

#### Skin contact

: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

## Section 4. First aid measures

#### Ingestion

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

## Most important symptoms/effects, acute and delayed

## Potential acute health effects

Eve contact

: Causes serious eye irritation.

Inhalation

: Harmful if inhaled. May cause respiratory irritation.

Skin contact

: Causes skin irritation.

Ingestion

: No known significant effects or critical hazards.

## Over-exposure signs/symptoms

Eye contact

: Adverse symptoms may include the following:

pain or irritation

watering redness

Inhalation

: Adverse symptoms may include the following:

respiratory tract irritation

coughing

reduced fetal weight increase in fetal deaths skeletal malformations

Skin contact

: Adverse symptoms may include the following:

irritation redness

reduced fetal weight increase in fetal deaths skeletal malformations

Ingestion

: Adverse symptoms may include the following:

reduced fetal weight increase in fetal deaths skeletal malformations

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

Notes to physician

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

Specific treatments

: No specific treatment.

Protection of first-aiders

: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

#### Extinguishing media

Suitable extinguishing

media

: Use dry chemical, CO2, water spray (fog) or foam.

Unsuitable extinguishing

media

: Do not use water jet.

### Specific hazards arising from the chemical

: Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

### Hazardous thermal decomposition products

: Decomposition products may include the following materials: carbon dioxide carbon monoxide

#### Special protective actions for fire-fighters

: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

### Special protective equipment for fire-fighters

: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

## Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

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

#### **Environmental precautions**

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

## Methods and materials for containment and cleaning up

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

## Section 7. Handling and storage

### Precautions for safe handling

#### Protective measures

: Put on appropriate personal protective equipment (see Section 8). Avoid exposure obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

## including any incompatibilities

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

# Section 8. Exposure controls/personal protection

### Control parameters

### Occupational exposure limits

Ingredient name	Exposure limits
o-xylene	OSHA PEL 1989 (United States, 3/1989).
0-xylerie	TWA: 100 ppm 8 hours.
	TWA: 435 mg/m³ 8 hours.
	STEL: 150 ppm 15 minutes.
	STEL: 655 mg/m³ 15 minutes.
	OSHA PEL (United States, 2/2013).
	TWA: 100 ppm 8 hours.
	TWA: 435 mg/m³ 8 hours.
	ACGIH TLV (United States, 4/2014).
	TWA: 100 ppm 8 hours.
	TWA: 434 mg/m³ 8 hours.
	STEL: 150 ppm 15 minutes.
	STEL: 651 mg/m³ 15 minutes.
1,2,4-trimethylbenzene	ACGIH TLV (United States, 4/2014).
1,2,4-tilifietriyiberizeric	TWA: 25 ppm 8 hours.
	TWA: 123 mg/m³ 8 hours.
	OSHA PEL 1989 (United States, 3/1989).
	TWA: 25 ppm 8 hours.
	TWA: 125 mg/m³ 8 hours.
mesitylene	ACGIH TLV (United States, 4/2014).
mesityiene	TWA: 25 ppm 8 hours.
	TWA: 123 mg/m <sup>3</sup> 8 hours.
	OSHA PEL 1989 (United States, 3/1989).
	TWA: 25 ppm 8 hours.
	TMA: 125 mg/m <sup>3</sup> 8 hours
cumono	OSHA PEL 1989 (United States, 3/1989). Absorbed through skin.
cumene	TWA: 50 ppm 8 hours.

Chemlease® 15 Sealer Section 8. Exposure controls/personal protection TWA: 245 mg/m<sup>3</sup> 8 hours. ACGIH TLV (United States, 4/2014). TWA: 50 ppm 8 hours. OSHA PEL (United States, 2/2013). Absorbed through skin. TWA: 50 ppm 8 hours. TWA: 245 mg/m<sup>3</sup> 8 hours. toluene OSHA PEL 1989 (United States, 3/1989). TWA: 100 ppm 8 hours TWA: 375 mg/m<sup>3</sup> 8 hours. STEL: 150 ppm 15 minutes. STEL: 560 mg/m3 15 minutes. OSHA PEL Z2 (United States, 2/2013). TWA: 200 ppm 8 hours. CEIL: 300 ppm

AMP: 500 ppm 10 minutes.

TWA: 20 ppm 8 hours.

ACGIH TLV (United States, 4/2014).

## Appropriate engineering controls

: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

## Environmental exposure controls

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

### Individual protection measures

#### Eye/face protection

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

#### Hand protection

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

#### **Body protection**

: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear antistatic protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

#### Other skin protection

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

#### Respiratory protection

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

# Section 9. Physical and chemical properties

Physical state	Liquid.	Color	Colorless.
Odor	Solvents	Odor threshold	Not available.
	Not available.	Melting point	Not available.
pH Boiling point	140°C (284°F)	Flash point	Closed cup: 29°C (84.2°F) [ Pensky-Martens]
Burning time	Not applicable.	Burning rate	Not applicable.
Evaporation rate	1 (ether (anhydrous) = 1)	Flammability (solid, gas)	Not available.
Lower and upper explosive (flammable) limits	Not available.	Vapor pressure	0.85 kPa (6.4 mm Hg) [room temperature]
Vapor density	>1 [Air = 1]	Relative density	0.88
Solubility	Insoluble in the following materials: cold water.	Solubility in water	Not available.
Partition coefficient: n-octanol/water	Not available.	Auto-ignition temperature	Not available.
Decomposition temperature	Not available.	SADT	Not available.
Viscosity	Not available.	Volatility	97.5

Lower and upper explosive (flammable) limits

cumene 1,2,4-trimethylbenzene

o-xylene

Solvent naphtha (petroleum), light arom.

Lower: 0.9% Upper: 6.5%

Lower: 0.9% Upper: 6.4% Lower: 0.9% Upper: 6.7%

Lower: 1.4% Upper: 7.6%

# Section 10. Stability and reactivity

Reactivity

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

**Chemical stability** 

: The product is stable.

Possibility of hazardous reactions

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

Conditions to avoid

: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Incompatible materials

: Reactive or incompatible with the following materials: oxidizing materials

Hazardous decomposition products

: Formaldehyde and silicon dioxide may be evolved at elevated temperatures.

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## Section 11. Toxicological information

### Information on toxicological effects

#### **Acute toxicity**

Product/ingredient name	Result	Species	Dose	Exposure
o-xylene Solvent naphtha (petroleum),	LD50 Oral LD50 Oral	Rat Rat	3567 mg/kg 8400 mg/kg	-
light arom. 1,2,4-trimethylbenzene mesitylene diethylbenzene	LC50 Inhalation Vapor LD50 Oral LC50 Inhalation Vapor LD50 Oral LD50 Dermal	Rat Rat Rat Rat Rabbit	18000 mg/m³ 5 g/kg 24000 mg/m³ 5000 mg/kg >5000 mg/kg	4 hours - 4 hours
cumene	LD50 Oral LC50 Inhalation Vapor LD50 Oral LC50 Inhalation Vapor	Rat Rat Rat	2050 mg/kg 39000 mg/m³ 1400 mg/kg	- 4 hours
toluene	LD50 Innalation Vapor LD50 Oral	Rat Rat	49 g/m³ 636 mg/kg	4 hours

Irritation/Corrosion : Causes serious eye irritation. Causes skin irritation. May cause respiratory irritation.

Sensitization : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Carcinogenicity : Suspected of causing cancer.

Reproductive toxicity: Suspected of damaging fertility or the unborn child.

Teratogenicity: No known significant effects or critical hazards.

## Specific target organ toxicity (single exposure)

lame	Target organs	
o-xylene 1,2,4-trimethylbenzene mesitylene cumene toluene	Respiratory tract irritation Respiratory tract irritation Respiratory tract irritation Respiratory tract irritation Narcotic effects	

### Specific target organ toxicity (repeated exposure)

Name	Target organs
toluene	Not determined

### Aspiration hazard

Name	Result
o-xylene	ASPIRATION HAZARD - Category 1
Solvent naphtha (petroleum), light arom.	ASPIRATION HAZARD - Category 1
cumene	ASPIRATION HAZARD - Category 1
toluene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure

: Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Harmful if inhaled. May cause respiratory irritation.

Skin contact : Causes skin irritation.

Ingestion : No known significant effects or critical hazards.

## Symptoms related to the physical, chemical and toxicological characteristics

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## Section 11. Toxicological information

#### Eye contact

Adverse symptoms may include the following: pain or irritation watering redness

#### Inhalation

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

#### Skin contact

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

#### Ingestion

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

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

### Short term exposure

Potential immediate

· Not available.

effects

Potential delayed effects

: Not available.

Long term exposure

Potential immediate

· Not available.

effects

Potential delayed effects

: Not available.

### Numerical measures of toxicity

### Acute toxicity estimates

Acute toxicity estimates	
Route	ATE value
Oral Dermal Inhalation (vapors)	4913 mg/kg 2182.7 mg/kg 17.87 mg/l

## Section 12. Ecological information

No known significant effects or critical hazards.

## Section 13. Disposal considerations

### Disposal methods

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

## Section 13. Disposal considerations

inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

RCRA classification

: D001 Because of its ignitability if the product is disposed of in its original form.

## Section 14. Transport information

	DOT Classification	Bulk	TDG Classification	IATA	IMDG
UN number	UN1866	UN1866	UN1866	UN1866	UN1866
UN proper shipping name	Resin solution	Resin solution	RESIN SOLUTION	Resin solution	RESIN SOLUTION
Transport hazard class(es)	3	3	3	3	3
Packing group	Ш	Ш	III	III	lii
Environmental hazards	No.	No.	No.	No.	No.
	Reportable quantity 2074 lbs / 941.61 kg [282.67 gal / 1070 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.  Limited quantity Yes.  Packaging instruction Passenger aircraft Quantity limitation: 60 L  Cargo aircraft Quantity limitation: 220 L  Special provisions			The environmentally hazardous substance mark may appear if required by other transportation regulations.  Passenger and Cargo Aircraft Quantity limitation: 60 L Packaging instructions: 355 Cargo Aircraft Only Quantity limitation: 220 L Packaging instructions: 366 Limited Quantities - Passenger Aircraft Quantity limitation: 10 L Packaging instructions: Y344  Special provisions A3	Emergency schedules (EmS) F-E, _S-E_ Special provisions 223, 955

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Chemlease® 15 Sealer		
Section 14.	Transport information	
	B1, B52, IB3, T2,	
	TP1	

Emergency Response Guidebook (ERG): 127

## Section 15. Regulatory information

### International lists:

nternational lists:	
Australia inventory (AICS)	All components are listed or exempted.
Canada inventory ( DSL/NDSL )	At least one component is not listed in DSL but all such components are listed in NDSL.
China inventory (IECSC)	All components are listed or exempted.
Europe inventory (EINECS)	All components are listed or exempted.
Japan inventory	All components are listed or exempted.
Korea inventory (KECI)	All components are listed or exempted.
New Zealand Inventory of Chemicals (NZIoC)	Not determined.
Philippines inventory (PICCS)	All components are listed or exempted.
United States inventory (TSCA 8b)	All components are listed or exempted.
Officoa Ottor	414.5

## Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)

Clean Air Act Section 112(b) Hazardous Air Foliata	Status
ngredient name	Listed
cumene o-xylene	Listed

### SARA 302/304

## Composition/information on ingredients

lients		SARA 302 TPQ		SARA 304 RQ	
%	EHS	(lbs)	(gallons)	(lbs)	(gallons)
	Yes	1000	-	10	-
	% 0 - 0.1	% EHS	% EHS (lbs)	% EHS (lbs) (gallons)	% EHS (lbs) (gallons) (lbs)

SARA 304 RQ

: 903948.8 lbs / 410392.8 kg [123198.1 gal / 466355.4 L]

SARA 311/312

Classification

: Fire hazard

Immediate (acute) health hazard Delayed (chronic) health hazard

#### **SARA 313**

SARA 313		OACmbox	%
	Product name	CAS number	70
Form R - Reporting requirements	o-xylene 1,2,4-trimethylbenzene cumene	95-47-6 95-63-6 98-82-8	≥44 - <50 ≥16 - <25 ≥1 - <3

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

### Canada

## Section 15. Regulatory information

WHMIS (Canada)

: Class B-2: Flammable liquid

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

#### State regulations

Massachusetts

: The following components are listed: MESITYLENE; PSEUDOCUMENE; CUMENE; O-

**XYLENE** 

**New York** 

: The following components are listed: Cumene; Benzene, 1-methylethyl-; o-Xylene

**New Jersey** 

: The following components are listed: TRIMETHYL BENZENE (mixed isomers);

BENZENE, TRIMETHYL-; PSEUDOCUMENE; 1,2,4-TRIMETHYL BENZENE;

CUMENE; BENZENE, (1-METHYLETHYL)-; DIETHYLBENZENE; BENZENE, DIETHYL-

; o-XYLENE; BENZENE, 1,2-DIMETHYL-

Pennsylvania

: The following components are listed: BENZENE, TRIMETHYL-; PSEUDOCUMENE;

BENZENE, (1-METHYLETHYL)-; BENZENE, 1,2-DIMETHYL-

### California Prop. 65

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

WARNING: This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
toluene	Yes. No.	No. Yes.	No. No.	No. 7000 μg/day
ethylbenzene	Yes.	No.		(ingestion) No.
ethylene oxide 1,4-dioxane	Yes. Yes.	Yes. No.	54 μg/day (inhalation) Yes. Yes.	Yes. No.

U.S. Federal regulations

: TSCA 8(a) PAIR: Siloxanes and Silicones, di-Me, hydroxy-terminated

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

## Section 16. Other information

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

Health: 1

Flammability: 3

Physical hazards: 0

Personal protection Code: H

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

Health: 1

Flammability: 3

Instability/Reactivity: 0

Special: -

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Version

: 1.08

Prepared by

: Chem-Trend Regulatory Affairs Department.

## Section 16. Other information

### Key to abbreviations

: ATE = Acute Toxicity Estimate

BCF = Bioconcentration Factor

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

IATA = International Air Transport Association

IBC = Intermediate Bulk Container

IMDG = International Maritime Dangerous Goods

LogPow = logarithm of the octanol/water partition coefficient

MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships,

1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)

UN = United Nations

 ${f {\Bbb Z}}$  Indicates information that has changed from previously issued version.

### Notice to reader

Information presented herein has been compiled from information provided to us by our suppliers and other sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief but is not guaranteed to be so. Nothing herein is to be construed as recommending any practice or the use of any product in violation of any patent or in violation of any law or regulation. It is the users' responsibility to determine the suitability of any material for a specific purpose and to adopt such safety precautions as may be necessary. We make no warranty as to the results to be obtained in using any material and, since conditions of use are not under our control, we must necessarily disclaim all liability with respect to the use of any material supplied by us.

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#### SAFETY DATA SHEET

in accordance with 1907/2006/EC (REACH, as amended by 2015/830/EU) and 29 GFR 1910.1200

Supplier:

Revision date:

29 April 2016

Initial date of issue: 6 July 2007

SDS No.

## SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

ARC BX2 (897) (Part A), ARC MX5 (Part A)

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

ARC Polymer Composite. Abrasion resistant two component coating, mixed and applied with a trowel.

1.3. Details of the supplier of the safety data sheet

A.W. CHESTERTON COMPANY

860 Salem Street

Groveland, MA 01834-1507, USA

Tel. +1 978-469-6446 Fax: +1 978-469-6785

(Mon. - Fri. 8:30 - 5:00 PM EST)

SDS requests: www.chesterton.com

E-mail (SDS questions): ProductMSDSs@chesterton.com

E-mail: customer.service@chesterton.com

EU: Chesterton International GmbH, Am Lenzenfleck 23,

D85737 Ismaning, Germany - Tel. +49-89-996-5460

### 1.4. Emergency telephone number

24 hours per day, 7 days per week

Call Infotrac: 1-800-535-5053

Outside N. America: +1 352-323-3500 (collect)

### SECTION 2: HAZARDS IDENTIFICATION

### 2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EC) No 1272/2008 [CLP] / 29 CFR 1910.1200 / WHMIS 2015 / GHS

Eye Irrit. 2, H319

Skin Irrit. 2, H315

Skin Sens. 1, H317

Aquatic Chronic 3, H412

### 2.1.2. Classification according to WHMIS 1988

D2B; Toxic materials causing other effects; D2A: Very toxic materials causing other effects

## 2.1.3. Australian statement of hazardous nature

Hazardous according to criteria of Safe Work Australia.

### 2.1.4. Additional information

For full text of H-statements: see SECTIONS 2.2 and 16.

### 2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP] / 29 CFR 1910.1200 / WHMIS 2015 / GHS

Hazard pictograms:

Signal word:

Warning

Hazard statements;

H319 H315

Causes serious eye irritation.

H317

Causes skin irritation.

May cause an allergic skin reaction.

H412

Harmful to aquatic life with long lasting effects.

SDS No. 237A-15

Date: 29 April 2016 Precautionary statements:

P273

Avoid release to the environment.

P280

Wear protective gloves and eye/face protection.

P302/352

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

P333/313

If skin irritation or rash occurs: Get medical advice/attention.

P305/351/338

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.

P337/313 P362/364

Take off contaminated clothing and wash it before reuse.

Supplemental information:

None

#### 2.3. Other hazards

If vapors are produced, they will irritate the respiratory tract and cause coughing and labored breathing. The safety and health hazards are detailed separately for Part A and Part B. The final cured material is considered nonhazardous.

SECTION 3: COMPOSITION/INFORMAT	ION ON INC	GREDIENTS	1,15	
3.2. Mixtures Hazardous Ingredients¹	% Wt.	CAS No./ EC No.	REACH Reg. No.	CLP/GHS Classification
Epoxy resin (number average molecular weight <= 700)	10-22	25068-38-6 500-033-5	01-211945 6619-26	Eye Irrit. 2, H319 Skin Irrit. 2, H315 Skin Sens. 1, H317 Aquatic Chronic 2, H411
Benzyl Alcohol	1-5	100-51-6 202-859-9	NA	Acute Tox. 4, H332/H304 Eye Irrit. 2, H319
Other ingredients: Aluminum oxide	10-20	1344-28-1 215-691-6	NA	Not classified*
Silicon carbide	5-10	409-21-2 206-991-8	NA	Not classified*
Titanium dioxide	0.1-0.9	13463-67-7 236-675-5	01-211948 9379-17	Not classified*

<sup>\*</sup>Substance with a workplace exposure limit.

For full text of H-statements; see SECTION 16.

### SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

Inhalation:

Remove to fresh air. If not breathing, administer artificial respiration. Contact physician.

Skin contact:

Remove contaminated clothing. Wash clothing before reuse. Wash skin with soap and water. Consult physician.

Eye contact:

Flush eyes for at least 15 minutes with large amounts of water. Contact physician if irritation persists.

Ingestion:

Do not induce vomiting. Contact physician immediately.

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

Moderate eye and skin irritant. May cause skin sensitization as evidenced by rashes or hives. If vapors are produced, they will irritate the respiratory tract and cause coughing and labored breathing.

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

Treat symptoms.

### SECTION 5: FIREFIGHTING MEASURES

## 5.1. Extinguishing media

Suitable extinguishing media: Carbon Dioxide, dry chemical, foam or water fog

Unsuitable extinguishing media: None known

## 5.2. Special hazards arising from the substance or mixture

None

<sup>&</sup>lt;sup>1</sup> Classified according to: \* 29 CFR 1910.1200, 1915, 1916, 1917, Mass. Right-to-Know Law (ch. 40, M.G.L..O. 111F), California Proposition 65

<sup>\* 1272/2008/</sup>EC, REACH

<sup>\*</sup> WHMIS 2015

<sup>\*</sup> Safe Work Australia [NOHSC: 1008 (2004)]

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#### 5.3. Advice for firefighters

Cool exposed containers with water. Recommend Firefighters wear self-contained breathing apparatus.

Flammability Classification: -

**HAZCHEM Emergency Action Code:** 

## SECTION 6: ACCIDENTAL RELEASE MEASURES

## 6.1. Personal precautions, protective equipment and emergency procedures

Avoid skin contact, Utilize exposure controls and personal protection as specified in Section 8.

### 6.2. Environmental Precautions

Keep out of sewers, streams and waterways.

## 6.3. Methods and material for containment and cleaning up

Scoop up and transfer to a suitable container for disposal.

### 6.4. Reference to other sections

Refer to section 13 for disposal advice.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for safe handling

Avoid skin contact. Utilize exposure controls and personal protection as specified in Section 8. Remove contaminated clothing immediately. Wash clothing before reuse. Contaminated leather including shoes cannot be decontaminated and should be discarded. Avoid creating and breathing dust during removal, drilling, grinding, sawing or sanding.

## 7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, dry area.

### 7.3. Specific end use(s)

No special precautions.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

Occupational exposure limit values

Ingredients	OSH ppm	A PEL <sup>1</sup> mg/m <sup>3</sup>	ACGI ppm	H TLV <sup>2</sup> mg/m <sup>3</sup>	UK '	WEL <sup>3</sup> mg/m <sup>3</sup>		ALIA ES <sup>4</sup>
Epoxy resin (number average					ppm	mgnn	ppm	mg/m³
molecular weight <= 700) Benzyl Alcohol	1 12/12/20					-	-	
Aluminum oxide	(total)	15	-	-	-	_	_	100
	(resp)	15 5	(resp)	. 1	(inhal)	10	-	10
Silicon carbide					(inhal) (resp)	4		
Silicon carbide	(total)	15	(inhal)	10	(resp)	10	-	10
Titanium dioxide	(resp) (total)	15	(resp)	3	<i></i>	4		10
	(resp)	5	3.0 30 19. <del>3-1</del> 3	10	(inhal) (resp)	10 4	_	10
1					( 2/2)	-1		

<sup>&</sup>lt;sup>1</sup> United States Occupational Health & Safety Administration permissible exposure limits.

#### 8.2. Exposure controls

### 8.2.1. Engineering measures

No special requirements. If it is necessary to alter the final cured product such that dust may be generated, use adequate dust extraction or damp down.

### 8.2.2. Individual protection measures

Respiratory protection:

Not normally needed.

Protective gloves: Chemical resistant gloves (e.g., neoprene)

Eye and face protection: Safety goggles.

<sup>&</sup>lt;sup>2</sup> American Conference of Governmental Industrial Hygienists threshold limit values.

<sup>&</sup>lt;sup>3</sup> EH40 Workplace exposure limits, Health & Safety Executive

<sup>4</sup> Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003].

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Date: 29 April 2016

Other:

Impervious clothing as necessary to prevent skin contact.

8.2.3. Environmental exposure controls

Refer to sections 6 and 12.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

## 9.1. Information on basic physical and chemical properties

Physical state Colour

Initial boiling point Melting point

% Volatile (by volume) Flash point Method Viscosity

Autoignition temperature Decomposition temperature Upper/lower flammability or explosive limits

Flammability (solid, gas) Explosive properties

gritty paste blue

not determined not determined none

> 102°C (> 216°F) PM Closed Cup 450K cps @ 25°C not applicable no data available not applicable

not applicable not applicable Odour

Odour threshold Vapour pressure @ 20°C % Aromatics by weight

Relative density Weight per volume Coefficient (water/oil) Vapour density (air=1) Rate of evaporation (ether=1)

Solubility in water

insoluble Oxidising properties

not applicable

sweet

none

< 1

>1

< 1

2.2 kg/l

not determined

< 0.1 mm Hg

not applicable

18,3 lbs/gal.

9.2. Other information

None

## SECTION 10: STABILITY AND REACTIVITY

#### 10.1. Reactivity

Refer to sections 10.3 and 10.5.

### 10.2. Chemical stability

Stable

## 10.3. Possibility of hazardous reactions

No dangerous reactions known under conditions of normal use.

### 10.4. Conditions to avoid

None

### 10.5. Incompatible materials

Strong mineral acids and bases and strong oxidizers like liquid Chlorine and concentrated Oxygen.

### 10.6. Hazardous decomposition products

Carbon Monoxide, aldehydes, acids and other toxic fumes.

## SECTION 11: TOXICOLOGICAL INFORMATION

## 11.1. Information on toxicological effects

Primary route of exposure under normal use:

Inhalation, skin and eye contact. Personnel with pre-existing skin and eye disorders and skin allergies may be aggravated by exposure.

Acute toxicity -

Oral:

ATE-mix oral, 70690 mg/kg.

0.1-1	Test	Result
Substance	LD50, oral, rat	> 5000 mg/kg
Epoxy resin	LD50, oral, rat	1230 mg/kg
Benzyl Alcohol	LD30, ordi, rac	

Dermal:

dermal, rabbit > 2000 mg/k	in
definal, labbit   2000 tilgit	Ky
	dermal, rabbit 2000 mg/kg

Inhalation:

ATE-mix inhalation > 240.1 mg/l (mist). ATE-mix inhalation, 505.7 mg/l (vapor).

O. I. stance	Test	Result
Substance	LC50, rat, 4 hours	8,8 mg/l (vapor)
Benzyl Alcohol	LC50, rat, 4 hours	4.178 mg/l (mist)
Benzyl Alcohol	LOSO, IRL, 4 Hours	

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Skin corrosion/irritation:	Causes skin irritation.	and a second	resultation of the second seco
	Substance	Test	Result
	Epoxy resin (number average molecular weight <= 700)	Skin irritation, rabbit	Moderate irritation
Serious eye damage/ irritation:	Causes serious eye irritation.		
	Substance	Test	Result
	Epoxy resin (number average molecular weight <= 700)	Eye irritation	Moderate irritation
Respiratory or skin sensitisation;	May cause an allergic skin reaction.	*	,
	Substance	Test	Result
	Epoxy resin (number average molecular weight <= 700)	Skin sensitization, guinea	Sensitizing
Germ cell mutagenicity:	Epoxy resin (number average molecular we available data, the classification criteria are	eight <= 700), Aluminum oxic	le, Silicon carbide: based o
Carcinogenicity:	Based on recent 2-year mice skin painting s Agency for Research on Cancer (IARC) cor classify Epoxy resin (number average moled designated inhaled titanium dioxide as poss	studies and other available in a studies and other available in a studied that they did not have sular weight <= 700, CAS po	e enough information to
Reproductive toxicity:	Epoxy resin (number average molecular we available data, the classification criteria are	ight <= 700) Aluminum ovid	e, Silicon carbide: based or
STOT-single exposure:	Epoxy resin (number average molecular we available data, the classification criteria are	ight <= 700) Aluminum ovid	e, Silicon carbide: based or
STOT-repeated exposure:	Epoxy resin (number average molecular wei available data, the classification criteria are i	ight <= 700). Aluminum ovid	e, Silicon carbide: based or
Aspiration hazard:	Based on available data, the classification or		
Other information:	None known	mona are not met,	

#### SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. The information given below is based on a knowledge of the components and the ecotoxicology of similar substances.

#### 12.1. Toxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Epoxy resin (number average molecular weight <= 700); material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species); chronic NOEC, 21 days, Daphnia magna (OECD 211) = 0.3 mg/l.

### 12.2. Persistence and degradability

Epoxy resin: not readily biodegradable Benzyl Alcohol: expected to biodegrade relatively quickly.

### 12.3. Bioaccumulative potential

Epoxy resin: Octanol/water partition coefficient (log Kow) = 2.64 - 3.78, low potential for bioaccumulation. Benzyl Alcohol: low potential for bioaccumulation (BCF < 100).

#### 12.4. Mobility in soil

Paste. Insoluble in water. Epoxy resin: if product enters soil, it will be mobile and may contaminate groundwater (log Koc  $\leq$  3.65). In determining environmental mobility, consider the product's physical and chemical properties (see Section 9).

### 12.5. Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

#### 12.6. Other adverse effects

None known

### SECTION 13: DISPOSAL CONSIDERATIONS

#### 13.1. Waste treatment methods

Combine resin and curative. The final cured material is considered nonhazardous, Landfill sealed containers with a properly licensed facility. Unreacted components are a special waste (classified as hazardous according to 2008/98/EC). Check local, state and national/federal regulations and comply with the most stringent requirement.

SECTION 14: TRANSPORT INFORMATION

14.1. UN number

ADR/RID/ADN/IMDG/ICAO:

TDG: US DOT: NOT APPLICABLE

NOT APPLICABLE NOT APPLICABLE

14.2. UN proper shipping name

ADRIRIDIADNIMDGIICAO:

TDG: US DOT: NON-HAZARDOUS, NON REGULATED NON-HAZARDOUS, NON REGULATED NON-HAZARDOUS, NON REGULATED

14.3. Transport hazard class(es)

ADRIRIDIADNIMDGIICAO:

TDG: US DOT: NOT APPLICABLE NOT APPLICABLE NOT APPLICABLE

14.4. Packing group

ADR/RID/ADN/IMDG/ICAO:

TDG: US DOT: NOT APPLICABLE NOT APPLICABLE 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 MARPOL73/78 and the IBC Code

NOT APPLICABLE

14.8. Other information

NOT APPLICABLE

SECTION 15: REGULATORY INFORMATION

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

15.1.1. EU regulations

Authorisations under Title VII: Not applicable

Restrictions under Title VIII: None

Other EU regulations: Directive 94/33/EC on the protection of young people at work.

15.1.2. National regulations

US EPA SARA TITLE III

312 Hazards:

313 Chemicals:

**Immediate** 

None

Delayed

National implementation of the EC Directive referred to in section 15.1.1. Other national regulations:

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

Date: 29 April 20	
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	HER INFORMATION
Abbreviations	ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways  ADR: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
and acronyms:	ATE: Acute Toxicity Estimate  BCF: Bioconcentration Factor
	CLP: Classification Labelling Packaging Regulation (1272/2008/EC) ES: Exposure Standard
	GHS: Globally Harmonized System
	ICAO: International Civil Aviation Organization
	IMDG: International Maritime Dangerous Goods
	LC50: Lethal Concentration to 50 % of a test population
	LD50: Lethal Dose to 50% of a test population
	LOEL: Lowest Observed Effect Level
	N/A: Not Applicable
	NA: Not Available
	NOEC: No Observed Effect Concentration
	NOEL: No Observed Effect Level
	OECD: Organization for Economic Co-operation and Development
	PBT: Persistent, Bioaccumulative and Toxic substance
	(Q)SAR: Quantitative Structure-Activity Relationship
	REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (1907/2006/EC) RID: Regulations concerning the International Carriage of Dangerous Goods by Rail SDS: Safety Data Sheet
:	STEL: Short Term Exposure Limit
	STOT RE: Specific Target Organ Toxicity, Repeated Exposure
(	STOT SE: Specific Target Organ Toxicity, Repeated Exposure
7	IDG: Transportation of Dangerous Goods (Canada)
l	JS DOT: United States Department of Transportation
V	PvB: very Persistent and very Bioaccumulative substance
Y	VEL. WORKPIACE EXPOSURE Limit
V	VHMIS: Workplace Hazardous Materials Information System
C	Other abbreviations and acronyms can be looked up at www.wikipedia.org.
Key literature refere	Pinces Commission dos permes de l'Article de di www.wikipedia.org.
and sources for dat	Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) Chemical Classification and Information Database (CCID) European Chemicals Agency (ECHA) - Information on Chemicals Hazardous Substances Information System (HSIS) National Institute of Technology and Evaluation (NITE) Swedish Chemicals Agency (KEMI)
	U.S. National Library of Medicine Toxicology Data Network (TOXNET)
Procedure used to	derive the about the district of

Procedure used to derive the classification for mixtures according to Regulation (EC) No 1272/2008 [CLP] / GHS:

Classification	Clossification (20) No Intelligence (CLF) 6H5:	
Eye Irrit, 2, H319	Classification procedure	
	Calculation method	
Skin Irrit. 2, H315	Calculation method	
Skin Sens. 1, H317	Bridging principle "Dilution"	
Aquatic Chronic 3, H412	Calculation method	
D.L. CO		

Relevant H-statements:

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H317: May cause an allergic skin reaction.

H319: Causes serious eye irritation.

H332: Harmful if inhaled.

H411: Toxic to aquatic life with long lasting effects. H412: Harmful to aquatic life with long lasting effects.

Hazard pictogram names: Exclamation mark

Changes to the SDS in this revision: Sections 1.1, 1.3, 2.2, 3, 11, 12.1, 12.3, 12.4, 12.5, 15.1.2.

Date of last revision: 29 April 2016

Further information:

None

This information is based solely on data provided by suppliers of the materials used, not on the mixture itself. No warranty is expressed or implied regarding the suitability of the product for the user's particular purpose. The user must make their own determination as to suitability.

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29 CFR 1910.1200 (OSHA HazCom 2012)

## SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product identifier

Trade name

: Derakane™ 8084

epoxy vinyl ester resin

™ Trademark, Ashland or its subsidiaries, registered in

various countries

Recommended use of the chemical and restrictions on use

Use of the Substance/Mixture : Reserved for industrial and professional use.

Details of the supplier of the safety data

sheet

Ashland P.O. Box 2219

Columbus, OH 43216

United States of America

EHS Customer Requests@ashland.com

Emergency telephone number 1-800-ASHLAND (1-800-274-5263)

Regulatory Information Number

1-800-325-3751

**Product Information** 

614-790-3333

## SECTION 2. HAZARDS IDENTIFICATION

**GHS Classification** 

Flammable liquids

: Category 3

Combustible Dust

Skin irritation

: Category 2

Eye irritation

: Category 2A

Specific target organ systemic toxicity - single

exposure

: Category 1 (Auditory system)

: Category 3 (Respiratory system)

Specific target organ systemic toxicity - repeated exposure (Inhalation)

**GHS Label element** 

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Hazard pictograms







Signal Word

: Danger

Hazard Statements

Flammable liquid and vapor.

May form combustible dust concentrations in air.

Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation.

Causes damage to organs (Auditory system) through prolonged

or repeated exposure if inhaled.

Precautionary Statements

#### : Prevention:

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 dust/ fume/ gas/ mist/ vapors/ spray.

Wash skin thoroughly after handling.

Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area.

Wear protective gloves/ eye protection/ face protection.

Response:

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. Call a POISON CENTER or doctor/ physician if you feel unwell.

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

Get medical advice/ attention if you feel unwell. If skin irritation occurs: Get medical advice/ attention. If eye irritation persists: Get medical advice/ attention. Take off contaminated clothing and wash before reuse. In case of fire: Use dry sand, dry chemical or alcohol-resistant

foam 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 to an approved waste disposal plant.

Other hazards

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Static Accumulating liquid

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture

: Mixture

Chemical nature

: Static Accumulator

Chemical nature

: Defatter

#### Hazardous components

Hazardous components	CAS-No.	Classification	Concentration (%)
Chemical Name STYRENE	100-42-5	Flam. Liq. 3; H226	39.82
	*	Acute Tox. 4; H332	
		Skin Irrit. 2; H315	200
		Eye Irrit. 2A; H319	
		STOT SE 3; H335	
	*	STOT RE 1; H372	
		Asp. Tox. 1; H304	
	6.		

### SECTION 4. FIRST AID MEASURES

General advice

: Move out of dangerous area.

Call a POISON CENTRE or doctor/physician if exposed or

vou feel unwell.

Show this safety data sheet to the doctor in attendance.

Do not leave the victim unattended.

If inhaled

Move to fresh air.

IF INHALED: Call a POISON CENTER or doctor/ physician if

you feel unwell.

Keep patient warm and at rest.

If unconscious place in recovery position and seek medical

advice.

In case of skin contact

: Remove contaminated clothing. If irritation develops, get

medical attention.

If on skin, rinse well with water.

Wash contaminated clothing before re-use.

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in various countries 40214	

If on clothes, remove clothes.

In case of eye contact

: Immediately flush eye(s) with plenty of water.

Remove contact lenses. Protect unharmed eye.

If swallowed

: Obtain medical attention.

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

: Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through

the skin may include:

stomach or intestinal upset (nausea, vomiting, diarrhea)

irritation (nose, throat, airways)

confusion

Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation.

Causes damage to organs through prolonged or repeated

exposure if inhaled.

Notes to physician

: No hazards which require special first aid measures.

### **SECTION 5. FIREFIGHTING MEASURES**

Suitable extinguishing media

: Use extinguishing measures that are appropriate to local

circumstances and the surrounding environment.

Water spray Foam

Alcohol-resistant foam Carbon dioxide (CO2)

Dry chemical

Unsuitable extinguishing media

: High volume water jet

Specific hazards during firefighting

: Organic dusts at sufficient concentration can form explosive

mixtures in air. Never use welding or cutting torch on or near drum (even

empty) because product (even just residue) can ignite explosively.

Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. Do not allow run-off from fire fighting to enter drains or water

courses.

Hazardous combustion products

: Hydrocarbons

carbon dioxide and carbon monoxide

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Specific extinguishing methods

Product is compatible with standard fire-fighting agents.

Further information

: Do not use a solid water stream as it may scatter and spread

Fire residues and contaminated fire extinguishing water must

be disposed of in accordance with local regulations. Use a water spray to cool fully closed containers.

Polymerization will take place under fire conditions. If polymerization occurs in a closed container, there is a possibility it will rupture violently. Cool storage container with

water, if exposed to fire.

Special protective equipment for firefighters

: In the event of fire, wear self-contained breathing apparatus.

## SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: Evacuate personnel to safe areas. Remove all sources of ignition. Use personal protective equipment.

Ensure adequate ventilation.

Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.

Environmental precautions

Prevent product from entering drains.

Prevent further leakage or spillage if safe to do so.

If the product contaminates rivers and lakes or drains inform

respective authorities.

Methods and materials for containment and cleaning up : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to

local / national regulations (see section 13).

Other information

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

## SECTION 7. HANDLING AND STORAGE

Advice on safe handling

: Open drum carefully as content may be under pressure.

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Avoid formation of aerosol.

Provide sufficient air exchange and/or exhaust in work rooms.

Do not breathe vapours/dust.

Do not smoke.

Container hazardous when empty.

Take precautionary measures against static discharges. Avoid exposure - obtain special instructions before use.

Avoid contact with skin and eyes.

Smoking, eating and drinking should be prohibited in the application area.

For personal protection see section 8.

Dispose of rinse water in accordance with local and national regulations.

Secondary operations, such as grinding and sanding, may produce dust.

Maintain good housekeeping. Do not permit dust layers to accumulate, for example, on floors, ledges, and equipment, in order to avoid any potential for dust explosion hazards.

For further guidance on prevention of dust explosions, refer to National Fire Protection Association (NFPA) 654: "Standard for the Prevention of Fire and Dust Explosions, from the Manufacturing, Processing and Handling of Combustible Particulate Solids".

Conditions for safe storage

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

Containers which are opened must be carefully resealed and

kept upright to prevent leakage. Observe label precautions.

No smoking.

Electrical installations / working materials must comply with

the technological safety standards.

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
STYRENE	100-42-5	TWA	20 ppm	ACGIH
		STEL	40 ppm	ACGIH
		REL	50 ppm 215 mg/m3	NIOSH/GUID E
		STEL	100 ppm 425 mg/m3	NIOSH/GUID E
		TWA	100 ppm	OSHA/Z2
		Ceiling	200 ppm	OSHA/Z2

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	1	MA	AX. CONC	600 ppm	08	SHA/Z2
Biological occupat	ional exposure l	imits		,		[ D
Components	CAS-No.	Control parameters	Biological specimen	Samplin g time	Permissible concentration	Basis
STYRENE	100-42-5	styrene	Venous blood	Samplin g time: End of shift.	0.2 mg/l	
Remarks:	Semi-quan	titative				
Remarks.		Mandelic acid plus phenylglyox ylic acid	Creatinine in urine	Samplin g time: End of shift.	400 mg/g	
Remarks:	Nonspecifi					

### **Engineering measures**

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

Provide appropriate exhaust ventilation at places where dust is formed.

### Personal protective equipment

Respiratory protection

In the case of vapour formation use a respirator with an approved filter.

A NIOSH-approved air-purifying respirator with an appropriate cartridge and/or filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits (if applicable) or if overexposure has otherwise been determined. Protection provided by airpurifying respirators is limited. Use a positive pressure, airsupplied respirator if there is any potential for uncontrolled release, exposure levels are not known or any other circumstances where an air-purifying respirator may not provide adequate protection.

Hand protection Remarks

: The suitability for a specific workplace should be discussed

with the producers of the protective gloves.

Eye protection

: Wear chemical splash goggles when there is the potential for

exposure of the eyes to liquid, vapor or mist.

Skin and body protection

: Wear as appropriate: impervious clothing Safety shoes

Flame-resistant clothing

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

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Discard gloves that show tears, pinholes, or signs of wear. Wear resistant gloves (consult your safety equipment

supplier).

Hygiene measures

Wash hands before breaks and at the end of workday.

When using do not eat or drink. When using do not smoke.

### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state

: liquid

Odour

: pungent

Odour Threshold

: No data available

рН

: No data available

Melting point/freezing point

: No data available

Boiling point/boiling range

: 293.4 °F / 145.2 °C

Flash point

: 84.9 °F / 29.4 °C

Method: ASTM D 56

Evaporation rate

: No data available

Flammability (solid, gas)

May form combustible dust concentrations in air (during

processing).

Flammability (liquids)

: Static Accumulating liquid

Flammability (liquids)

Upper explosion limit

Lower explosion limit

: 6.1 %(V) : 1.1 %(V)

Vapour pressure

: 8.53248 hPa (25 °C)

Calculated Vapor Pressure

Relative vapour density

: > 1AIR=1

Relative density

: No data available

Density

: 1.078 g/cm3 (20 °C)

Solubility(ies)

Water solubility

: insoluble

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Solubility in other solvents

: No data available

Partition coefficient: n-

octanol/water

: No data available

Thermal decomposition

: No data available

Viscosity

Viscosity, dynamic

: No data available

Viscosity, kinematic

: > 20.5 mm2/s (40 °C)

Oxidizing properties

: No data available

## SECTION 10. STABILITY AND REACTIVITY

Reactivity

: No decomposition if stored and applied as directed.

Chemical stability

: Stable under recommended storage conditions.

Possibility of hazardous

reactions

Hazardous polymerisation may occur.

Vapours may form explosive mixture with air.

This product does not present a dust explosion hazard as delivered. However, fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source, is a

potential dust explosion hazard.

Conditions to avoid

: Heat, flames and sparks.

Exposure to air. Exposure to sunlight.

Incompatible materials

Acids

aluminum

aluminum chloride

Bases
Copper
Copper alloys
halogens
iron chloride
metal salts

Strong oxidizing agents

Peroxides

Hazardous decomposition

products

carbon dioxide and carbon monoxide

Hydrocarbons

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## SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of : Inhalation

exposure

Skin contact

Eye Contact Ingestion

Acute toxicity

Not classified based on available information.

Components:

STYRENE:

Acute oral toxicity

: LD50 Oral (Rat): > 2,000 mg/kg

Acute inhalation toxicity

: LC 50 (Rat): 11.8 mg/l, 2770 ppm

Exposure time: 4 h Test atmosphere: vapour

No observed adverse effect level (Humans): 100 ppm

Exposure time: 7 h Test atmosphere: vapour

Acute dermal toxicity

: LD 50 (Rat): > 2,000 mg/kg

Method: OECD Test Guideline 402

Assessment: No adverse effect has been observed in acute

dermal toxicity tests.

### Skin corrosion/irritation

Causes skin irritation.

Product:

Remarks: May cause skin irritation and/or dermatitis.

Result: Repeated exposure may cause skin dryness or cracking.

### Components:

STYRENE:

Species: Rabbit

Result: Irritating to skin

### Serious eye damage/eye irritation

Causes serious eye irritation.

Product:

Remarks: Vapours may cause irritation to the eyes, respiratory system and the skin., Causes serious eye irritation.

### Components:

STYRENE:

Result: Irritating to eyes

Remarks: Vapour during processing may be irritating to the respiratory tract and to the eyes.

Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information.

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Respiratory sensitisation: Not classified based on available information.

Components: STYRENE:

Exposure routes: Skin contact

Species: Guinea pig

Assessment: Does not cause skin sensitisation.

Result: negative

Exposure routes: inhalation (vapour)

Species: Humans

Assessment: Does not cause respiratory sensitisation.

Result: negative

Germ cell mutagenicity

Not classified based on available information.

Carcinogenicity

Not classified based on available information.

Product:

Carcinogenicity -Assessment

: Styrene has been tested for carcinogenicity in rats and mice.

Styrene caused lung tumors in mice only. These tumors are

not considered to be relevant to humans.

Reproductive toxicity

Not classified based on available information.

STOT - single exposure

May cause respiratory irritation.

Components:

STYRENE:

Assessment: May cause respiratory irritation.

STOT - repeated exposure

Causes damage to organs (Auditory system) through prolonged or repeated exposure if inhaled.

Components:

STYRENE:

Exposure routes: inhalation (vapour)

Target Organs: Auditory system

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

Repeated dose toxicity

Components:

STYRENE:

Species: Human

85 mg/m3

Application Route: inhalation (vapour)

Species: Human

615 mg/kg

Application Route: Skin contact

Aspiration toxicity

Not classified based on available information.

Components:

STYRENE:

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May be fatal if swallowed and enters airways.

**Further information** 

Product:

Remarks: Solvents may degrease the skin.

Carcinogenicity:

IARC

Group 2B: Possibly carcinogenic to humans

STYRENE

100-42-5

**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

Reasonably anticipated to be a human carcinogen

STYRENE

100-42-5

## SECTION 12. ECOLOGICAL INFORMATION

### **Ecotoxicity**

### Components:

STYRENE:

Toxicity to fish

: LC 50 (Pimephales promelas (fathead minnow)): 4.02 mg/l

Exposure time: 96 h

Toxicity to daphnia and other

aquatic invertebrates

: EC 50 (Water flea (Daphnia magna)): 4.7 mg/l

Exposure time: 48 h

Toxicity to algae

: ErC50 (Pseudokirchneriella subcapitata (green algae)): 4.9

mq/l

Exposure time: 72 h

Toxicity to daphnia and other

aquatic invertebrates (Chronic toxicity)

: NOEC (Water flea (Daphnia magna)): 1.01 mg/l

Exposure time: 21 d

Toxicity to bacteria

: EC 50 (activated sludge): ca. 500 mg/l

Exposure time: 0.5 h

Toxicity to soil dwelling

organisms

: NOEC (Eisenia fetida (earthworms)): 34 mg/kg

Exposure time: 14 d

Method: OECD Test Guideline 207

### Persistence and degradability

### Components:

STYRENE:

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Biodegradability

Result: Readily biodegradable

Biodegradation: > 60 % Exposure time: 10 d

## Bioaccumulative potential

### Components:

STYRENE:

Bioaccumulation

: Bioconcentration factor (BCF): < 100

Partition coefficient: n-

octanol/water

: log Pow: 2.96 (25 °C)

### Mobility in soil

### Components:

STYRENE:

Distribution among

: Koc: 352

environmental compartments

### Other adverse effects

#### Product:

Additional ecological

information

: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Toxic to aquatic life.

### Components:

STYRENE:

Results of PBT and vPvB

assessment

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating

(vPvB).

## SECTION 13. DISPOSAL CONSIDERATIONS

### Disposal methods

General advice

: The product should not be allowed to enter drains, water

courses or the soil.

Do not contaminate ponds, waterways or ditches with

chemical or used container.

Send to a licensed waste management company.

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

Contaminated packaging

: Empty remaining contents.

Dispose of as unused product.

Empty containers should be taken to an approved waste

handling site for recycling or disposal.

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Derakane™ 8084 epoxy vinyl ester resin ™ Trademark, Ashland or its subsidiaries, registered in various countries 40214	Version: 1.0

Do not re-use empty containers.

Do not burn, or use a cutting torch on, the empty drum.

#### SECTION 14. TRANSPORT INFORMATION International transport regulations REGULATION **ID NUMBER** PROPER SHIPPING NAME \*HAZARD SUBSIDIARY **PACKING** MARINE CLASS **HAZARDS GROUP** POLLUTANT / LTD. QTY. U.S. DOT - ROAD UN Resin solution 1866 3 Ш U.S. DOT - RAIL UN 1866 Resin solution 3 III U.S. DOT - INLAND WATERWAYS UN 1866 Resin solution 3 III TRANSPORT CANADA - ROAD UN 1866 **RESIN SOLUTION** 3 III TRANSPORT CANADA - RAIL RESIN SOLUTION UN 1866 3 III TRANSPORT CANADA - INLAND WATERWAYS UN 1866 RESIN SOLUTION 3 III INTERNATIONAL MARITIME DANGEROUS GOODS UN 1866 **RESIN SOLUTION** 3 Ш INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO UN 1866 Resin solution 3 111 INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER 1866 Resin solution 3 111 MEXICAN REGULATION FOR THE LAND TRANSPORT OF HAZARDOUS MATERIALS AND **WASTES**

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

Marine pollutant	no	

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** 

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
STYRENE	100-42-5	1000	2510.676652

SARA 311/312 Hazards

: Reactivity Hazard Acute Health Hazard

Fire Hazard

Chronic Health Hazard

SARA 313 Component(s)

STYRENE

100-42-5

39.82 %

California Prop 65

WARNING! This product contains a chemical known to the

State of California to cause cancer. 71-43-2

BENZENE

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

harm.

BENZENE

71-43-2

The components of this product are reported in the following inventories:

**TSCA** 

: On TSCA Inventory

DSL

: This product contains one or several components that are not

on the Canadian DSL and have annual quantity limits.

**AUSTR** 

: On the inventory, or in compliance with the inventory

**ENCS** 

: Not in compliance with the inventory

**KECL** 

: Not in compliance with the inventory

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**PICCS** 

: Not in compliance with the inventory

**IECSC** 

: On the inventory, or in compliance with the inventory

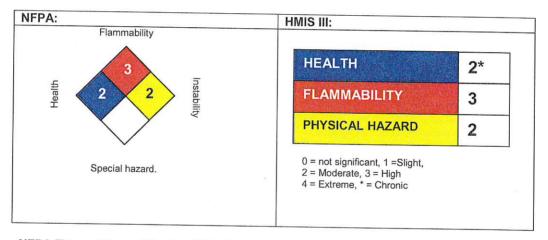
### Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TSCA (USA)

### **SECTION 16. OTHER INFORMATION**

### **Further information**

Revision Date: 05/22/2015



# NFPA Flammable and Combustible Liquids Classification

Flammable Liquid Class IC

# Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.

Sources of key data used to compile the Safety Data Sheet
Ashland internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

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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 Ashland's Environmental Health and Safety Department (1-800-325-3751).

List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet:

ACGIH: American Conference of Industrial Hygienists

BEI: Biological Exposure Index

CAS : Chemical Abstracts Service (Division of the American Chemical Society).

CMR: Carcinogenic, Mutagenic or Toxic for Reproduction

FG: Food grade

GHS: Globally Harmonized System of Classification and Labeling of Chemicals.

H-statement: Hazard Statement

IATA: International Air Transport Association.

IATA-DGR: Dangerous Goods Regulation by the "International Air Transport Association" (IATA).

ICAO: International Civil Aviation Organization

ICAO-TI (ICAO): Technical Instructions by the "International Civil Aviation Organization"

IMDG: International Maritime Code for Dangerous Goods

ISO: International Organization for Standardization

logPow: octanol-water partition coefficient

LCxx: Lethal Concentration, for xx percent of test population

LDxx: Lethal Dose, for xx percent of test population. ICxx: Inhibitory Concentration for xx of a substance

Ecxx: Effective Concentration of xx N.O.S.: Not Otherwise Specified

OECD: Organization for Economic Co-operation and Development

OEL: Occupational Exposure Limit P-Statement : Precautionary Statement PBT: Persistent, Bioaccumulative and Toxic

PPE: Personal Protective Equipment STEL: Short-term exposure limit STOT: Specific Target Organ Toxicity

TLV: Threshold Limit Value TWA: Time-weighted average

vPvB : Very Persistent and Very Bioaccumulative

WEL: Workplace Exposure Level

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

DOT: Department of Transportation

FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act HMIRC: Hazardous Materials Information Review Commission

HMIS: Hazardous Materials Identification System NFPA: National Fire Protection Association

NIOSH: National Institute for Occupational Safety and Health OSHA: Occupational Safety and Health Administration

PMRA: Health Canada Pest Management Regulatory Agency

RTK: Right to Know

WHMIS: Workplace Hazardous Materials Information System

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# SAFETY DATA SHEET

Revision Date: 19/Dec/2014

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

Product Identifier

**Product Description:** 

**DION® 9800-05** 

Other means of identification

SAP ID(s):

4771; 4772; 199623

Material Code:

9800-05

**Chemical Family** 

Urethane Modified Vinyl Ester Resin

Recommended use of the chemical and restrictions on use

Intended Use:

Corrosion Resistant Resin

Uses advised against

No information available

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Reichhold LLC 2

Corporate Headquarters

P.O. Box 13582

Research Triangle Park, NC 27709

USA

Tel +1-919-990-7500

Fax +1-919-767-8602

**Emergency Telephone** E-mail address

(Chemtrec) 1-800-424-9300 prodsafety@reichhold.com

# 2. HAZARDS IDENTIFICATION

### Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Inhalation (Vapors)

Skin corrosion/irritation

Serious eye damage/eye irritation

Carcinogenicity

Specific target organ toxicity (single exposure)

Specific target organ toxicity (repeated exposure)

Chronic aquatic toxicity

Flammable liquids

Category 4

Category 2

Category 2A

Sub-category 1B

Category 3

Category 1

Category 3

Category 3

## Label elements

## **Emergency Overview Statements**

#### Danger

### Hazard Statements

Harmful if inhaled

Causes skin irritation

Causes serious eye irritation

May cause cancer

May cause respiratory irritation

Causes damage to hearing through prolonged or repeated exposure if inhaled

Harmful to aquatic life with long lasting effects

Flammable liquid and vapor

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Appearance Clear, amber colored

Physical State Liquid

Odor Pungent

### **Precautionary Statements - Prevention**

Obtain special instructions before use

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

Use personal protective equipment as required

Use only outdoors or in a well-ventilated area

Wash face, hands and any exposed skin thoroughly after handling

Wear protective gloves/protective clothing/eye protection/face protection

Do not breathe mist, vapors, spray

Do not eat, drink or smoke when using this product

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

Keep cool

Avoid release to the environment

Contaminated work clothing should not be allowed out of the workplace

## Precautionary Statements - Response

IF exposed or concerned: Get medical advice/attention

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 skin irritation occurs: Get medical advice/attention

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower

Wash contaminated clothing before reuse

If skin irritation or rash occurs: Get medical advice/attention

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

In case of fire: Use CO2, dry chemical, or foam to extinguish

## Precautionary Statements - Storage

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

### Precautionary Statements - Disposal

Dispose of contents/container to industrial incineration plant

Dispose of in accordance with federal, state and local regulations

## Hazards not otherwise classified (HNOC)

#### Other Information

Unknown acute toxicity

53.4% of the mixture consists of ingredient(s) of unknown toxicity.

Unknown aquatic toxicity 53.4% of the mixture consists of components(s) of unknown hazards to the aquatic

# 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No	Weight-%	Trade Secret
Urethane modified polyester resin	Proprietary	53	Trade decre
Styrene	100-42-5	47	

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## 4. FIRST AID MEASURES

First Aid Measures

Immediately flush eyes for at least 15 minutes. Get medical attention. **Eve Contact** 

Wash off with warm water and soap. Remove contaminated clothing and shoes. If skin Skin Contact

irritation persists, call a physician. Wash contaminated clothing before reuse.

Remove person to fresh air. If signs/symptoms continue, get medical attention. Keep Inhalation

patient warm and at rest. If not breathing, give artificial respiration. If breathing is labored,

administer oxygen. Get medical attention immediately.

Do not induce vomiting. Potential for aspiration if swallowed. This material may enter the Ingestion

lungs during vomiting. Never give anything by mouth to an unconscious person. GET

IMMEDIATE MEDICAL ATTENTION.

Most important symptoms and effects, both acute and delayed

Most Important Symptoms and **Effects** 

Irritating to eyes, respiratory system and skin. Harmful by inhalation, in contact with skin

and if swallowed.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

Treat symptomatically.

## 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Carbon dioxide (CO2), Foam, Dry chemical, Water spray

Unsuitable Extinguishing Media

Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Combustion may produce carbon monoxide, carbon dioxide and irritating or toxic vapors Hazardous combustion products

and gases

Flammable. Vapors may form explosive mixture with air. Flash back possible over Combustion/Explosion Hazards

considerable distance. This material may polymerize (react) when its container is exposed to heat (as during a fire). This polymerization increases pressure inside a closed container and may result in the violent rupture of the container. Empty containers may retain product residue (liquid and/or vapor). Do not pressurize, cut, weld, braze, solder, drill, grind, or expose these containers to heat, flame, sparks, static electricity, or other sources of ignition

as the container may explode and may cause injury or death.

Protective Equipment and Precautions for Firefighters:

Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. Thoroughly decontaminate all protective equipment after use. Evacuate all persons from the fire area to a safe location. Move non-burning material, as feasible, to a safe location as soon as possible. Fire fighters should be protected from potential explosion hazard while extinguishing the blaze. DO NOT extinguish a fire resulting from the flow of this flammable liquid until the flow of liquid is effectively shut off. This precaution will help prevent the accumulation of an explosive vapor-air mixture after the initial fire is extinguished. Use water spray to cool fire-exposed containers.

# 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

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**Personal Precautions** Remove all sources of ignition. Evacuate personnel to safe areas. Avoid contact with skin

and eyes. Use personal protective equipment as required. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Beware of vapors accumulating to form

explosive concentrations. Vapors can accumulate in low areas.

Other Information All equipment used when handling the product must be grounded.

**Environmental Precautions** 

**Environmental Precautions** Prevent further leakage or spillage if safe to do so. Do not allow material to contaminate

ground water system. Prevent product from entering drains. Beware of vapors accumulating

to form explosive concentrations. Vapors can accumulate in low areas.

Methods and material for containment and cleaning up

**Methods for Containment** Prevent spilled material from 1) contaminating soil, 2) entering sanitary sewers, storm

sewers, and drainage systems, and 3) entering bodies of water or ditches that lead to waterways. Prevent spreading over a wide area (e.g. by containment or oil barriers).

Soak up with inert absorbent material. Remove from surface water (e.g. by skimming or Methods for Clean-up

siphoning). Dispose of contaminated material as waste according to item 13.

### 7. HANDLING AND STORAGE

### Precautions for Safe Handling

Handling Do not breathe vapor or mist. Avoid contact with eyes, skin and clothing. Take off

contaminated clothing and wash before reuse. Ensure adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion-proof equipment. Consult your supplier of promoters and catalysts for additional instructions on proper mixing and usage. Empty containers may retain product residue (liquid and/or vapor). Do not pressurize, cut, weld, braze, solder, drill, grind, or expose these containers to heat, flame, sparks, static electricity, or other sources of ignition as the container may explode and may cause injury or death. Empty drums should be completely drained and properly bunged. Empty drums should be promptly returned to a drum reconditioner or properly disposed. Do not use compressed air for filling, discharging or handling.

### Conditions for safe storage, including any incompatibilities

Storage

Keep away from heat and sources of ignition. No smoking. Keep away from direct sunlight. Keep containers tightly closed in a cool, well-ventilated place. To ensure maximum stability and maintain optimum resin properties, resins should be stored in closed containers at temperatures below 77°F (25°C).

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Exposure limits** 

OSHA PEL

Industry PEL

Components with workplace control parameters

Styrene (CAS #: 100-42-5)

ACGIH TLV

20 ppm TWA

40 ppm STEL

A4 Not Classifiable as a Human Carcinogen

100 ppm TWA

200 ppm Ceiling

While the federal workplace exposure limit for styrene is 100

ppm, OSHA accepted the styrene industry's proposal to

voluntarily meet a PEL of 50 ppm on an 8 hour TWA and a Short

Term Exposure Limit (STEL) of 100 ppm, 15 minute exposure.

40 ppm STEL

170 mg/m3 STEL 20 ppm TWA 85 mg/m3 TWA

Canada - Alberta OELs

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Canada - Ontario OELs

Canada - British Columbia OELs

NIOSH IDLH Mexico OEL 35 ppm TWA 100 ppm STEL 50 ppm TWA

75 ppm STEL

700 ppm Immediately dangerous to life or health IDLH

100 ppm STEL 425 mg/m<sup>3</sup> STEL 50 ppm TWA 215 mg/m<sup>3</sup> TWA (skin)

Legend

ACGIH (American Conference of Governmental Industrial Hygienists) TLV® (Threshold Limit Value) TWA (time-weighted average) STEL - Short Term Exposure Limit

OSHA - Occupational Safety and Health Administration

PEL - Permissible Exposure Limit OEL - Occupational Exposure Limit

NIOSH - National Institute for Occupational Safety and Health

IDLH - Immediately Dangerous to Life or Health

SKIN: Skin Absorption

### Appropriate engineering controls

**Engineering Controls** 

Use general ventilation to maintain airborne concentrations to levels that are below regulatory and recommended occupational exposure limits. Local ventilation may be required during certain operations.

# Individual protection measures, such as personal protective equipment

Eve/face Protection

Safety glasses with side-shields. If splashes are likely to occur:. Tight sealing safety goggles. Ensure that eyewash stations and safety showers are close to the workstation location.

**Skin Protection** 

Wear protective nitrile rubber or Viton™ gloves. Gloves made of nitrile rubber or polyvinyl chloride (PVC) may be used for splash protection and brief or intermittent contact with styrenated polyester resin. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion. Impervious clothing. Rubber or plastic boots.

Respiratory Protection

None required if hazards have been assessed and airborne concentrations are maintained below the exposure limits listed in Section 8. Wear an approved air-purifying respirator with organic vapor cartridges and particulate filters where airborne concentrations may exceed exposure limits in Section 8 and/or there is exposure to dust or mists due to sanding, grinding, cutting, or spraying. Use an approved positive-pressure air-supplied respirator with emergency escape provisions if there is any potential for an uncontrolled release, airborne concentrations are not known, or any other circumstances where air-purifying respirators may not provide adequate protection

**General Hygiene Considerations** 

Handle in accordance with good industrial hygiene and safety practice.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance Odor

Odor Threshold Physical State

pH

Flash Point

Flash Point Method: Autoignition Temperature Boiling point / boiling range Clear, amber colored

Pungent

0.2 ppm (Styrene)

Liquid

Not applicable 32 °C / 89 °F Seta closed cup

490°C / 914°F (Styrene) 146°C / 295°F (Styrene) 4771; DION® 9800-05

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Melting point / Freezing point Flammability Limit in Air

Lower
Upper
Specific Gravity
Solubility
Evaporation Rate
Vapor Pressure

No information available

1.1% (Styrene) 6.1% (Styrene) 1.03 - 1.06 @ 25°C Insoluble in water 0.49 (BuAc = 1) (Styrene) 5 mmHg @ 20°C (Styrene)

Vapor Density

Explosive Properties

Oxidizing Properties

Percent Volatile, wt.%

VOC Content:

Viscosity

6.7 hPa (Styrene)

3.6 (Air = 1) (Styrene)

No information available

No information available

44.0 - 48.0 % by weight

481 g/l (calculated) product as supplied

Partition Coefficient (n-octanol/water)

Decomposition temperature

350 - 450 cps @ 25°C

No information available

No information available

# 10. STABILITY AND REACTIVITY

#### Reactivity

Unstable upon depletion of inhibitor.

### **Chemical Stability**

Stable under normal conditions. Stable under recommended storage conditions.

## Possibility of Hazardous Reactions

Hazardous Polymerization

Polymerization can occur. Hazardous polymerization will occur if contaminated with peroxides, metal salts and polymerization catalysts. Hazardous polymerization may occur upon depletion of inhibitor - may cause heat and pressure build-up in closed containers. Product will undergo hazardous polymerization at temperatures above 150 F (65 C).

#### **Conditions to Avoid**

Heat, flames and sparks. Contamination by those materials referred to under Incompatible materials. Unstable upon depletion of inhibitor. Elevated temperatures.

### Incompatible materials

Strong acids. Strong oxidizing agents. Metal salts. Polymerization catalysts.

### Hazardous Decomposition Products

Hydrocarbons. Carbon monoxide. Carbon dioxide (CO2). Thermal decomposition can lead to release of irritating and toxic gases and vapors.

## 11. TOXICOLOGICAL INFORMATION

## Information on likely routes of exposure

**Primary Routes of Entry** 

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

### Acute toxicity

Styrene

Oral LD50 Dermal LD50

= 5000 mg/kg (Rat) > 2000 mg/kg (Rat)

Inhalation LC50

= 11.8 mg/l (4 H) (Rat)

### Information on toxicological effects

Symptoms

Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

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Eyes

Irritating to eyes.

Skin

Harmful by skin absorption. Contact causes skin irritation. Prolonged skin contact may defat

the skin and produce dermatitis.

Inhalation

Harmful by inhalation. May cause irritation of respiratory tract. Inhalation of high vapor

concentrations can cause CNS-depression and narcosis.

Ingestion

Harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Aspiration hazard if swallowed - can enter lungs and cause damage. Ingestion is

not an anticipated route of exposure for this material in industrial use.

Irritation

Irritating to eyes and skin.

Corrosivity

Not corrosive.

Sensitization

Not sensitizing.

Repeated dose toxicity

In humans, styrene may cause a transient decrease in color discrimination and effects on hearing. Repeated or prolonged exposure may cause skin irritation and dermatitis, due to defatting properties of the product. May cause damage to the liver, eyes, brain, respiratory system, central nervous system through prolonged or repeated exposure if inhaled.

Mutagenic effects

Styrene has given mixed positive and negative results in a number of mutagenicity tests. Styrene was not mutagenic without metabolic activation but gave negative and positive

mutagenic results with metabolic activation.

Carcinogenicity

Styrene

ACGIH

Group A4 - Not classifiable as a human carcinogen.

IARC NTP Group 2B - Possibly Carcinogenic to Humans Reasonably anticipated to be human carcinogen

Legend

IARC - International Agency for Research on Cancer

NTP - National Toxicology Program

Reproductive Toxicity

No information available.

**Neurological Effects** 

No information available.

STOT - single exposure

No information available.

STOT - repeated exposure

No information available.

Target organ(s)

Liver, Central nervous system (CNS), Respiratory system.

Aspiration Hazard

No information available.

Numerical measures of toxicity - Product Information

Unknown acute toxicity

53.4% of the mixture consists of ingredient(s) of unknown toxicity.

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)

5001 mg/kg

ATEmix (dermal)

2002 mg/kg

ATEmix (inhalation-vapor)

11.8 mg/L

# 12. ECOLOGICAL INFORMATION

Ecotoxicity Styrene

Log Kow

2.95

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Bioconcentration factor (BCF)

Algae

Fish

EC50 = 1.4 mg/L (Pseudokirchneriella subcapitata) (72h)

EC50 0.46 - 4.3 mg/L (Pseudokirchneriella subcapitata) (72h)

LC50 3.24 - 4.99 mg/L (Pimephales promelas) (96 h) flow-through LC50 19.03 - 33.53 mg/L (Lepomis macrochirus) (96 h) static LC50 6.75 - 14.5 mg/L (Pimephales promelas) (96 h) static

LC50 58.75 - 95.32 mg/L (Poecilia reticulata) (96 h) static

Water Flea EC50 3.3 - 7.4 mg/L 48 h

Unknown aquatic toxicity

53.4% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

74

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Other adverse effects

No information available.

### 13. DISPOSAL CONSIDERATIONS

Waste treatment methods

**Disposal Considerations** 

Hazardous waste. Can be incinerated, when in compliance with local regulations.

Contaminated packaging

Empty containers should be taken for local recycling, recovery or waste disposal.

**US EPA Waste Number** 

D001 (IGNITABLE): When discarded in its purchased form, this material would be regulated under 40 CFR 261.21 as EPA Hazardous Waste Number D001 based on the characteristic

of ignitability.

### 14. TRANSPORT INFORMATION

DOT

**UN-No** 

UN1866

**Proper Shipping Name** 

**RESIN SOLUTION** 

**Hazard Class Packing Group** 

3 Ш

NAERG:

127

TDG

**UN-No** 

UN1866

**Proper Shipping Name** 

**RESIN SOLUTION** CLASS 3

**Hazard Class Packing Group** 

PG III 127

MEX

UN-No

NAERG:

UN1866

**Proper Shipping Name** 

**RESIN SOLUTION** 

**Hazard Class Packing Group**  CLASS 3 PG III 127

**IATA** 

**UN-No** 

NAERG:

UN1866

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Proper Shipping Name

**RESIN SOLUTION** 

Hazard Class Packing Group

III

Packing Instructions

355; 366

NAERG:

127

IMDG/IMO

UN-No

UN1866

Proper Shipping Name

**RESIN SOLUTION** 

Hazard Class Packing Group CLASS 3 PG III

EmS-No NAERG: F-E, S-E 127

## 15. REGULATORY INFORMATION

International Inventories

**TSCA Inventory Status:** 

All components of this material are listed on the US Toxic Substances Control Act (TSCA)

inventory.

Canadian Inventory Status:

All components of this material are listed on the Canadian Domestic Substances List (DSL)

Australian Inventory Status:

This product contains one or more chemicals currently not on the Australian Inventory of

**Chemical Substances** 

Korean Inventory Status:

This product contains one or more chemicals currently not on the Korean Chemical

Substances List

Philippine Inventory:

This product contains one or more chemicals currently not on the Philippine Inventory of

Chemicals and Chemical Substances

Japan ENCS:

This product contains one or more chemicals currently not on the Japanese Inventory of

Existing and New Chemical Substances

Chinese IECS:

This product contains only chemicals that are currently listed on the Chinese Inventory of

**Existing Chemical Substances** 

New Zealand Inventory:

This product contains one or more chemicals currently not on the New Zealand Inventory of

Chemicals

### **US Federal Regulations**

TSCA 12(b) - Export Notification:

This material does not contain any components that are subject to the US Toxic Substances Control Act (TSCA) Section 12(b) Export Notification requirements.

#### **SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight-%	SARA 313 Status
Styrene	100-42-5	47	Listed

### SARA 311/312 Hazardous Categorization

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

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#### Clean Water Act

This product contains the following listed substances:

Component	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Styrene 100-42-5	1000 lb			Listed

### Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following HAPs:

Component	CAS No	Weight-%	HAPS data
Styrene	100-42-5	47	

#### **CERCLA**

This product contains the following reportable quantities:

Component	40 CFR 302.4 RQ	40 CFR 355 EHS TPQs
Styrene	1000 lb	
	454 kg	

#### Chemical Weapons Convention (CWC)

This product does not contain any listed substances.

### State Regulations

### California Proposition 65

WARNING: This material contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. The California Safe Drinking Water and Toxic Enforcement Act of 1986 requires that clear and reasonable warning be given prior to exposing any person to this chemical.

#### Canada

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

### 16. OTHER INFORMATION

NFPA Rating

Prepared By

Reichhold Product Regulatory Department

Revision Date:

19/Dec/2014

**Revision Summary:** 

This data sheet contains changes from the previous version in section(s):

2, 3, 4, 5, 8, 9, 11, 14, 15

Former date:

05 July 2010

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**End of Safety Data Sheet** 

# MOMENTIVE

# SAFETY DATA SHEET

## FOR INDUSTRIAL USE ONLY

### EPONTM Resin 828

# Section 1. Product and company identification

GHS product identifier

EPONTM Resin 828

MSDS Number

K122F

Product type Material uses Epoxy Resin

Epoxy Resin Systems

Manufacturer/Supplier/Impor :

Hexion Inc.

180 East Broad Street Columbus, Ohio

43215 USA

Contact person

4information@hexion.com

Telephone

For additional health and safety or regulatory information, call

1 888 443 9466.

Emergency telephone number

For Emergency Medical Assistance

Call Health & Safety Information Services

1-866-303-6949

For Emergency Transportation Information CHEMTREC US Domestic (800) 424-9300 CHEMTREC International (703) 527-3887 CANUTEC CA Domestic (613) 996-6666

# Section 2. Hazards identification

Classification of the substance or

mixture

SKIN CORROSION/IRRITATION - Category 2

SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A

SKIN SENSITIZATION - Category 1

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)

[Respiratory tract irritation] - Category 3

GHS label elements

Hazard pictograms

Signal word

Hazard statements

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H317 May cause an allergic skin reaction.

H335 May cause respiratory irritation.

### Precautionary statements

General

Not applicable.

Prevention

Wear protective gloves.

Wear eye or face protection.

Use only outdoors or in a well-ventilated area.

Avoid breathing vapor.

Wash hands thoroughly after handling.

Contaminated work clothing should not be allowed out of the

workplace.

Response

IF INHALED:

Remove victim to fresh air and keep at rest in a position comfortable

for breathing.

Call a POISON CENTER or physician if you feel unwell.

IF ON SKIN:

Wash with plenty of soap and water. Take off contaminated clothing.

Wash contaminated clothing before reuse.

If skin irritation or rash occurs:

Get medical attention.

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 attention.

Storage

Store locked up.

Disposal

Dispose of contents and container in accordance with all local,

regional, national and international regulations.

Other hazards which do not result

in classification

None known.

# Section 3. Composition/information on ingredients

Substance/mixture

Mixture

Ingredient name	% by weight	CAS
		number
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	100	25068-38-6

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

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

# Section 4. First aid measures

### Description of necessary first aid measures

Eve contact

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation

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

Skin contact

Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion

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

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

Notes to physician

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

Specific treatments Protection of first aid personnel No specific treatment.

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

See toxicological information (Section 11)

# Section 5. Fire-fighting measures

### Extinguishing media

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

None known.

Specific hazards arising from the chemical

In a fire or if heated, a pressure increase will occur and the container may burst.

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Hazardous thermal decomposition products

: Decomposition products may include the following materials: carbon dioxide

carbon monoxide halogenated compounds

Special protective actions for firefighters Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters

Fire-fighters should wear appropriate protective equipment and selfcontained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

# Section 6. Accidental release measures

# Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

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

For emergency responders

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

Environmental precautions

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

## Methods and materials for containment and cleaning up

Small spill

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

Large spill

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

# Section 7. Handling and storage

### Precautions for safe handling

Protective measures

: Put on appropriate personal protective equipment (see section 8 of

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SDS). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene

: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

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

# Section 8. Exposure controls/personal protection

### Control parameters

## Occupational exposure limits

None.

Recommended monitoring procedures

: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Appropriate engineering controls

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

Environmental exposure controls

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

## Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash

Eye/face protection

contaminated clothing before reusing. Ensure that eyewash stations

and safety showers are close to the workstation location.

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to

liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a

higher degree of protection: chemical splash goggles.

## Skin protection

Chemical-resistant, impervious gloves complying with an approved Hand protection

standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves

cannot be accurately estimated.

Personal protective equipment for the body should be selected based **Body** protection on the task being performed and the risks involved and should be

approved by a specialist before handling this product.

Appropriate footwear and any additional skin protection measures Other skin protection should be selected based on the task being performed and the risks

involved and should be approved by a specialist before handling this

product.

. Use a properly fitted, air-purifying or air-fed respirator complying with Respiratory protection

an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the

selected respirator.

# Section 9. Physical and chemical properties

### Appearance

Physical state

Color

Viscous liquid.

Clear.

Odor

Odor threshold

Not available

Not available

pH

Not available

Melting point/ Freezing point

Boiling point

Not available

260 °C (500.00 °F)

Flash point

Pensky-Martens Closed Cup: 251 °C (483.80 °F) (ASTM D 93)

Burning time Burning rate Evaporation rate Not available Not available

Not available

Flammability (solid, gas) Lower and upper explosive Not available

Lower: Not available

(flammable) limits

Upper: Not available

Vapor pressure

0.03 mbar @ 77 °C (170.60 °F)

Vapor density

Not available

Relative density

1.17

Solubility

Not available

Solubility in water

Negligible

Partition coefficient: n-

Not available

octanol/water

Auto-ignition temperature

Not available

Decomposition temperature

Not available

SADT

Not available

Viscosity

Dynamic: Not available

Kinematic: Not available

### Other information

No additional information.

# Section 10. Stability and reactivity

Reactivity

Stable under normal conditions.

Chemical stability

The product is stable.

Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will

not occur.

Conditions to avoid

Extremes of temperature and direct sunlight.

Incompatible materials

Reactive or incompatible with the following materials:

aliphatic amines,

strong oxidizing agents,

strong acids,

Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition

products should not be produced.

Other hazards

Reacts with considerable heat release with some curing agents.

# Section 11. Toxicological information

## Information on toxicological effects

### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
4,4'-Isopropylidenediphenol-	Epichlorohydri	n Copolymer		

LD50 Oral	Rat	11,400 mg/kg	-
		2,000 mg/kg	
	LD50 Oral LD50 Dermal		2,000 mg/kg

Conclusion/Summary

Not available

## Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
4.4'-Isopropylidenediphenol- Epichlorohydrin Copolymer	Skin - Erythema/E schar 404 Acute Dermal Irritation/Co rrosion	Rabbit	1.5 - 2		-
	Skin - Edema 404 Acute Dermal Irritation/Co	Rabbit	1.0 - 1.5		-
	eyes 405 Acute Eye Irritation/Co	Rabbit	0		•
	eyes - Redness of the conjunctiva e	Rabbit	0.7		-
	Skin - Moderate irritant	Rabbit		24 hrs	-
	Skin - Severe irritant	Rabbit		24 hrs	
	eyes - Mild irritant	Rabbit			-

Conclusion/Summary

Skin

Not available

Not available

eyes Respiratory

Not available

### Sensitization

Conclusion/Summary

Skin

Not available

Respiratory

Not available

Mutagenicity

Conclusion/Summary

Not available

Carcinogenicity

Conclusion/Summary

Not available

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### Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
4,4'- Isopropylidenediphenol -Epichlorohydrin Copolymer	-			-		
Remarks:	generation ra	eproductive ef at oral gavage weight decre	study conducted up to	an O.E.C.I a high dosc	D. Test Guidel level of 750 n	ine no. 416 GLP two- ng/kg/day that resulted

Conclusion/Summary

Not available

### Teratogenicity

Conclusion/Summary

Not available

Specific target organ toxicity (s	ingle exposure)		Τ
Product/ingredient name	Category	Route of exposure	Target organs
4,4'-Isopropylidenediphenol-	Category 3		Respiratory tract irritation
Enichlorohydrin Conglymer	i		

## Specific target organ toxicity (repeated exposure)

Not available

### Aspiration hazard

Not available

Information on the likely routes of

: Not available

exposure

## Potential acute health effects

Eye contact

: Causes serious eye irritation.

Inhalation

May cause respiratory irritation.

Skin contact

Causes skin irritation. May cause an allergic skin reaction.

Ingestion

Irritating to mouth, throat and stomach.

# Symptoms related to the physical, chemical and toxicological characteristics

Eye contact

Adverse symptoms may include the following:

pain or irritation

watering

Inhalation

redness Adverse symptoms may include the following:

respiratory tract irritation

coughing

Skin contact

Adverse symptoms may include the following:

irritation redness

Ingestion

No specific data.

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

### Short term exposure

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Potential immediate effects Potential delayed effects

Not available Not available

### Long term exposure

Potential immediate effects Potential delayed effects

Not available Not available

### Potential chronic health effects

Conclusion/Summary

Not available

General

Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity Mutagenicity Teratogenicity

No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.

Developmental effects Fertility effects

No known significant effects or critical hazards. No known significant effects or critical hazards.

### Numerical measures of toxicity

### Acute toxicity estimates

Not available

# Section 12. Ecological information

### Toxicity

Product/ingredient name	Result	Species	Exposure
reaction product; bisphenol-A-	-(epichlorhydrin); epoxy resin (number avera	ge molecular weight ≤ 700	)
	Acute LC50 1.3 mg/l - 203 Fish, Acute Toxicity Test	Fish - Fish	96 h
	Acute EC50 2.1 mg/l - 202 Daphnia sp. Acute Immobilization Test and Reproduction Test	Aquatic invertebrates. Water flea	48 h
	Acute NOEC 0.3 mg/l - 211 Daphnia Magna Reproduction Test	Aquatic invertebrates. Water flea	21 d
	Acute LC50 > 11 mg/l -	Aquatic plants - Algae	72 h

Conclusion/Summary

Not available

### Persistence/degradability

Conclusion/Summary

Not available

### Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
4,4'-Isopropylidenediphenol-	2.64 - 3.78	3 - 31 31.00	low

Epichlorohydrin Copolymer

### Mobility in soil

Soil/water partition coefficient

Not available

(KOC)

Other adverse effects

No known significant effects or critical hazards.

# Section 13. Disposal considerations

### Disposal methods

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

# Section 14. Transport information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

UN/NA Regulatory number information

Proper shipping name

Classes/\*PG

Reportable Quantity (RQ)

**CFR** 

Non-regulated

TDG

Non-regulated

IMO/IMDG

Non-regulated

IATA (Cargo)

Non-regulated

\*PG: Packing group

Special precautions for user

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

# Section 15. Regulatory information

#### United States

U.S. Federal regulations

United States - TSCA 12(b) - Chemical export notification: None

required.

United States - TSCA 5(a)2 - Final significant new use rules: Not listed

United States - TSCA 5(a)2 - Proposed significant new use rules: Not

United States - TSCA 5(e) - Substances consent order: Not listed

California Prop. 65:

WARNING: This product contains less than 0.1% of a chemical known to

the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Oxirane, 2-(phenoxymethyl)-	Yes.	No.	5 μg/day	No.

United States inventory (TSCA:

All components are listed or exempted.

Canada

WHMIS (Canada)

Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI

None required.

CEPA Toxic substances

None required.

### International regulations

International lists

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

Canada inventory: All components are listed or exempted. Japan inventory: All components are listed or exempted.

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

Korea inventory: All components are listed or exempted.

New Zealand Inventory (NZIoC): All components are listed or exempted. Philippines inventory (PICCS): All components are listed or exempted. United States inventory (TSCA 8b): All components are listed or exempted.

Taiwan inventory (CSNN): All components are listed or exempted.

## Section 16. Other information

mazardous Material Information System III (	U.S.A.):
Health *	2
	1
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4

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representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910,1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868. The customer is responsible for determining the PPE code for this material.

Full text of abbreviated H

: Not applicable.

statements

#### History

Date of printing

Date of issue/Date of revision

Date of previous issue Version

Prepared by

Key to abbreviations

06/02/2015

02/03/2015

05/28/2014 19.0 •

Product Safety Stewardship :

ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

IATA = International Air Transport Association

IBC = Intermediate Bulk Container

IMDG = International Maritime Dangerous Goods

LogPow = logarithm of the octanol/water partition coefficient

MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) RID = The Regulations concerning the International Carriage of Dangerous Goods by

Rail

UN = United Nations

References

Not available

### Notice to reader

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# Safety Data Sheet (SDS)

### North American

Revision date: 2016-05-05

### SECTION 1: Identification

Product identifiers:

Product trade name:

HYPRO\* 1300X8 CTBN

Company product number:

X08

Other means of identification:

**CTBN** 

Recommended use of the chemical and restrictions on use:

Elastomeric modifier for thermoset resins.

Restrictions on use:

None identified

Details of the supplier:

Manufacturer/Supplier:

**CVC Thermoset Specialties** 

844 N. Lenola Road

Moorestown, New Jersey 08057

**United States** 

Telephone: +001-856-533-3000 FAX: +001-856-533-3003

For further information about this SDS:

Email: CTS.info@emeraldmaterials.com

Emergency telephone number:

ChemTel (24 hours): USA: 1-800-255-3924; International: +001-813-248-0585.

Alternate: Chemtrec (24 hours): USA: 1-800-424-9300; International:

+001-703-527-3887.

## SECTION 2: Hazard(s) identification

Information in accordance with U.S. 29 CFR 1910.1200 (Hazcom 2012) and Canada Hazardous Products Regulations (WHMIS 2015):

### Classification of the product:

Not classified as hazardous under any GHS hazard class according to U.S. 29 CFR 1910.1200 (Hazcom 2012) and Canada Hazardous Products Regulations (WHMIS 2015).

Label elements:

Hazard pictogram(s):

Not Applicable

Signal word:

Not Applicable

Hazard statements:

Not Applicable

Precautionary statements: Supplemental information: No Additional Information

Not Applicable

Hazards not otherwise classified:

Physical hazards not otherwise classified: No Additional Information Health hazards not otherwise classified: No Additional Information

See Section 11 for toxicological information.

## SECTION 3: Composition/information on ingredients

#### Substance:

No Hazardous Components found under applicable regulations.

Notes: Contains CTBN polymer (CAS# 68891-46-3).

Amounts specified are typical and do not represent a specification. Remaining components are proprietary, non-hazardous, and/or present at amounts below reportable limits. Exact percentage values for components are proprietary in accordance with SDS Name: HYPRO\* 1300X8 CTBN

29 CFR 1910.1200(i).

### **SECTION 4: First-aid measures**

### Description of first aid measures:

General: If irritation or other symptoms occur or persist from any route of exposure, remove the affected individual from the area: see a physician/get medical attention.

Eye contact: Any material that contacts the eye should be washed out immediately with water. Get medical attention if symptoms occur.

Skin contact: Wash the affected area thoroughly with plenty of soap and water. Get medical attention if symptoms occur.

Inhalation: If affected, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a POISON CENTER or doctor/physician if you feel unwell.

Ingestion: Get medical attention if symptoms occur.

Protection of first aid responders: Wear proper personal protective clothing and equipment.

Most important symptoms and effects, both acute and delayed: Irritation. Pre-existing skin problems may be aggravated by prolonged or repeated contact. See section 11 for additional information.

Indication of any immediate medical attention and special treatment needed, if necessary: Treat symptomatically.

## **SECTION 5: Fire-fighting measures**

NFPA flammability class: IIIB

### Extinguishing media:

Suitable: NFPA Class IIIB (Combustible liquid): Use water spray, ABC dry chemical, foam or carbon dioxide. Water or foam may cause frothing. Use water to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures.

Unsuitable: None known.

### Special hazards arising From the chemical:

Unusual fire/explosion hazards: Product is not considered a fire hazard, but will burn if ignited. Hot vapor or mists may be susceptible to spontaneous combustion when mixed with air. Ignition temperatures decrease with increasing vapor volume and vapor/air contact time and are influenced by pressure changes. Therefore, ignition may occur below published ignition temperatures. Use of this product in processes involving elevated-temperatures, vacuum if subject to sudden ingress of air, sudden escape of vapor or mist, etc., must be thoroughly evaluated to assure safe operation. Closed container may rupture (due to build up in pressure) when exposed to extreme heat.

Hazardous combustion products: Irritating or toxic substances may be emitted upon burning, combustion or decomposition. See section 10 (Hazardous decomposition products) for additional information.

Special protective equipment and precautions for fire-fighters: Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and approved protective clothing. Personnel without suitable respiratory protection must leave the area to prevent significant exposure to hazardous gases from combustion, burning or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

See section 9 for additional information.

### SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: See Section 8 for recommendations on the use of personal protective equipment. If spilled in an enclosed area, ventilate. Eliminate ignition sources.

Environmental precautions: Do not flush liquid into public sewer, water systems or surface waters.

Methods and materials for containment and cleaning up: Contain by diking with sand, earth or other non-combustible material. Wear proper personal protective clothing and equipment. Absorb spill with an inert material. Place into labeled, closed container;

SDS Name: HYPRO\* 1300X8 CTBN

store in safe location to await disposal. Change contaminated clothing and launder before reuse. CAUTION: Spilled liquid and dried film are slippery. Use care to avoid falls.

### SECTION 7: Handling and storage

Precautions for safe handling: As with any chemical product, use good laboratory/workplace procedures. Do not cut, puncture, or weld on or near the container. Wash thoroughly after handling this product. Always wash up before eating, smoking or using the facilities. Use under well-ventilated conditions. Avoid eye and skin contact. Avoid inhalation of aerosol, mist, spray, fume or vapor. Avoid drinking, tasting, swallowing or ingesting this product. Wash contaminated clothing before reuse. Provide eyewash fountains and safety showers in the work area.

Conditions for safe storage, including any incompatibilities: Store cool and dry, under well-ventilated conditions. Store this material away from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use. Empty container contains residual product which may exhibit hazards of product. Do not reuse empty container without commercial cleaning or reconditioning. Store product where temperatures are below 122°F (50°C).

## SECTION 8: Exposure controls / personal protection

#### Control parameters:

Occupational exposure limits (OEL): No applicable exposure limits.

#### Exposure controls:

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation to draw spray, aerosol, fume, mist and vapor away from workers to prevent routine inhalation. Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in the SDS. (Ventilation guidelines/techniques may be found in publications such as Industrial Ventilation: American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, OH, 45240-1634, USA.) (http://www.acgih.org/home.htm).

Individual protection measures, such as personal protective equipment (PPE):

Eye/face protection: Wear eye protection.

Skin and body protection: Wear protective gloves. Use good laboratory/workplace procedures including personal protective clothing: labcoat, safety glasses and protective gloves.

Respiratory protection: Respiratory protection is not needed with proper ventilation. Wear an approved respirator (e.g., an organic vapor respirator, a full face air purifying respirator for organic vapors, or a self-contained breathing apparatus) whenever exposure to aerosol, mist, spray, fume or vapor exceed the applicable exposure limit(s) of any chemical substance listed in this SDS. Use respirator in accordance with manufacturer's use limitations and OSHA standard 1910.134 (29CFR).

Further information: Eyewash fountains and safety showers are recommended in the work area.

#### SECTION 9: Physical and chemical properties Form: Viscous liquid pH: Not Available Appearance: Caramel 0.95 Relative density: Odor: Slight aromatic Partition coefficient (n-Not Available octanol/water): Odor threshold: Not Available % Volatile by weight: <1.5 % VOC: Solubility in water: Negligible Not Available Evaporation rate: Not Available Boiling point °C: Not Available Vapor pressure: Not Available Boiling point °F: Not Available Vapor density: Not Available Flash point: 170 °C (338 °F) Closed Cup Viscosity: 135,000 cP @ 27°C Auto-ignition temperature: Not Available Melting point/Freezing point: Not Available Flammability (solid, gas): Not Applicable (liquid) Oxidizing properties: Not oxidizing Flammability or explosive LFL/LEL Not Available limits: UFL/UEL Not Available Explosive properties: Not explosive

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Decomposition temperature: Not Available

Other information: Amounts specified are typical and do not represent a specification.

### SECTION 10: Stability and reactivity

Reactivity: Product reacts with isocyanates.

Chemical stability: This product is stable.

Possibility of hazardous reactions: Hazardous polymerization will not occur.

Conditions to avoid: Excessive heat and ignition sources.

Incompatible materials: Avoid contact with strong oxidizing agents and reducing agents. Depending on the amount and specific materials involved, contact can result in intense heat, boiling, flame development, explosion or toxic gas generation.

Hazardous decomposition products: Carbon monoxide, carbon dioxide, oxides of nitrogen, hydrogen cyanide, aliphatic and aromatic hydrocarbons. Thermal processing may produce volatiles, possibly including cyclohexene carbonitrile.

## **SECTION 11: Toxicological information**

### Information on likely routes of exposure:

**General:** Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure. Health effects are particularly evident when product is heated.

Eyes: May cause eye irritation.

Skin: May cause skin irritation.

**Inhalation:** Inhalation of fumes and vapors from processing, combustion or decomposition may cause irritation of the respiratory tract and mucous membranes.

Ingestion: Ingestion may cause irritation.

Symptoms/effects, acute and delayed: Irritation

Acute toxicity information: Not classified (based on available data, the classification criteria are not met). Note: These results are typical for this family of polymers. The high molecular weight of this polymer makes absorption by the body highly unlikely thus greatly diminishing the likelihood of toxic effects by the chemical itself. Oral, Rat, adult, LD50 >34 g/kg. Dermal, Rabbit, adult, LD50 >3 g/kg.

Skin corrosion/irritation: Not classified (based on available data, the classification criteria are not met). Note: These results are typical for this family of polymers. Skin irritation, rabbit: Primary irritation score = 0.8/8.0; Slight irritant.

Serious eye damage/irritation: Not classified (based on available data, the classification criteria are not met). Note: These results are typical for this family of polymers. Eye irritation, rabbit: Irritation score = 11.0/110.0; Slight - mild irritant.

Respiratory or skin sensitization: Not classified (based on available data, the classification criteria are not met).

Carcinogenicity: Not classified (based on available data, the classification criteria are not met).

Carcinogenic status: Not listed or regulated by IARC, NTP, OSHA, or ACGIH.

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met).

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met).

Specific target organ toxicity (STOT) - single exposure: Not classified (based on available data, the classification criteria are not met)

Specific target organ toxicity (STOT) - repeated exposure: Not classified (based on available data, the classification criteria are not

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met).

Aspiration hazard: Not classified (based on available data, the classification criteria are not met).

Other toxicity information: No additional information available.

# **SECTION 12: Ecological information**

Ecotoxicity: Note: These results are typical for this family of polymers. Freshwater Invertebrates Toxicity - 48 hour EC50; >1000 mg/L (OECD 202). Algal Toxicity - 72 hour EC50; >1000 mg/L (OECD 201).

Persistence and degradability: Not readily biodegradable.

Bioaccumulative potential: No specific information available.

Mobility in soil: No specific information available.

Other adverse effects: No additional information available.

# **SECTION 13: Disposal considerations**

For waste disposal purposes, this product is not known to be defined or designated as hazardous by current provisions of the Federal (EPA) Resource Conservation and Recovery Act (RCRA, 40CFR261). Incinerate waste product when in liquid form (i.e., as supplied) in a properly permitted (approved) incineration facility in accordance with federal, state and local regulations. Liquids cannot be disposed of in a landfill. Federal, state and local regulations where the waste material is generated, treated, and/or disposed of must be examined to verify the appropriate waste classification.

See Section 8 for recommendations on the use of personal protective equipment.

# **SECTION 14: Transport information**

The information below is provided to assist in documentation. It may supplement the information on the package. The package in your possession may carry a different version of the label depending on the date of manufacture. Depending on inner packaging quantities and packaging instructions, it may be subject to specific regulatory exceptions.

UN number: N/A

UN proper shipping name:

Not regulated - See Bill of Lading for Details

Transport hazard class(es):

U.S. DOT hazard class: N/A Canada TDG hazard class: N/A Europe ADR/RID hazard class: N/A IMDG Code (ocean) hazard class: N/A ICAO/IATA (air) hazard class: N/A

A "N/A" listing for the hazard class indicates the product is not regulated for transport by that regulation.

Packing group: N/A

Environmental hazards:

Marine pollutant: Not Applicable

Hazardous substance (USA): Not Applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:

Not Applicable

Special precautions for user: Not Applicable

# **SECTION 15: Regulatory information**

Safety, health and environmental regulations specific for the product in question:

#### U.S. federal and state regulations/legislation:

This SDS has been prepared in accordance with the hazard criteria of the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

# U.S. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Reportable Quantity (RQ):

Not Applicable

# U.S. Superfund Amendments and Reauthorization Act (SARA) - SARA Section 313:

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and 40 CFR 372: None known

# U.S. TSCA Section 12(b) Export Notification:

This product is not subject to TSCA 12(b) reporting requirements.

#### California Proposition 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer: None known to be present or none in reportable amounts for occupational exposure as per OSHA's approval of the California Hazard Communication Standard, Federal Register, page 31159 ff, 6 June 1997.

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

None known to be present or none in reportable amounts for occupational exposure as per OSHA's approval of the California Hazard Communication Standard, Federal Register, page 31159 ff, 6 June 1997.

Notes: No additional information

#### Canada regulations/legislation:

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

Notes: No additional information

#### Mexico regulations/legislation:

This SDS contains the information required by NOM-018-STPS-2000 Workplace Hazardous Chemical Substances Communication and Identification Standard.

Notes: No additional information

#### Chemical inventories:

Regulation	<u>Status</u>
Australian Inventory of Chemical Substances (AICS):	Y
Canadian Domestic Substances List (DSL):	Y
Canadian Non-Domestic Substances List (NDSL):	Ν
China Inventory of Existing Chemical Substances (IECSC):	Υ
European Inventory of Existing Chemical Substances (EINECS):	Υ
European List of Notified Chemical Substances (ELINCS):	' N
Japan Existing and New Chemical Substances (ENCS):	Υ
Korean Existing and Evaluated Chemical Substances (KECL):	Υ
New Zealand Inventory of Chemicals (NZIoC):	Υ
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	N
Taiwan Inventory of Existing Chemicals:	Υ
U.S. Toxic Substances Control Act (TSCA):	Υ

# Chemical inventory notes: Monomers are listed: European Union EINECS.

A "Y" listing indicates all intentionally added components are either listed or are otherwise compliant with the regulation. A "N" listing indicates that for one or more components: 1) there is no listing on the public inventory; 2) no information is available; or 3) the component has not been reviewed. A "Y" for New Zealand may mean that a qualified group standard may exist for the components in this product.

Europe REACH (EC) 1907/2006: Applicable components are pre-registered, exempt or otherwise compliant. REACh is

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only relevant to substances either manufactured or imported into the EU. Emerald Performance Materials has met its obligations under the REACh regulation. REACh information regarding this product is provided for informational purposes only. Each Legal Entity may have differing REACh obligations, depending on their place in the supply chain. For material manufactured outside of the EU, the importer of record must understand and meet their specific obligations under the regulation.

0

# SECTION 16: Other information

SDS Revision date: 2016-05-05

HMIS (Hazardous Materials Identification System) Ratings:

Health: 1

Flammability:

Reactivity (Stability):

Personal Protection:

Χ

#### NFPA (National Fire Protection Association) Ratings:

Health:

Flammability:

Instability:

0

Key: 0=Insignificant; 1=Slight; 2=Moderate; 3=High; 4=Extreme. An asterisk appearing after the HMIS Health numerical rating denotes a chronic hazard.

Hazardous Materials Identification System (HMIS), National Paint and Coating Association, rating applies to product "as packaged" (i.e., ambient temperature). Ratings are based upon HMIS® III and NFPA 704 (2007). An asterisk appearing after the HMIS Health® III numerical rating denotes a chronic hazard. National Fire Protection Association (NFPA) rating identifies the severity of hazards of material during a fire emergency (i.e., "on fire").

#### Legend:

\*: Trademark owned by Emerald Performance Materials, LLC.

ACGIH: American Conference of Governmental Industrial Hygienists

AIHA WEEL: American Industrial Hygiene Association (AIHA) Niveau d'exposition en milieu de travail sur l'environnement (WEEL)

N/A: Not Applicable N/E: None Established

STEL: Short Term Exposure Limit

TWA: Time Weighted Average (exposure for 8-hour workday)

### Users Responsibility/Disclaimer of Liability:

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local laws and local regulations remains the responsibility of the user.

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of your operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained in this bulletin should be provided to your employees or customers. It is your responsibility to develop appropriate work practice guidelines and employee instructional programs for your operation.

Safety Data Sheet Preparer: Product Compliance Department Emerald Performance Materials, LLC 2020 Front Street, Suite 100 Cuyahoga Falls, Ohio 44221 United States

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M25

#### 1. Identification

#### 1.1. Product identifier

Trade name

NOROX® MEKP-9

#### Recommended use of the chemical and restrictions on use 1.2.

Relevant applications identified

Curing agent (polymer technology)

#### Details of the supplier of the safety data sheet 1.3.

Company

United Initiators, Inc. 334 Phillips 311 Rd. Helena, AR 72342-9033

USA

Telephone

870-572-2935

Telefax

870-572-1416

Email address

Cs-initiators.nafta@united-in.com

#### 24 HOUR EMERGENCY TELEPHONE NUMBERS: 1.4.

CHEMTREC - US &

800-424-9300

CANADA:

CHEMTREC INTERNATIONAL: +1 703-527-3887 (collect calls accepted)

**Product Regulatory** 

800-231-2702

Information

#### Hazards identification 2.

#### Classification of the substance or mixture 2.1.

Classification according to Regulation 29CFR 1910.1200

H227 Category 4 Flammable liquids H242 Type D Organic peroxides Category 1B H314 Skin corrosion Category 1 H318 Serious eye damage Category 3 H402 Acute aquatic toxicity H412 Category 3 Chronic aquatic toxicity

#### 2.2. Label elements

Statutory basis Symbol(s)

Classification according to Regulation 29CFR 1910.1200



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Signal word

Danger

Hazard statement

H227 - Combustible liquid

H242 - Heating may cause a fire.

H314 - Causes severe skin burns and eye damage. H412 - Harmful to aquatic life with long lasting effects.

Precautionary statement:

Prevention

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition

sources. No smoking.

P220 - Keep/Store away from clothing/ strong acids, bases, heavy metal salts and

other reducing substances /combustible materials.

P234 - Keep only in original container. P260 - Do not breathe dust or mist. P264 - Wash skin thoroughly after handling.

P273 - Avoid release to the environment.

P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection.

Precautionary statement:

Reaction

P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated

clothing. Rinse skin with water/shower.

P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for

breathing

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes.

Remove contact lenses, if present and easy to do. Continue rinsing.

P310 - Immediately call a POISON CENTER/doctor. P363 - Wash contaminated clothing before reuse.

P370 + P378 - In case of fire: Use water spray, alcohol-resistant foam, dry chemical

or carbon dioxide to extinguish.

P391 - Collect spillage.

Precautionary statement:

Storage

P403 + P235 - Store in a well-ventilated place. Keep cool.

P405 - Store locked up.

P411 - Store at temperatures not exceeding 38°C (100°F).

P420 - Store away from other materials.

Precautionary statement:

Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant.

#### 2.3. Other hazards

None known.

#### 3. Composition/information on ingredients

<ul> <li>Methyl ethyl ketone peroxide</li> </ul>	32% - 35%
CAS-No. 1338-23-4	A MANUAL PROPERTY OF THE PROPE
Flammable liquids	Category 4
Organic peroxides	Type D
Acute toxicity (Oral)	Category 4
Skin corrosion	Category 1
Serious eye damage	Category 1
Dimethyl phthalate	35% - 60%

CAS-No.

131-11-3

Remarks

Not a hazardous substance or mixture

Phlegmatizer

6% - 26%

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CAS-No. Proprietary Acute aquatic toxicity Chronic aquatic toxicity		Category 2 Category 2
Methyl ethyl ketone	0% - 2%	
CAS-No. 78-93-3 Flammable liquids Eye irritation Specific target organ toxicity - single expos	ure (Central nervous system)	Category 2 Category 2A Category 3
Hydrogen peroxide	<= 1%	
CAS-No. 7722-84-1 Oxidizing liquids Acute toxicity (Oral) Skin corrosion Serious eye damage Specific target organ toxicity - single expos Chronic aquatic toxicity	ure (Respiratory system)	Category 1 Category 4 Category 1A Category 1 Category 3 Category 3

#### Other information

This material is classified as hazardous under OSHA regulations.

### 4. First aid measures

### 4.1. Description of first aid measures

#### Inhalation

If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If unconscious, evaluate the need for artificial respiration. Get immediate medical attention.

# Skin contact

Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Obtain medical attention immediately if symptoms occur. Wash clothing before reuse.

#### Eve contact

In case of contact, immediately flush eyes with plenty of water. Obtain medical attention if irritation develops.

#### Ingestion

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

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

# **Symptoms**

None known

# 4.3. Indication of any immediate medical attention and special treatment needed None known.

# 5. Fire-fighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide., Dry Chemical combined with peroxide may reignite fire., Light water additives may be particularly effective at extinguishing peroxide fires.

Unsuitable extinguishing media:

High volume water jet.

# 5.2. Special hazards arising from the substance or mixture

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The heat of decomposition of the peroxides adds to the heat of the fire. Dry chemical fire extinguishing agent may catalyze the decomposition.

#### 5.3. Advice for firefighters

If dry chemical is used to extinguish a peroxide fire, the extinguished area must be thoroughly wetted down with water to prevent reignition.

As in any fire, wear self-contained positive-pressure breathing apparatus and full protective gear.

Containers near the source of fire should be cooled with a water spray to prevent contents from reaching decomposition temperature.

#### 6. Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

Evacuate personnel to safe areas. Wear a self-contained breathing apparatus and appropriate personal protective equipment. (See Section 8 - Exposure Controls/Personal Protection.) Remove all sources of ignition. Ventilate the area.

#### **Environmental precautions** 6.2.

Obey relevant local, state, provincial and federal laws and regulations. Do not contaminate any lakes, streams, ponds, groundwater or soil.

#### 6.3. Methods and material for containment and cleaning up

Dike spill to prevent runoff from entering drains, sewers, streams, etc. Wet spilled material with water and absorb with an inert absorbent material such as perlite, vermiculite, or sand. Sweep up using non-sparking tools and place in a clean polyethylene drum or a polyethylene pail. DO NOT place into a steel container, lined or unlined, as decomposition may occur. Treat any contaminated cardboard packaging as hazardous waste. Wet container with additional water prior to sealing. Use absorbent/absorbent material to solidify liquids. Clean up promptly by sweeping or vacuum. Wear protective equipment, including eye protection. to avoid exposure (see Section 8 for specific handling precautions).

#### 7. Handling and storage

#### 7.1. Precautions for safe handling

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

#### 7.2. Conditions for safe storage, including any incompatibilities

# Storage

The stability of peroxide formulations us directly related to the shipping and storage temperature history. Cool storage at 80° F (27°C) or below is recommended for longer shelf life and stability. Prolonged storage at elevated temperatures of 100° F (38°C) and higher will cause product degradation, gassing and potential container rupture which can result in a fire and/or explosion. Store out of direct sunlight in a well ventilated area away from combustible and incompatible material. DO NOT STORE WITH FOOD OR DRINK.

Refer to NFPA 400 Hazardous Materials Code from the National Fire Protection Association for additional storage information.

### Further information

Store apart from other dangerous and incompatible substances.

Keep away from direct sunlight.

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Keep containers tightly closed in a cool, well-ventilated place.

# 8. Exposure controls/personal protection

8.1. Control parameters

Control parameter	ers	
<ul> <li>Methyl ethyl k</li> </ul>	etone peroxide	
CAS-No. Control parameters	1338-23-4 0.2 ppm	Ceiling Limit Value:(ACGIH)
Control parameters	0.2 ppm 1.5 mg/m3	Ceiling Limit Value:(US CA OEL)
Dimethyl phth	nalate	
CAS-No. Control parameters	131-11-3 5 mg/m3	Time Weighted Average (TWA):(ACGIH)
Control parameters	5 mg/m3	Permissible exposure limit:(OSHA Z1)
Control parameters	5 mg/m3	Time Weighted Average (TWA) Permissible Exposure Limit (PEL):(US CA OEL)
Methyl ethyl i	cetone	
CAS-No. Control parameters	78-93-3 200 ppm	Time Weighted Average (TWA):(ACGIH)
Control parameters	300 ppm	Short Term Exposure Limit (STEL):(ACGIH)
Control parameters	200 ppm 590 mg/m3	Permissible exposure limit:(OSHA Z1)
Control parameters	200 ppm 590 mg/m3	Time Weighted Average (TWA) Permissible Exposure Limit (PEL):(US CA OEL)
Control parameters	300 ppm 885 mg/m3	Short Term Exposure Limit (STEL):(US CA OEL)
Hydrogen per	roxide	
CAS-No. Control parameters	7722-84-1 1 ppm	Time Weighted Average (TWA):(ACGIH)
Control parameters	1 ppm 1.4 mg/m3	Permissible exposure limit:(OSHA Z1)
Control parameters	1 ppm 1.4 mg/m3	Time Weighted Average (TWA) Permissible Exposure Limit (PEL):(US CA OEL)

# 8.2. Exposure controls

# **Engineering measures**

Local exhaust and mechanical ventilation recommended.

# 8.3. Personal protective equipment

# Respiratory protection

A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

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#### Hand protection

Wear protective gloves made of the following materials:.

solvent-resistant gloves (butyl-rubber)

nitrile rubber

Neoprene gloves

Skin should be washed after contact.

#### Eye protection

Use chemical splash goggles or face shield.

# Skin and body protection

A safety shower and eye wash fountain should be readily available.

To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29CFR1910.132) be conducted before using this product.

# Hygiene measures

Do not eat, drink or smoke during use.

Wash hands before breaks and immediately after handling the product.

#### Protective measures

Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing

(Seta closed cup)

#### 9. Physical and chemical properties

# Information on basic physical and chemical properties

physical state

liquid

Colour

Water-white.

Form

liquid

Odour

slight

Odour Threshold

No data available

pH

not applicable

Melting point/range

no data available

Boiling point/range

not determined

Flash point

76 °C

Evaporation rate

not determined

Flammability (solid, gas)

not applicable

Lower explosion limit

no data available

Upper explosion limit

no data available

Vapour pressure

no data available

Relative vapour density

Relative density

1.1

Water solubility

soluble

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Solubility/qualitative

no data available

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Partition coefficient (n-

no data available

octanol/water)

Autoignition temperature no data available

Thermal decomposition > 60 °C

Viscosity, dynamic

no data available

Viscosity, kinematic

not determined

9.2. Other information

peroxides

The substance or mixture is an organic peroxide classified as type D.

SADT

SADT

> 60 °C

# 10. Stability and reactivity

#### 10.1. Reactivity

Stable under recommended storage conditions.

# 10.2. Chemical stability

Contact with incompatible substances can cause disintegration at or below SADT.

# 10.3. Possibility of hazardous reactions

Stability

Stable under recommended storage conditions.

Possibility of hazardous

Vapors may form explosive mixtures with air.

reactions

# 10.4. Conditions to avoid

Keep away from heat and sources of ignition.

Exposure to sunlight.

Prolonged storage above 100°F (38°). Storage above SADT. Storage near flammable or combustible material.

# 10.5. Incompatible materials

Keep away from strong acids, bases, heavy metals, salts, reducing agents and accelerators. Contaminants (e.g. rust, dust, ash). Combustible materials., Risk of decomposition. Dimethylaniline, cobalt napthenate and other promoters, accelerators, reducing agents, or any hot material.

#### 10.6. Hazardous decomposition products

Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke)., Irritant, caustic, flammable, noxious/toxic gases and vapors can develop in the case of fire and decomposition., Acrid smoke and irritating fumes.

#### 11. Toxicological information

# 11.1. Information on toxicological effects

No toxicological studies are available on the mixture.

carcinogenicity assessment

NTP: No component of this product present at levels greater than or equal

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to 0.1% is identified as a known or anticipated carcinogen by NTP.

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

by IARC.

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.

# Toxicological information on components Methyl ethyl ketone peroxide

Acute oral toxicity

LD50 Oral Rat(male): 1017 mg/kg

Skin irritation

Causes severe skin burns and eye damage.

Causes burns.

Eye irritation

Causes serious eye damage. Risk of serious damage to eyes.

Dimethyl phthalate

Acute oral toxicity

LD50 Oral Rat: 8200 mg/kg

Acute inhalation toxicity

LC50: 10.4 mg/l / 6 h

Assessment:

H332: Harmful if inhaled.

Acute dermal toxicity

LD50 Dermal Rat: > 12000 mg/kg

Skin irritation

No skin irritation

Eye irritation

No eye irritation

Sensitization

Not sensitizing.

Phlegmatizer

Acute oral toxicity

LD50 Oral Rat(female): > 2000 mg/kg

Acute inhalation toxicity

LCLo Rat: > 0.12 mg/l / 6 h

Acute dermal toxicity

LD50 Dermal Rat(male/female): > 2000 mg/kg

Skin irritation

No skin irritation

Eye irritation

No eye irritation

Hydrogen peroxide

Acute oral toxicity

LD50 Oral Rat(male): 1026 mg/kg

Test substance:

Hydrogen peroxide >= 50%

LD50 Oral Rat(female): 693.7 mg/kg

Test substance:

Hydrogen peroxide >= 50%

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Acute inhalation toxicity

Assessment:

Harmful if inhaled.

Acute dermal toxicity

LD50 Dermal Rat(male and female): > 2000 mg/kg

Skin irritation

corrosive

Eye irritation

corrosive

Sensitization

Not sensitizing.

Assessment of STOT single

exposure

Assessment:

May cause respiratory irritation.

1.0 / US

Methyl ethyl ketone

Acute oral toxicity

LD50 Oral Rat: 2737 mg/kg

Acute inhalation toxicity

LC50 Rat: 23500 mg/l / 8 h

Acute dermal toxicity

LD50 Rabbit: 6480 mg/kg

Eye irritation

Irritating to eyes.

irritating

Assessment of STOT single

exposure

Target Organs:

Central nervous system

Assessment:

May cause drowsiness or dizziness.

Mutagenicity assessment

This product may cause mutagenic effects.

#### 12. **Ecological information**

#### 12.1. Toxicity

Toxicity to fish

There is no data available for this product.

Toxicity in aquatic

No data is available on the product itself.

invertebrates Toxicity to algae

No data is available on the product itself.

# 12.2. Persistence and degradability

Biodegradability

no data available

#### 12.3. Bioaccumulative potential

Bioaccumulation

no data available

# 12.4. Mobility in soil

Mobility

No data available

#### 12.5. Other adverse effects

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**Further Information** 

Avoid release to the environment.

#### 13. Disposal considerations

#### 13.1. Waste treatment methods

#### **Product**

Waste must be disposed of in accordance with federal, state and local regulations. Incineration is the preferred method of disposal. Contact United Initiators for additional information. Empty containers must be handled with care due to product residue. DO NOT HEAT OR CUT THE EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH.

# Uncleaned packaging

Packaging material should be recycled or disposed of in accordance with federal, state and local regulations.

#### 14. Transport information

200	-	-	-		
D.	U.	١.	Ko	ad/	Rail

14.1. UN number:

UN 3105

14.2. UN proper shipping name:

Organic peroxide type D, liquid(Methyl ethyl ketone peroxide

<= 45%)

14.3. Transport hazard class(es):

5.2

14.4. Packing group:

П

14.5. Environmental hazards (Marine

pollutant): 14.6. Special precautions for user:

No

Air transport ICAO-TI/IATA-DGR

14.1. UN number:

UN 3105

14.2. UN proper shipping name:

Organic peroxide type D, liquid(Methyl ethyl ketone peroxide <= 45%)

14.3. Transport hazard class(es):

5.2

14.4. Packing group:

14.5. Environmental hazards:

14.6. Special precautions for user:

Yes

IATA-C: ERG-Code 5L

> Must be protected from direct sunlight and stored away from all sources of heat in a wellventilated area.

IATA-P: ERG-Code 5L

> Must be protected from direct sunlight and stored away from all sources of heat in a wellventilated area.

# Sea transport IMDG-Code/GGVSee (Germany)

14.1. UN number:

**UN 3105** 

14.2. UN proper shipping name:

ORGANIC PEROXIDE TYPE D, LIQUID(Methyl ethyl ketone peroxide <= 45%)

14.3. Transport hazard class(es):

5.2

14.4. Packing group:

14.5. Environmental hazards (Marine

pollutant): 14.6. Special precautions for user:

Yes

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EmS:

F-J,S-R

"Separated from" acids and alkalis. Protected from sources of heat.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: for transportapproval see regulatory information

Page

# 15. Regulatory information

# **US Federal Regulations**

# **OSHA**

If listed below, chemical specific standards apply to the product or components:

None listed

Clean Air Act Section (112)

If listed below, components present at or above the de minimus level are hazardous air pollutants:

Dimethyl phthalate CAS-No. 131-11-3

**CERCLA Reportable Quantities** 

If listed below, a reportable quantity (RQ) applies to the product based on the percent of the named component:

 Methyl ethyl ketone peroxide CAS-No. 1338-23-4 Reportable Quantity 29 lbs

# SARA Title III Section 311/312 Hazard Categories

The product meets the criteria only for the listed hazard classes:

- Acute Health Hazard
- Fire Hazard

SARA Title III Section 313 Reportable Substances

If listed below, components are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

None listed

Toxic Substances Control Act (TSCA)

If listed below, non-proprietary substances are subject to export notification under Section 12 (b) of TSCA:

None listed

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### State Regulations

# California Proposition 65

A warning under the California Drinking Water Act is required only if listed below:

None listed

# International Chemical Inventory Status

Unless otherwise noted, this product is in compliance with the inventory listing of the countries shown below. For information on listing for countries not shown, contact the Product Regulatory Services Department.

Europe (EINECS/ELINCS)

listed/registered

USA (TSCA)

listed/registered

Canada (DSL)

listed/registered

Australia (AICS)

listed/registered

Japan (MÎTI)

listed/registered

Korea (TCCL)

listed/registered

Philippines (PICCS)

not listed/registered

China

listed/registered

New Zealand

not listed/registered

An employer using HMIS/NFPA labeling must through training ensure that its employees are fully aware of the hazards of the chemicals used.

# **HMIS Ratings**

Health:

3

Flammability:

Physical Hazard:

2

2

### **NFPA Ratings**

Health:

3

Flammability:

2

Reactivity:

2

#### 16. Other information

### **Further information**

Revision date

12/18/2014

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

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

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Legend

ACC American Chemistry Council

**ACGIH** American Conference of Governmental Industrial Hygenists

ACS Advisory Committee on Sustainability

Acceptable Daily Intake ADI

**ASTM** American Society for Testing and Materials

ATP Adaptation to Technical Progress BCF

Bioconcentration factor BOD Biochemical oxygen demand

closed cup C.C.

CAO Cargo Aircraft Only

Carc Carcinogen

CAS Chemical Abstract Services CDN Canada

**CEPA** Canadian Environmental Protection Act

**CERCLA** Comprehensive Environmental Response - Compensation and Liability Act

CFR Code of Federal Regulations

carcinogenic-mutagenic-toxic for reproduction CMR

COD Chemical oxygen demand

DIN German Institute for Standardization

**DMEL** Derived minimum effect level DNEL Derived no effect level DOT Department of Transportation EC50 half maximal effective concentration

**EPA Environmental Protection Agency** ErC50 Reduction of Growth Rate **ERG** Emergency Response Guide Book **FDA** Food and Drug Administration

GHS Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

GLP Good Laboratory Practice **GMO** Genetic Modified Organism Hazard Communication Standard HCS **HMIS** Hazardous Materials Identification System IARC International Agency for Research on Cancer International Air Transport Association IATA

**IBC** Intermediate Bulk Container

ICAO-TI International Civil Aviation Organization- Technical Instructions

**ICCA** International Council of Chemical Association

ID Identification number

**IMDG** International Maritime Dangerous Goods

**IUPAC** International Union of Pure and Applied Chemistry ISO International Organization For Standardization

LC50 50 % Lethal Concentration LD50 50 % Lethal Dose

L(E)C50 LC50 or EC50 LÒÁEL Lowest observed adverse effect level

LOEL Lowest observed effect level

International Convention for the Prevention of Pollution from Ships MARPOL

**NFPA** National Fire Protection Association NOAEL No observed adverse effect level NOEC no observed effect concentration

NOEL no observed effect level

O. C. open cup

OECD Organisation for Economic Cooperation and Development

OEL Occupational Exposure Limit

**OSHA** Occupational Safety and Health Administration

PBT Persistent, bioaccumulative, toxic PEC Predicted effect concentration **PNEC** Predicted no effect concentration

RQ Reportable Quantity SDS Safety Data Sheet

STOT Specific Target Organ Toxicity

UN **United Nations** 

vPvB very persistent, very bioaccumulative

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voc WHMIS WHO

volatile organic compounds Workplace Hazardous Materials Information System

World Health Organization

according to Regulation (EC) No. 1907/2006



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

#### 1.1 Product identifier

Trade name

: NOROX CHP

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

Use of the Sub-

: polymerisation initiators

stance/Mixture

# 1.3 Details of the supplier of the safety data sheet

Company

: United Initiators GmbH & Co. KG

Dr. Gustav-Adolph-Str. 3

D-82049 Pullach

E-mail address of person

responsible for the SDS

: contact@united-in.com

# 1.4 Emergency telephone number

+49 / 89 / 74422 - 0 (24 h)

#### **SECTION 2: Hazards identification**

#### 2.1 Classification of the substance or mixture

# Classification (REGULATION (EC) No 1272/2008)

Flammable liquids, Category 3

H226: Flammable liquid and vapour.

Organic peroxides, Type F

H242: Heating may cause a fire.

Acute toxicity, Category 4

H302: Harmful if swallowed.

Acute toxicity, Category 3

H331: Toxic if inhaled.

Acute toxicity, Category 4

H312: Harmful in contact with skin.

Skin corrosion, Category 1B

H314: Causes severe skin burns and eye damage.

Serious eye damage, Category 1

H318: Causes serious eye damage.

Specific target organ toxicity - single exposure, Category 3, Respiratory system H335: May cause respiratory irritation.

Specific target organ toxicity - repeated

exposure, Category 2

H373: May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard, Category 1

H304: May be fatal if swallowed and enters air-

ways.

Chronic aquatic toxicity, Category 2

H411: Toxic to aquatic life with long lasting effects.

according to Regulation (EC) No. 1907/2006



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# 2.2 Label elements

# Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms











Signal	word
--------	------

Danger

Hazard statements

H226 H242

Flammable liquid and vapour. Heating may cause a fire.

H302 + H312 H304

Harmful if swallowed or in contact with skin May be fatal if swallowed and enters air-

ways.

Causes severe skin burns and eye damage. Toxic if inhaled.

H314 H331 H335

May cause respiratory irritation. May cause damage to organs through pro-

H373 longed or repeated exposure.

H411

Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention:

P210

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No

smoking.

P220

Keep/Store away from clothing/ strong acids, bases, heavy metal salts and other reducing substances /combustible materials.

Keep container tightly closed.

P233

Keep cool.

P235 P260

Do not breathe dust/ fume/ gas/ mist/ va-

P262

pours/ spray.

Do not get in eyes, on skin, or on clothing.

P273

Avoid release to the environment.

Wear protective gloves/ protective clothing/

P280

eve protection/ face protection.

Response:

P301 + P310

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

IF SWALLOWED: Call a POISON CENTER

P301 + P312

or doctor/ physician if you feel unwell.

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin

with water/shower.

P305 + P351 + P338

IF IN EYES: Rinse cautiously with wa-

ter for several minutes. Remove contact lenses, if present and easy to do. Continue

rinsing.

P308 + P313

IF exposed or concerned: Get medical ad-

vice/ attention.

P314

Get medical advice/ attention if you feel

unwell.

P315

Get immediate medical advice/ attention.

according to Regulation (EC) No. 1907/2006



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P331

Do NOT induce vomiting.

Storage:

P403 + P235

Store in a well-ventilated place. Keep cool.

Disposal:

P501

Dispose of contents/ container to an ap-

proved waste disposal plant.

Hazardous components which must be listed on the label:

Cumene hydroperoxide (CAS-No. 80-15-9)

Cumene (CAS-No. 98-82-8)

# 2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Vapours may form explosive mixture with air.

# SECTION 3: Composition/information on ingredients

#### 3.2 Mixtures

#### Hazardous components

Chemical Name	CAS-No. EC-No. Registration number	Classification	Concentration (% w/w)
Cumene hydroperoxide	80-15-9 201-254-7 01-2119475796-19	Flam. Liq. 3; H226 Org. Perox. E; H242 Acute Tox. 4; H302 Acute Tox. 3; H331 Acute Tox. 4; H312 Skin Corr. 1B; H314 Eye Dam. 1; H318 STOT RE 2; H373 Aquatic Chronic 2; H411	>= 80 - < 84
Cumene	98-82-8 202-704-5 01-2119473983-24	Flam. Liq. 3; H226 STOT SE 3; H335 Asp. Tox. 1; H304 Aquatic Chronic 2; H411	>= 10 - < 15
Benzenemethanol, alpha,alpha- dimethyl-	617-94-7 210-539-5 01-2119965145-35	Acute Tox. 4; H302 Skin Irrit. 2; H315 Eye Irrit. 2; H319	>= 3 - < 5
acetophenone	98-86-2 202-708-7 01-2119533169-37	Acute Tox. 4; H302 Eye Irrit. 2; H319	>= 1 - < 3

For explanation of abbreviations see section 16.

# **SECTION 4: First aid measures**

according to Regulation (EC) No. 1907/2006

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4.1 Description of first aid measures

General advice

Move out of dangerous area.

Show this safety data sheet to the doctor in attendance.

Do not leave the victim unattended.

Symptoms of poisoning may appear several hours later. No artificial respiration, mouth-to-mouth or mouth to nose. Use

suitable instruments/apparatus. Call a physician immediately.

Protection of first-aiders

: First Aid responders should pay attention to self-protection

and use the recommended protective clothing

If inhaled

: Call a physician or poison control centre immediately.

If unconscious place in recovery position and seek medical

advice.

Keep respiratory tract clear. Call a physician immediately.

If breathed in, move person into fresh air.

Contact a poison control center.

In case of skin contact

: In case of contact, immediately flush skin with plenty of water

for at least 15 minutes while removing contaminated clothing

and shoes.

Wash contaminated clothing before re-use.

If on skin, rinse well with water. If on clothes, remove clothes. If symptoms persist, call a physician.

In case of eye contact

: Small amounts splashed into eyes can cause irreversible tis-

sue damage and blindness.

In the case of contact with eyes, rinse immediately with plenty

of water and seek medical advice.

Continue rinsing eyes during transport to hospital.

Remove contact lenses. Protect unharmed eye.

Keep eye wide open while rinsing.

If eye irritation persists, consult a specialist.

If swallowed

: Keep respiratory tract clear.

Call a physician immediately.
Contact a poison control center.
Rinse mouth thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed

Risks

Harmful if swallowed or in contact with skin

May be fatal if swallowed and enters airways.

Causes serious eye damage.

Toxic if inhaled.

May cause respiratory irritation.

May cause damage to organs through prolonged or repeated

exposure.

Causes severe burns.

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

Treatment

: Treat symptomatically and supportively.

# **SECTION 5: Firefighting measures**

#### 5.1 Extinguishing media

Suitable extinguishing media

: Water spray

Alcohol-resistant foam Carbon dioxide (CO2)

Dry chemical

Unsuitable extinguishing

media

: High volume water jet

# 5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-

fighting

: Contact with incompatible materials or exposure to temperatures exceeding SADT may result in a self-accelerating decomposition reaction with release of flammable vapors which

may auto-ignite.

The product burns violently.

Flash back possible over considerable distance. Vapours may form explosive mixtures with air.

The product will float on water and can be reignited on surface

water.

Cool closed containers exposed to fire with water spray.

# 5.3 Advice for firefighters

Special protective equipment

for firefighters

: Wear self-contained breathing apparatus for firefighting if nec-

essary. Use personal protective equipment.

Specific extinguishing meth-

ods

Do not use a solid water stream as it may scatter and spread

fire

Remove undamaged containers from fire area if it is safe to do

SO.

Use water spray to cool unopened containers.

Further information

: Collect contaminated fire extinguishing water separately. This

must not be discharged into drains.

Fire residues and contaminated fire extinguishing water must

be disposed of in accordance with local regulations.

Use extinguishing measures that are appropriate to local cir-

cumstances and the surrounding environment.

# SECTION 6: Accidental release measures

# 6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions

: Use personal protective equipment.

Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.

Follow safe handling advice and personal protective equip-

according to Regulation (EC) No. 1907/2006



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ment recommendations.

Beware of vapours accumulating to form explosive concentra-

tions. Vapours can accumulate in low areas.

Never return spills in original containers for re-use.

Treat recovered material as described in the section "Disposal

considerations".

# 6.2 Environmental precautions

Environmental precautions

: Prevent product from entering drains.

Prevent further leakage or spillage if safe to do so.

If the product contaminates rivers and lakes or drains inform

respective authorities.

# 6.3 Methods and material for containment and cleaning up

Methods for cleaning up

: Contact with incompatible substances can cause decomposi-

tion at or below SADT. Clear spills immediately.

Suppress (knock down) gases/vapours/mists with a water

spray jet.

To clean the floor and all objects contaminated by this materi-

al, use plenty of water.

Soak up with inert absorbent material. Isolate waste and do not reuse. Non-sparking tools should be used.

Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to deter-

mine which regulations are applicable.

# 6.4 Reference to other sections

For personal protection see section 8.

# **SECTION 7: Handling and storage**

# 7.1 Precautions for safe handling

Technical measures

: See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Advice on safe handling

Do not swallow.

Do not breathe vapours/dust.

Avoid exposure - obtain special instructions before use.

Avoid contact with skin and eyes.

Avoid formation of aerosol.

Take precautionary measures against static discharges. Never return any product to the container from which it was

originally removed.

Provide sufficient air exchange and/or exhaust in work rooms.

Avoid confinement.

Keep away from heat, hot surfaces, sparks, open flames and

other ignition sources. No smoking.

Smoking, eating and drinking should be prohibited in the ap-

plication area.

according to Regulation (EC) No. 1907/2006



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Wash thoroughly after handling. For personal protection see section 8. Protect from contamination.

Advice on protection against fire and explosion

: Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). Keep away from heat and sources of ignition. Use only explosion-proof equipment. Keep away from combustible material.

Hygiene measures

: Avoid contact with skin, eyes and clothing. Keep away from food and drink. When using do not eat or drink. When using do not smoke. Wash hands before breaks and immediately after handling the product.

#### 7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers

: Avoid impurities (e.g. rust, dust, ash), risk of decomposition. Electrical installations / working materials must comply with the technological safety standards. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in original container. Store in accordance with the particular national regulations.

Advice on common storage

: Keep away from strong acids, bases, heavy metal salts and

other reducing substances.

Recommended storage tem-

perature

: < 30 °C

Other data

: No decomposition if stored normally.

# 7.3 Specific end use(s)

# SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Cumene	Cumene	TWA	20 ppm 100 mg/m3	2000/39/EC
Further information	Identifies the	possibility of significa	ant uptake through the skin, I	ndicative
		STEL	50 ppm 250 mg/m3	2000/39/EC
Further information	Identifies the	possibility of significa	ant uptake through the skin, I	ndicative
		TWA	25 ppm 125 mg/m3	GB EH40
Further information	Can be absor there are con-	bed through skin. Th	ne assigned substances are t sorption will lead to systemic	hose for which toxicity.
		STEL	50 ppm 250 mg/m3	GB EH40
Further information	Can be absor	bed through skin. Th	ne assigned substances are t	hose for which

according to Regulation (EC) No. 1907/2006



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there are concerns that dermal absorption will lead to systemic toxicity.

# Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
Cumene hydroperox- ide	Workers	Inhalation	Long-term systemic effects	6 mg/m3

# Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
Cumene hydroperoxide	Fresh water	0.0031 mg/l
Cumene hydroperoxide	Marine water	0.00031 mg/l
Cumene hydroperoxide	Intermittent use/release	0.031 mg/l
Cumene hydroperoxide	Sewage treatment plant	0.35 mg/l
Cumene hydroperoxide	Fresh water sediment	0.023 mg/kg
Cumene hydroperoxide	Marine sediment	0.0023 mg/kg
Cumene hydroperoxide	Soil	0.0029 mg/kg

#### 8.2 Exposure controls

# **Engineering measures**

Minimize workplace exposure concentrations.

# Personal protective equipment

Eye protection

: Tightly fitting safety goggles

Please wear suitable protective goggles. Also wear face pro-

tection if there is a splash hazard.

Ensure that eyewash stations and safety showers are close to

the workstation location.

Hand protection

Material

butyl-rubber >= 480 min

Break through time

0.5 mm

Glove thickness

Remarks

: Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday. Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Skin and body protection

Select appropriate protective clothing based on chemical re-

according to Regulation (EC) No. 1907/2006



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sistance data and an assessment of the local exposure poten-

tial.

Respiratory protection

: In the case of dust or aerosol formation use respirator with an

approved filter.

Filter type

: ABEK-filter

# SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

: liquid

Colour

: colourless, light yellow

Odour

: aromatic

pH

: No data available

Melting point/range

: No data available

Boiling point/boiling range

: Decomposition: Decomposes below the boiling point.

Flash point

53 °C

Method: ISO 3679

Flammability (solid, gas)

: Not applicable

Upper explosion limit

: No data available

Lower explosion limit

: No data available

Vapour pressure

: No data available

Density

: 1.04 - 1.07 g/cm3 (20 °C)

Solubility(ies)

Water solubility

: slightly soluble

Solubility in other solvents

: No data available

Partition coefficient: n-

octanol/water

: No data available

Viscosity

Viscosity, dynamic

: 12 - 15 mPa.s

Explosive properties

: Not explosive

Oxidizing properties

The substance or mixture is not classified as oxidizing.

Organic peroxide

according to Regulation (EC) No. 1907/2006



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9.2 Other information

Self-Accelerating decomposi-

tion temperature (SADT)

: 60 °C

Method: UN-Test H.4

SADT-Self Accelerating Decomposition Temperature. Lowest temperature at which the tested package size will undergo a

self-accelerating decomposition reaction.

# **SECTION 10: Stability and reactivity**

#### 10.1 Reactivity

Stable under recommended storage conditions.

#### 10.2 Chemical stability

Stable under recommended storage conditions.

# 10.3 Possibility of hazardous reactions

# 10.4 Conditions to avoid

Conditions to avoid

: Heat, flames and sparks.

#### 10.5 Incompatible materials

Materials to avoid

: Accelerators, strong acids and bases, heavy metals and

heavy metal salts, reducing agents

# 10.6 Hazardous decomposition products

Irritant, caustic, flammable, noxious/toxic gases and vapours can develop in the case of fire and decomposition

# **SECTION 11: Toxicological information**

# 11.1 Information on toxicological effects

#### Acute toxicity

Harmful if swallowed or in contact with skin Toxic if inhaled.

# Product:

Acute oral toxicity

: LD50 (Rat): 382 mg/kg

Acute inhalation toxicity

: Acute toxicity estimate: 2.01 mg/l

Exposure time: 4 h Test atmosphere: vapour Method: Expert judgement

Assessment: The component/mixture is toxic after short term

inhalation.

Acute dermal toxicity

: Acute toxicity estimate: 1,100 mg/kg

Method: Expert judgement

#### Components:

Cumene hydroperoxide:

according to Regulation (EC) No. 1907/2006



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Acute oral toxicity

: LD50 (Rat): 382 mg/kg

Acute inhalation toxicity

: Acute toxicity estimate: 2.01 mg/l

Exposure time: 4 h
Test atmosphere: vapour
Method: Expert judgement

Assessment: The component/mixture is toxic after short term

inhalation.

Acute dermal toxicity

: Acute toxicity estimate: 1,100 mg/kg

Method: Expert judgement

Cumene:

Acute oral toxicity

: LD50 (Rat): 2,700 mg/kg

Method: OECD Test Guideline 401

Acute dermal toxicity

: LD50 (Rabbit): > 3,160 mg/kg

Benzenemethanol, alpha, alpha-dimethyl-:

Acute oral toxicity

: LD50 (Rat): 1,300 mg/kg

Acute dermal toxicity

: LD50 (Rabbit): 4,300 mg/kg

acetophenone:

Acute oral toxicity

: LD50 (Rat): 2,081 mg/kg

Method: OECD Test Guideline 401

Acute dermal toxicity

: LD50 (Rat): 3,300 mg/kg

Method: OECD Test Guideline 402

#### Skin corrosion/irritation

Causes severe burns.

**Product:** 

Remarks: Extremely corrosive and destructive to tissue.

### Components:

Cumene hydroperoxide:

Species: Rabbit Result: Causes burns.

Cumene:

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

Benzenemethanol, alpha, alpha-dimethyl-:

Species: Rabbit

Result: Severe skin irritation

acetophenone: Species: Rabbit

Method: OECD Test Guideline 404

according to Regulation (EC) No. 1907/2006



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Result: No skin irritation

# Serious eye damage/eye irritation

Causes serious eye damage.

**Product:** 

Remarks: May cause irreversible eye damage.

### Components:

#### Cumene hydroperoxide:

Species: Rabbit Result: Corrosive

#### Cumene:

Species: Rabbit

Method: OECD Test Guideline 405

Result: No eye irritation

# Benzenemethanol, alpha, alpha-dimethyl-:

Result: Irritating to eyes.

# acetophenone:

Species: Rabbit

Method: OECD Test Guideline 405

Result: No eye irritation

#### Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information. Respiratory sensitisation: Not classified based on available information.

# Components:

# Cumene hydroperoxide:

Result: Does not cause skin sensitisation.

# Cumene:

Exposure routes: Skin contact

Species: Guinea pig

Method: OECD Test Guideline 406

Result: Does not cause skin sensitisation.

# acetophenone:

Test Type: Draize Test Exposure routes: Skin contact

Species: Guinea pig

Result: Does not cause skin sensitisation.

#### Germ cell mutagenicity

Not classified based on available information.

# Components:

Cumene hydroperoxide:

according to Regulation (EC) No. 1907/2006



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Genotoxicity in vitro

: Result: positive

Remarks: In vitro tests have shown mutagenic effects.

Genotoxicity in vivo

: Test Type: Micronucleus test

Species: Mouse

Application Route: Skin contact

Result: negative

Cumene:

Genotoxicity in vitro

: Method: OECD Test Guideline 473

Result: negative

: Method: OECD Test Guideline 471

Result: negative

: Method: OECD Test Guideline 476

Result: negative

: Method: OECD Test Guideline 482

Result: negative

: Test Type: Ames test

Result: positive

Genotoxicity in vivo

: Species: Rat

Application Route: Intraperitoneal

Exposure time: 72 h

Method: OECD Test Guideline 474

Result: Equivocal

Species: Mouse

Application Route: inhalation (gas)

Exposure time: 14 w

Method: OECD Test Guideline 474

Result: negative

acetophenone:

Genotoxicity in vitro

Method: OECD Test Guideline 473

Result: negative

: Method: OECD Test Guideline 476

Result: negative

: Method: OECD Test Guideline 471

Result: negative

Genotoxicity in vivo

: Species: Mouse

Application Route: Intraperitoneal Method: OECD Test Guideline 474

Result: negative

Carcinogenicity

Not classified based on available information.

according to Regulation (EC) No. 1907/2006



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Components:

Cumene hydroperoxide:

Remarks: This information is not available.

Cumene:

Species: Rat

Application Route: inhalation (gas)

Exposure time: 2 Years

LOAEL: Lowest Observed Effect Concentration: 250

Method: OECD Test Guideline 451

Species: Mouse

Application Route: inhalation (gas)

Exposure time: 2 Years

LOAEL: Lowest Observed Effect Concentration: 125

Method: OECD Test Guideline 451

Reproductive toxicity

Not classified based on available information.

Components:

Cumene hydroperoxide:

Effects on fertility

: Remarks: No data available

Effects on foetal develop-

ment

: Remarks: No data available

Cumene:

Effects on foetal develop-

ment

: Species: Rabbit

Application Route: inhalation (vapour)

General Toxicity Maternal: Lowest observed adverse effect

level: 500

Developmental Toxicity: No observed adverse effect level:

2,300

Method: OECD Test Guideline 414

Species: Rat

Application Route: inhalation (vapour)

General Toxicity Maternal: No observed adverse effect level:

100

Developmental Toxicity: No observed adverse effect level: >

1,200

Method: OECD Test Guideline 414

acetophenone:

Effects on fertility

Species: Rat

Application Route: Ingestion

General Toxicity - Parent: No observed adverse effect level:

225 mg/kg body weight

General Toxicity F1: No observed adverse effect level: 225

mg/kg body weight

Method: OECD Test Guideline 422

Result: negative

according to Regulation (EC) No. 1907/2006



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Species: Rat

Application Route: Ingestion

General Toxicity - Parent: Lowest observed adverse effect

level: 750 mg/kg body weight

General Toxicity F1: Lowest observed adverse effect level:

750 mg/kg body weight

Method: OECD Test Guideline 422

Effects on foetal develop-

ment

Species: Mouse

Application Route: Ingestion

General Toxicity Maternal: No observed adverse effect level:

>= 175 mg/kg body weight

Teratogenicity: No observed adverse effect level: >= 175

mg/kg body weight

Developmental Toxicity: No observed adverse effect level: >=

175 mg/kg body weight

Method: OECD Test Guideline 414

Result: negative

#### STOT - single exposure

May cause respiratory irritation.

# Components:

#### Cumene:

Assessment: May cause respiratory irritation.

# STOT - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

#### Components:

#### Cumene hydroperoxide:

Assessment: May cause damage to organs through prolonged or repeated exposure.

### Repeated dose toxicity

#### Components:

#### Cumene hydroperoxide:

Species: Rat NOAEL: 0.031 mg/l

Application Route: inhalation (dust/mist/fume)

Exposure time: 90 d

#### Cumene:

Species: Rat

NOEL: > 536 mg/kg

Application Route: oral (feed)

Species: Rat

No observed adverse effect level: 125 mg/kg Application Route: inhalation (vapour) Method: OECD Test Guideline 413

according to Regulation (EC) No. 1907/2006



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acetophenone:

Species: Rat NOAEL: 225 mg/kg LOAEL: 750 mg/kg

Application Route: Ingestion Method: OECD Test Guideline 422

Aspiration toxicity

May be fatal if swallowed and enters airways.

Components:

Cumene:

May be fatal if swallowed and enters airways.

**Further information** 

Product:

Remarks: Solvents may degrease the skin.

**SECTION 12: Ecological information** 

12.1 Toxicity

Components:

Cumene hydroperoxide:

Toxicity to fish

: LC50 (Oncorhynchus mykiss (rainbow trout)): 3.9 mg/l

Exposure time: 96 h

aquatic invertebrates

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 18 mg/l

Exposure time: 48 h

Toxicity to algae

: EC50 (Desmodesmus subspicatus (green algae)): 1.6 mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

Cumene:

Toxicity to fish

: LC50 (Oncorhynchus mykiss (rainbow trout)): 4.8 mg/l

Exposure time: 96 h

Toxicity to daphnia and other

aquatic invertebrates

: EC50 (Daphnia magna (Water flea)): 2.14 mg/l

Exposure time: 48 h

Method: OECD Test Guideline 202

Toxicity to algae

: EC50 (Desmodesmus subspicatus (green algae)): 2.01 mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

Toxicity to bacteria

: EC50: > 2,000 mg/l

Exposure time: 3 h

Method: OECD Test Guideline 209

according to Regulation (EC) No. 1907/2006



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Toxicity to daphnia and other aquatic invertebrates (Chron-

ic toxicity)

: NOEC: 0.35 mg/l Exposure time: 21 d

> Species: Daphnia magna (Water flea) Method: OECD Test Guideline 211

**Ecotoxicology Assessment** 

Chronic aquatic toxicity

: Toxic to aquatic life with long lasting effects.

acetophenone:

Toxicity to fish

: LC50 (Pimephales promelas (fathead minnow)): 162 mg/l

Exposure time: 96 h

Method: OECD Test Guideline 203

Toxicity to daphnia and other

aquatic invertebrates

: EC50 (Daphnia magna (Water flea)): 528 mg/l

Exposure time: 48 h

Toxicity to algae

: EC50 (Pseudokirchneriella subcapitata (green algae)): 86.4

mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 24.8

mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

Toxicity to bacteria

: IC50 : > 1,000 mg/l

Exposure time: 3 h

Method: OECD Test Guideline 209

# 12.2 Persistence and degradability

# Components:

Cumene hydroperoxide:

Biodegradability

: Result: Not readily biodegradable.

Method: OECD Test Guideline 301B

Cumene:

Biodegradability

: Result: Readily biodegradable

Benzenemethanol, alpha, alpha-dimethyl-:

Biodegradability

: Remarks: No data available

acetophenone:

Biodegradability

: Result: Readily biodegradable

Method: OECD Test Guideline 301C

# 12.3 Bioaccumulative potential

#### Components:

Cumene hydroperoxide:

according to Regulation (EC) No. 1907/2006



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Partition coefficient: n-

octanol/water

: log Pow: 1.6

Cumene:

Bioaccumulation

: Bioconcentration factor (BCF): 94.69

Remarks: Calculation

Partition coefficient: n-

octanol/water

: log Pow: 3.55 (23 °C)

Benzenemethanol, alpha, alpha-dimethyl-:

Partition coefficient: n-

octanol/water

: Remarks: No data available

acetophenone:

Bioaccumulation

: Bioconcentration factor (BCF): 0.48

Partition coefficient: n-

octanol/water

: log Pow: 1.63

# 12.4 Mobility in soil

No data available

# 12.5 Results of PBT and vPvB assessment

#### Product:

Assessment

: This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher...

### 12.6 Other adverse effects

# Product:

Additional ecological infor-

mation

: An environmental hazard cannot be excluded in the event of

unprofessional handling or disposal.

Toxic to aquatic life with long lasting effects.

# **SECTION 13: Disposal considerations**

#### 13.1 Waste treatment methods

Product

: The product should not be allowed to enter drains, water

courses or the soil.

Do not contaminate ponds, waterways or ditches with chemi-

cal or used container.

Dispose of wastes in an approved waste disposal facility.

Contaminated packaging

Empty remaining contents.

Dispose of as unused product.

Do not re-use empty containers.

Do not burn, or use a cutting torch on, the empty drum.

Dispose of in accordance with local regulations.

according to Regulation (EC) No. 1907/2006



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#### **SECTION 14: Transport information**

#### 14.1 UN number

ADN

: UN 3109

**ADR** 

: UN 3109

RID

: UN 3109

IMDG

: UN 3109

IATA

: UN 3109

#### 14.2 UN proper shipping name

ADN

: ORGANIC PEROXIDE TYPE F, LIQUID

(CUMYL HYDROPEROXIDE)

**ADR** 

: ORGANIC PEROXIDE TYPE F, LIQUID

(CUMYL HYDROPEROXIDE)

RID

: ORGANIC PEROXIDE TYPE F, LIQUID

(CUMYL HYDROPEROXIDE)

IMDG

: ORGANIC PEROXIDE TYPE F, LIQUID

(CUMYL HYDROPEROXIDE)

IATA

: Organic peroxide type F, liquid

(Cumyl hydroperoxide)

#### 14.3 Transport hazard class(es)

ADN

: 5.2 (8)

ADR RID

: 5.2 (8)

IMDG

: 5.2 (8)

LATA

: 5.2 (8)

IATA

: 5.2 (8)

#### 14.4 Packing group

#### ADN

Packing group

: Not assigned by regulation

Classification Code

: P1 : 539

Hazard Identification Number Labels

: 5.2 (8)

#### **ADR**

Packing group

: Not assigned by regulation

Classification Code

: P1

Hazard Identification Number

: 539

Labels

5.2 (8)

Tunnel restriction code

: (D)

#### RID

Packing group

: Not assigned by regulation

Classification Code

: P1

according to Regulation (EC) No. 1907/2006



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Hazard Identification Number

Labels

: 539 : 5.2 (8)

**IMDG** 

Packing group

: Not assigned by regulation

Labels EmS Code

5.2 (8) F-J, S-R

IATA

Packing instruction (cargo

: 570

aircraft)

Packing instruction (passen-

ger aircraft)

: 570

Packing group

: Not assigned by regulation

Labels

: Organic Peroxides, Keep Away From Heat, Corrosive

14.5 Environmental hazards

Environmentally hazardous

: yes

Environmentally hazardous

: yes

Environmentally hazardous

: yes

**IMDG** 

Marine pollutant

: yes

#### 14.6 Special precautions for user

Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

#### **SECTION 15: Regulatory information**

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

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals

: Not applicable

REACH - Candidate List of Substances of Very High

Concern for Authorisation (Article 59).

: Not applicable

Regulation (EC) No 1005/2009 on substances that de-

plete the ozone layer

: Not applicable

Regulation (EC) No 850/2004 on persistent organic pol-

lutants

: Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

Quantity 1

Quantity 2

according to Regulation (EC) No. 1907/2006



#### **NOROX CHP**

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	H2			ACUTE TOXIC	50 t	200 t
	P6b			SELF-REACTIVE SUBSTANCES AND MIXTURES and ORGANIC PEROXIDES	50 t	200 t
	E2			ENVIRONMENTAL HAZARDS	200 t	500 t
	Water contam (Germany)	inating class :	:	WGK 3 highly water endangering		
	Other regulation	ons :	•	Gefahrengruppe nach § 3 BGV B4 requirements)	1: II (German regu	latory
				Take note of Directive 92/85/EEC tion or stricter national regulations		
				Take note of Directive 94/33/EC o people at work or stricter national ble.		
	The compone	ents of this produc	ıct	are reported in the following in	ventories:	
	CH INV (CH)	:		On the inventory, or in compliance		у
	TSCA (US)	:	:	On TSCA Inventory		
	DSL (CA)	:	:	All components of this product are	on the Canadian	DSL
	AICS (AU)	:	:	On the inventory, or in compliance	with the inventor	у
	NZIoC (NZ)	:	:	On the inventory, or in compliance	with the inventor	y
	ENCS (JP)	:	:	On the inventory, or in compliance	e with the inventor	y
	ISHL (JP)	:	:	On the inventory, or in compliance	e with the inventor	y
	KECI (KR)	. :	:	On the inventory, or in compliance	e with the inventor	у
	PICCS (PH)	:	:	On the inventory, or in compliance	with the inventor	у
	IECSC (CN)	:	:	On the inventory, or in compliance	with the inventor	у
4						

#### 15.2 Chemical Safety Assessment

This information is not available.

#### **SECTION 16: Other information**

according to Regulation (EC) No. 1907/2006



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#### Full text of H-Statements

H242 : H302 : H304 : H312 : H314 : H315 : H318 : H319 : H331 : H335 : H335	Flammable liquid and vapour. Heating may cause a fire. Harmful if swallowed. May be fatal if swallowed and enters airways. Harmful in contact with skin. Causes severe skin burns and eye damage. Causes skin irritation. Causes serious eye damage. Causes serious eye irritation. Toxic if inhaled. May cause respiratory irritation. May cause damage to organs through prolonged or repeated
H373 :	May cause damage to organs through prolonged or repeated
H411 :	exposure. Toxic to aquatic life with long lasting effects.

#### Full text of other abbreviations

Acute Tox.	: Acute toxicity
Aguatic Chronic	: Chronic aquatic toxicity
Asp. Tox.	: Aspiration hazard
Eye Dam.	: Serious eye damage
Eye Irrit.	: Eye irritation
Flam. Liq.	: Flammable liquids
Org. Perox.	: Organic peroxides
Skin Corr.	: Skin corrosion
Skin Irrit.	: Skin irritation
	0 10 1 1 1 1 1

STOT RE : Specific target organ toxicity - repeated exposure STOT SE : Specific target organ toxicity - single exposure

(Q)SAR - (Quantitative) Structure Activity Relationship; ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; DIN - Standard of the German Institute for Standardisation; ECHA - European Chemicals Agency; EC-Number - European Community number; ECx -Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; IARC - International Agency for Research on Cancer; IATA -International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISO - International Organisation for Standardization; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals, RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TRGS - Technical Rule for Hazardous Substances; UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative; DSL - Domestic Substances List (Canada); KECI - Korea Existing Chemicals Inventory; TSCA -

according to Regulation (EC) No. 1907/2006



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Toxic Substances Control Act (United States); AICS - Australian Inventory of Chemical Substances; IECSC - Inventory of Existing Chemical Substances in China; ENCS - Existing and New Chemical Substances (Japan); ISHL - Industrial Safety and Health Law (Japan); PICCS - Philippines Inventory of Chemicals and Chemical Substances; NZIoC - New Zealand Inventory of Chemicals; TCSI - Taiwan Chemical Substance Inventory; CMR - Carcinogen, Mutagen or Reproductive Toxicant; GLP - Good Laboratory Practice

#### Further information

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

GB / EN



Australian Perlite

Chemwatch: 32-2117 Version No: 2.1.1.1

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 1

Issue Date: 06/27/2017 Print Date: 03/28/2018 L.GHS.USA.EN

#### SECTION 1 IDENTIFICATION

#### **Product Identifier**

Product name	Australian Perlite Ausperl Expanded Perlite
Synonyms	P100; P200; P400; P500 & P550.
Other means of identification	Not Available

#### Recommended use of the chemical and restrictions on use

#### Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	Australian Perlite
Address	PO Box 305 Botany NSW 1455 Australia
Telephone	+61 2 9316 0052
Fax	+61 2 9316 0050
Website	Not Available
Email	david@ausperl.com.au

#### Emergency phone number

Linergency phone number		
Association / Organisation	Not Available	
Emergency telephone numbers	Not Available	
Other emergency telephone numbers	Not Available	

#### SECTION 2 HAZARD(S) IDENTIFICATION

#### Classification of the substance or mixture

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Classification

Not Applicable

Label elements

Hazard pictogram(s)

Not Applicable

SIGNAL WORD

NOT APPLICABLE

#### Hazard statement(s)

Not Applicable

#### Hazard(s) not otherwise specified

Not Applicable

#### Precautionary statement(s) Prevention

Not Applicable

#### Precautionary statement(s) Response

Not Applicable

#### Precautionary statement(s) Storage

Not Applicable

#### Version No: 2.1.1.1

#### Australian Perlite Ausperl Expanded Perlite

Print Date: 03/28/2018

#### Precautionary statement(s) Disposal

Not Applicable

#### SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

#### Substances

See section below for composition of Mixtures

#### Mixtures

CAS No	%[weight]	Name	
14464-46-1	<0.1 < d>	cristobalite	GAME T 27/7 DE
14808-60-7	<0.1 < d>	silica crystalline - quartz	

#### SECTION 4 FIRST-AID MEASURES

#### Description of first aid measures

Eye Contact	If this product comes in contact with eyes:  Wash out immediately with water.  If irritation continues, seek medical attention.  Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs:  ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul> <li>If fumes, aerosols or combustion products are inhaled remove from contaminated area.</li> <li>Other measures are usually unnecessary.</li> </ul>
Ingestion	<ul> <li>Immediately give a glass of water.</li> <li>First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.</li> </ul>

#### Most important symptoms and effects, both acute and delayed

See Section 11

#### Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

#### SECTION 5 FIRE-FIGHTING MEASURES

#### Extinguishing media

- ► There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

#### Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.	
Special protective equipment	and precautions for fire-fighters	
Fire Fighting	<ul> <li>Alert Fire Brigade and tell them location and nature of hazard.</li> <li>Wear breathing apparatus plus protective gloves in the event of a fire.</li> <li>Prevent, by any means available, spillage from entering drains or water courses.</li> <li>Use fire fighting procedures suitable for surrounding area.</li> <li>DO NOT approach containers suspected to be hot.</li> <li>Cool fire exposed containers with water spray from a protected location.</li> </ul>	
Fire/Explosion Hazard	<ul> <li>Non combustible.</li> <li>Not considered a significant fire risk, however containers may burn.</li> </ul>	

#### SECTION 6 ACCIDENTAL RELEASE MEASURES

#### Personal precautions, protective equipment and emergency procedures

See section 8

#### **Environmental precautions**

See section 12

#### Methods and material for containment and cleaning up

	Clean up all spills immediately.
	<ul> <li>Avoid breathing dust and contact with skin and eyes.</li> </ul>
	<ul> <li>Wear protective clothing, gloves, safety glasses and dust respirator.</li> </ul>
Minor Spills	<ul> <li>Use dry clean up procedures and avoid generating dust.</li> </ul>
	<ul> <li>Sweep up, shovel up or</li> </ul>
	<ul> <li>Vacuum up (consider explosion-proof machines designed to be grounded during storage and use).</li> </ul>
	<ul> <li>Place spilled material in clean, dry, sealable, labelled container.</li> </ul>

Issue Date: 06/27/2017 Print Date: 03/28/2018

## Major Spills

#### Moderate hazard.

- ► CAUTION: Advise personnel in area.

- Alert Emergency Services and tell them location and nature of hazard.
   Control personal contact by wearing protective clothing.
   Prevent, by any means available, spillage from entering drains or water courses.
  - ▶ Recover product wherever possible.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

#### SECTION 7 HANDLING AND STORAGE

#### Precautions for safe handling

Safe handling	Avoid all personal contact, including inhalation.     Wear protective clothing when risk of exposure occurs.     Use in a well-ventilated area.     Prevent concentration in hollows and sumps.     DO NOT enter confined spaces until atmosphere has been checked.     DO NOT allow material to contact humans, exposed food or food utensils.
	<ul> <li>Store in original containers.</li> <li>Keep containers securely sealed.</li> </ul>

Other information

- Store in a cool, dry area protected from environmental extremes.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
   Observe manufacturer's storage and handling recommendations contained within this SDS.

#### Conditions for safe storage, including any incompatibilities

Suitable container

- ► Lined metal can, lined metal pail/ can.
- Plastic pail.
- ▶ Polyliner drum.
- Packing as recommended by manufacturer. ► Check all containers are clearly labelled and free from leaks.

Storage incompatibility None known

#### SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

#### Control parameters

#### OCCUPATIONAL EXPOSURE LIMITS (OEL)

#### INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Levels (PELs) - Table Z3	cristobalite	Silica: Crystalline Cristobalite	Not - Available	Not Available	Not Available	(Name (Use 1/2 the value calculated from the count or mass formulae for quartz. ((f) This standard applies to any operations or sectors for which the respirable crystalline silica standard, 1910.1053, is stayed or is otherwise not in effect.)))
US ACGIH Threshold Limit Values (TLV)	cristobalite	Silica, crystalline - α-quartz and cristobalite	0.025 mg/m3	Not Available	Not Available	TLV® Basis: Pulm fibrosis; lung cancer
US OSHA Permissible Exposure Levels (PELs) - Table Z1	cristobalite	Silica, crystalline, respirable dust: - Cristobalite	Not Available	Not Available	Not Available	see 1910.1053; (7) See Table Z-3 for the exposure limit for any operations or sectors where the exposure limit in § 1910.1053 is stayed or is otherwise not in effect.
US NIOSH Recommended Exposure Limits (RELs)	silica crystalline - quartz	Cristobalite, Quartz, Tridymite, Tripoli	0.05 mg/m3	Not Available	Not Available	Ca See Appendix A
US OSHA Permissible Exposure Levels (PELs) - Table Z3	silica crystalline - quartz	Silica: Crystalline Quartz	10 / (% SiO2 + 2) mg/m3 / 250 / (%SiO2 + 5) mppcf	Not Available	Not Available	(Name ((Respirable) ((f) This standard applies to any operations or sectors for which the respirable crystalline silica standard, 1910.1053, is stayed or is otherwise not in effect.))); (TWA mppcf (((b) The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.))); (TWA mg/m3 (((e) Bott concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics: Aerodynamic diameter (unit density sphere), Percent passing selector 2, 90
US ACGIH Threshold Limit Values (TLV)	silica crystalline - quartz	Silica, crystalline - α-quartz and cristobalite	0.025 mg/m3	Not Available	Not Available	2.5, 75
US OSHA Permissible Exposure Levels (PELs) - Table Z1	silica crystalline - quartz	Silica, crystalline, respirable dust: Quartz	Not Available	Not Available	Not Available	3.5, 50

<b>EMERGENCY</b>	LIMITS

Ingredient	Material name		TEEL-1	TEEL-2	TEEL-3
myreulent		10 항상 10 10 10 10 10 10 10 10 10 10 10 10 10			

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cristobalite	Cristobalite	0.075 mg/m3	33 mg/m3	200 mg/m3
silica crystalline - quartz	Silica, crystalline-quartz; (Silicon dioxide)	0.075 mg/m3	33 mg/m3	200 mg/m3
Ingredient	Original IDLH	Revised IDLH		
cristobalite	25 mg/m3	Not Available		
Chatobalite				

#### MATERIAL DATA

sure controls	
Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.  The basic types of engineering controls are:  Process controls which involve changing the way a job activity or process is done to reduce the risk.  Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Personal protection	
Eye and face protection	<ul> <li>Safety glasses with side shields.</li> <li>Chemical goggles.</li> <li>Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available.</li> </ul>
Skin protection	See Hand protection below
Hands/feet protection	Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly.  Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.  • polychloroprene.  • nitrile rubber.  • butyl rubber.  • fluorocaoutchouc.  • polyvinyl chloride.
Body protection	See Other protection below
Other protection	Overalls.     P.V.C. apron.     Barrier cream.     Skin cleansing cream.     Eye wash unit.
Thermal hazards	Not Available

#### Respiratory protection

Type AX-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AX P1 Air-line*	-	AX PAPR-P1
up to 50 x ES	Air-line**	AX P2	AX PAPR-P2
up to 100 x ES	-	AX P3	
		Air-line*	-
100+ x ES	-	Air-line**	AX PAPR-P3

\* - Negative pressure demand \*\* - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- ► Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- ► Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- ► Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

#### SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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Appearance	Off-white, odourless, free flowing pow	der.	
Physical state	Divided Solid	Relative density (Water = 1)	0.20-0.25
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Available	Decomposition temperature	Not Available
Melting point / freezing point (°C)	~1250	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Applicable	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Applicable	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Applicable	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Applicable	Gas group	Not Available
Solubility in water (g/L)	Not Available	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

#### SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7,
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

#### SECTION 11 TOXICOLOGICAL INFORMATION

#### Information on toxicological effects

Inhaled	following inhalation. In contrast to most organs, t repairing the damage. The repair process, which further lung damage resulting in the impairment inflammatory response involving the recruitment a Persons with impaired respiratory function, airway expessive concentrations of particulate are inhalations.	ems has occurred or if kidney damage has been sustained, proper screenings should be conducted on	
Ingestion	The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g. liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.		
Skin Contact	Nevertheless, good hygiene practice requires the	, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with narmful effects. Examine	
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.		
Chronic	nevertheless exposure by all routes should be m  Long term exposure to high dust concentrations	nt to produce chronic effects adverse to health (as classified by EC Directives using animal models); inimised as a matter of course.  If may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron symptom is breathlessness. Lung shadows show on X-ray.	
Australian Perlite Ausperl	TOXICITY	RRITATION	
Expanded Perlite	Not Available	Not Available	
	TOXICITY	IRRITATION	
cristobalite	Not Available	Not Available	

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silica crystalline - quartz	TOXICITY	
sinca crystainie - quarz	Not Available Not Available	
Legend:	Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained data extracted from RTECS - Register of Toxic Effect of chemical Substances	from manufacturer's SDS. Unless otherwise specified
CRISTOBALITE	Inhalation (human) TCLo: 16 mppcf*/8H/17.9y-l * Millions of particles per cubic foot	
CRISTOBALITE & SILICA CRYSTALLINE - QUARTZ	WARNING: For inhalation exposure ONLY: This substance has been classified by the IARC as	Group 1: CARCINOGENIC TO HUMANS
	The International Agency for Possarch on Concer (IAPC) has also if a decreased and in a linear standard and in a linear s	
CRISTOBALITE & SILICA CRYSTALLINE - QUARTZ	The International Agency for Research on Cancer (IARC) has classified occupational exposures carcinogenic to humans. This classification is based on what IARC considered sufficient evidence carcinogenicity of inhaled silica in the forms of quartz and cristobalite. Crystalline silica is also know the intermittent exposure produces; focal fibrosis, (pneumoconiosis), cough, dyspnoea, liver tumours  * Millions of particles per cubic foot (based on impinger samples counted by light field technique NOTE: the physical nature of quartz in the product determines whether it is likely to present a characteristic product of the product determines whether it is likely to present a characteristic product of the product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present a characteristic product determines whether it is likely to present and the product determines whether it is likely to present and the product determines whether it is likely to present and the product determines whether it is likely to present and the product determines whether it is likely to present and the product determines whether it is likely to present and the product determines whether it is likely to present and the product determines whether it is likely to present and the product determines whether the product determines and the product determines ar	e from epidemiological studies of humans for the nown to cause silicosis, a non-cancerous lung diseas  . s).
THE RESERVE OF THE PARTY OF THE	carcinogenic to humans. This classification is based on what IARC considered sufficient evidenc carcinogenicity of inhaled silica in the forms of quartz and cristobalite. Crystalline silica is also know Intermittent exposure produces; focal fibrosis, (pneumoconiosis), cough, dyspnoea, liver tumours.  * Millions of particles per cubic foot (based on impinger samples counted by light field technique.)	e from epidemiological studies of humans for the nown to cause silicosis, a non-cancerous lung diseas  . s).
CRYSTALLINE - QUARTZ	carcinogenic to humans. This classification is based on what IARC considered sufficient evidenc carcinogenicity of inhaled silica in the forms of quartz and cristobalite. Crystalline silica is also kr Intermittent exposure produces; focal fibrosis, (pneumoconiosis), cough, dyspnoea, liver tumours * Millions of particles per cubic foot (based on impinger samples counted by light field technique NOTE: the physical nature of quartz in the product determines whether it is likely to present a ch	e from epidemiological studies of humans for the nown to cause silicosis, a non-cancerous lung diseas .  s). ronic health problem.
CRYSTALLINE - QUARTZ  Acute Toxicity  Skin Irritation/Corrosion	carcinogenic to humans. This classification is based on what IARC considered sufficient evidence carcinogenicity of inhaled silica in the forms of quartz and cristobalitie. Crystalline silica is also know the transfer of the produces; focal fibrosis, (pneumoconiosis), cough, dyspnoea, liver tumours   * Millions of particles per cubic foot (based on impinger samples counted by light field technique NOTE: the physical nature of quartz in the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the product determines and the product determines and the product determines and the product determines and the product determines	ee from epidemiological studies of humans for the nown to cause silicosis, a non-cancerous lung diseas s).  s). ronic health problem.
CRYSTALLINE - QUARTZ  Acute Toxicity	carcinogenic to humans. This classification is based on what IARC considered sufficient evidence carcinogenicity of inhaled silica in the forms of quartz and cristobalite. Crystalline silica is also known intermittent exposure produces; focal fibrosis, (pneumoconiosis), cough, dyspnoea, liver tumours  * Millions of particles per cubic foot (based on impinger samples counted by light field technique NOTE: the physical nature of quartz in the product determines whether it is likely to present a characteristic stream of the product determines whether it is likely to present a characteristic stream of the productivity of t	pe from epidemiological studies of humans for the nown to cause silicosis, a non-cancerous lung diseas s).  s). ronic health problem.

- ✓ Data available to make classification
- O Data Not Available to make classification

#### SECTION 12 ECOLOGICAL INFORMATION

#### Toxicity

	Available	TEST DURATION (HR)	SPECIES	Available	Available
cristobalite	Not	Not Available	Not Available	Not	Not
	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Expanded Perlite	Not Available	Not Available	Not Available	Not Available	Not Available
Australian Perlite Ausperl	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE

Legend:

Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

#### Bioaccumulative potential

Ingredient	Bioaccumulation
	Dicaccumulation .
	No Data available for all ingredients

#### Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

#### **SECTION 13 DISPOSAL CONSIDERATIONS**

#### Waste treatment methods

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate:

Product / Packaging disposal

 Reduction Reuse

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- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

- DO NOT allow wash water from cleaning or process equipment to enter drains
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.

#### SECTION 14 TRANSPORT INFORMATION

#### Labels Required

Marine Pollutant NO

Land transport (DOT): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code Not Applicable

#### SECTION 15 REGULATORY INFORMATION

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

#### CRISTOBALITE(14464-46-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

- US Alaska Limits for Air Contaminants
- US California Permissible Exposure Limits for Chemical Contaminants
- US Hawaii Air Contaminant Limits
- US Idaho Limits for Air Contaminants
- US Idaho Toxic and Hazardous Substances Mineral Dust
- US Massachusetts Right To Know Listed Chemicals
- US Michigan Exposure Limits for Air Contaminants
- US Minnesota Permissible Exposure Limits (PELs)
- US New Jersey Right to Know Special Health Hazard Substance List (SHHSL): Carcinogens
- US Oregon Permissible Exposure Limits (Z-1)
- US Oregon Permissible Exposure Limits (Z-3)
- US Pennsylvania Hazardous Substance List
- US Tennessee Occupational Exposure Limits Limits For Air Contaminants

- US Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
- US Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
- US Washington Permissible exposure limits of air contaminants
- US Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
- US Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants US - Wyoming Toxic and Hazardous Substances Table Z-3 Mineral Dusts
- US ACGIH Threshold Limit Values (TLV)
- US ACGIH Threshold Limit Values (TLV) Carcinogens
- US OSHA Permissible Exposure Levels (PELs) Table Z1
- US OSHA Permissible Exposure Levels (PELs) Table Z3
- US Toxic Substances Control Act (TSCA) Chemical Substance Inventory
- US TSCA Chemical Substance Inventory Interim List of Active Substances

#### SILICA CRYSTALLINE - QUARTZ(14808-60-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

- US Alaska Limits for Air Contaminants
- US California OEHHA/ARB Chronic Reference Exposure Levels and Target Organs (CRELs)
- US California Permissible Exposure Limits for Chemical Contaminants
- US California Proposition 65 Carcinogens
- US Hawaii Air Contaminant Limits
- US Idaho Limits for Air Contaminants
- US Idaho Toxic and Hazardous Substances Mineral Dust
- US Massachusetts Right To Know Listed Chemicals
- US Michigan Exposure Limits for Air Contaminants US - Minnesota Permissible Exposure Limits (PELs)
- US New Jersey Right to Know Special Health Hazard Substance List (SHHSL): Carcinogens
- US Oregon Permissible Exposure Limits (Z-1)
- US Oregon Permissible Exposure Limits (Z-3)
- US Pennsylvania Hazardous Substance List
- US Rhode Island Hazardous Substance List

- US Tennessee Occupational Exposure Limits Limits For Air Contaminants
- US Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
- US Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air
- US Washington Permissible exposure limits of air contaminants
- US Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
- US Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
- US Wyoming Toxic and Hazardous Substances Table Z-3 Mineral Dusts
- US ACGIH Threshold Limit Values (TLV)
- US ACGIH Threshold Limit Values (TLV) Carcinogens
- US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens
- US NIOSH Recommended Exposure Limits (RELs)
- US OSHA Permissible Exposure Levels (PELs) Table Z1
- US OSHA Permissible Exposure Levels (PELs) Table Z3
- US Toxic Substances Control Act (TSCA) Chemical Substance Inventory
- US TSCA Chemical Substance Inventory Interim List of Active Substances

#### Federal Regulations

#### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### SECTION 311/312 HAZARD CATEGORIES

SECTION STITS IZ HAZARD CATEGORIES	a.	
Flammable (Gases, Aerosols, Liquids, or Solids)	No .	
Gas under pressure	No	
	No	
Explosive	No	
Self-heating		

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LOD: Limit Of Detection OTV: Odour Threshold Value BCF: BioConcentration Factors BEI: Biological Exposure Index

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#### Australian Perlite Ausperl Expanded Perlite

No
No
No
A A DOMESTIC OF THE ADMINISTRATION OF THE PARTY OF THE PA
No
No
No

#### US. EPA CERCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES (40 CFR 302.4)

None Reported

#### State Regulations

#### 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 - CARCINOGENS & REPRODUCTIVE TOXICITY (CRT): LISTED SUBSTANCE

Silica, crystalline (airborne particles of respirable size) Listed

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (silica crystalline - quartz; cristobalite)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
Legend:	Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

#### SECTION 16 OTHER INFORMATION

#### Other information

#### Ingredients with multiple cas numbers

ingrediente manipie	
Name	CAS No
silica crystalline - quartz	14808-60-7, 122304-48-7, 122304-49-8, 12425-26-2, 1317-79-9, 70594-95-5, 87347-84-0, 308075-07-2

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

#### Definitions and abbreviations

PC-TWA: Permissible Concentration-Time Weighted Average

PC-STEL: Permissible Concentration-Short Term Exposure Limit

IARC: International Agency for Research on Cancer

ACGIH: American Conference of Governmental Industrial Hygienists

STEL: Short Term Exposure Limit

TEEL: Temporary Emergency Exposure Limit.

IDLH: Immediately Dangerous to Life or Health Concentrations

OSF: Odour Safety Factor

NOAEL: No Observed Adverse Effect Level LOAEL: Lowest Observed Adverse Effect Level

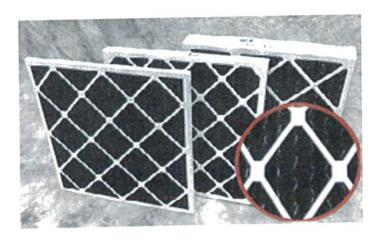
TLV: Threshold Limit Value

# Appendix G Emission Control Equipment





# **Poly-Sorb**® Activated Carbon Pleated Filters 1", 2" & 4"



## **Best in Class!**

**Poly-Sorb**® Activated Carbon Pleated Filters are engineered with superior performance criteria in all facets of molecular air filtration. These carbon pleated filters are one of the most effective means for postive air purification and odor removal. Each Filter's porous microscopic channels act as a purifying, absorptive net to capture odors and impurities, and entrap them on the activated carbon's vast surface network.

As a part of the most advanced and innovative line of HVAC filtration products, the **Poly-Sorb**® Activated Carbon Pleated Filter combines a low resistance to airflow at various impregnation densities and filter depth. These activated carbon pleated filters provide an economical and medium efficiency for a variety of applications.

The **Poly-Sorb**® Activated Carbon Pleated Filter is backed by the outstanding customer service and on-time delivery that customers have come to expect from Columbus Industries, Inc.

### **Description and Benefits**

**Poly-Sorb**® Activated Carbon Pleated Filters are an excellent economical choice for molecular air filtration applications. Each filter utilizes a technologically advanced media that incorporates activated carbon combined with non-woven polyester to provide odor and particulate capture. The activated carbon filter targets applications where odor removal and moderate molecular filtration is desired.

These high-performance **Poly-Sorb**® Activated Carbon products maintain the perfect balance of effectively and efficiently capturing and removing odors, pollutants and particulates from HVAC environments and excellent airflow properties.

The **Poly-Sorb**® Activated Carbon Pleated Filter utilizes a geometrically formed pleat pack. Each pleat pack is further strengthened with expanded metal backer. The pack is then sealed into a heavy-duty, moisture-resistant kraft board frame. The design and construction process combines to produce the best all around carbon performance.

The activated carbon used by Columbus Industries, Inc. is a coconut shell material with an activity level of 60% or more when tested with carbon tetrachloride. The pleated filter is made with synthetic media that is chemically enriched with 200 grams/sq. meter of activated carbon.

Pleated filters are one option in our **Poly-Sorb**® product line. Our **Poly-Sorb**® product line also includes rolls, pads, panels.

#### **Quick Facts**

#### Features:

- Effectively and efficiently captures and removes odors, pollutants, and particulates from HVAC environments
- Provides an economical choice for molecular air filtration applications
- · Removes various nuisance odors

#### Applications:

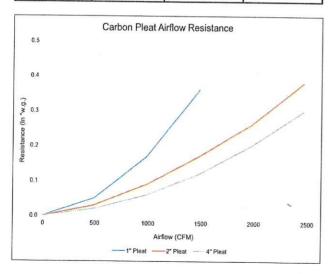
- Commercial Office Buildings
- · Industrial facilities
- · Government Facilities
- Educational Facilities
- · Paint booth/finishing
- Hospitals
- General HVAC Filtration
- · Food Processing

#### **Technical Information:**

- Available in 1", 2", and 4" depths in a variety of standard sizes
- Tested in accordance with ASHRAE Test Standard 52.2-2007
- UL Standard 900 tested and approved
- 100% mechanical synthetic media
- Temperature rated up to 160°F

# Poly-Sorb® Activated Carbon Pleats

Part #	Nominal Size	Initial Resistance @ 250 fpm ("w.g.)	Initial Resistance @ 500 fpm ("w.g.)		
P1S7C-1224	12 X 24 X 1	.18	N/A		
P1S7C-1620	16 X 20 X 1	.18	N/A		
P1S7C-1625	16 X 25 X 1	.18	N/A		
P1S7C-1824	18 X 24 X 1	.18	N/A		
P1S7C-2020	20 X 20 X 1	.18	N/A		
P1S7C-2024	20 X 24 X 1	.18	N/A		
P1S7C-2025	20 X 25 X 1	.18	N/A		
P1S7C-2424	24 X 24 X 1	.18	N/A		
P2S7C-1224	12 X 24 X 2	.09	.25		
P2S7C-1620	16 X 20 X 2	.09	.25		
P2S7C-1625	16 X 25 X 2	.09	.25		
P2S7C-1824	18 X 24 X 2	.09	.25		
P2S7C-2020	20 X 20 X 2	.09	.25		
P2S7C-2024	20 X 24 X 2	.09	.25		
P2S7C-2025	20 X 25 X 2	.09	.25		
P2S7C-2424	24 X 24 X 2	.09	.25		
P4S7C-1224	12 X 24 X 4	.06	.20		
P4S7C-1620	16 X 20 X 4	.06	.20		
P4S7C-1625	16 X 25 X 4	.06	.20		
P4S7C-1824	18 X 24 X 4	.06	.20		
P4S7C-2020	20 X 20 X 4	.06	.20		
P4S7C-2024	20 X 24 X 4	.06	.20		
P4S7C-2025	20 X 25 X 4	.06	.20		
P4S7C-2424	24 X 24 X 4	.06	.20		





2938 State Route 752 • P.O.Box 257 • Ashville, Ohio 43103-0257
Phone: 740.983.2552 • Fax: 740.983.4622
www.colind.com • E-mail: ci@colind.com

The substances in the chart below reflect an activity level rating of  $4^\star$  which has high adsorptive capacity. The activity typically will run 20% or more of the activated carbon's media weight.

Substance	Substance Molecular Typically Found In:						
Substance	Weight	Typically Found In:					
	Methane Se	eries					
Heptane	100.20	Gasoline					
Octane	114.23	Gasoline					
Decane	142.28	Kerosene					
	Benzene Se	eries					
Benzene	78.11	Benzol, Paint Solvent & Remover					
Xylene	106.16	Solvent					
	Other Substa	ances					
Naphthalene	128.16	Moth Balls					
Phenol	94.11	Plastic Ingredient					
Ethyl Alcohol	46.07	Grain Alcohol					
Propyl Alcohol	60.09						
Amyl Alcohol	88.15	Fusel Oil					
Cresol	108.13	Ingredient of Creosote, Wood Preservative					
Menthol	156.26						
Crotonaldehyde	70.09	Solvent, Tear Gas					
Butric Acid	88.10	Sweat, Body Odor					
Valeric Acid	102.13	Sweat, Body Odor					
Caprylic Acid	144.21	Animal Odors					
Propyl Acetate	102.13	Lacquer Solvent					
Butyl Acetate	116.16	Lacquer Solvent					
Ethyl Acrylate	100.11	Apt to Pilymerize					
Methyl Mercaptan	48.10	Garlic, Onion, Sewer					
Ethyl Mercaptan	63.13	Garlic, Onion, Sewer					
Propyl Mercaptan	76.15	Garlic, Onion, Sewer					
Carbon Tetrachloride	153.84	Cleaning Fluid, Solvent					
Pyridine	79.10	Burning Tobacco					
Skatole	131.17	Excreta					
Nicotine	162.23	Tobacco					
Uric Acid	168.11	Urine					
Bromine	159.83	May partially hydrolyze to HBr					
lodine	253.84	May partially hydrolyze to HI					

In addition to the chart above, the following substances are also highly effective:

Adhesives

·Hospital Odors

Asphalt Fumes

·Household Smells

Diesel Fumes

Trouscriola officia

Bathroom Smells

Jet Fuel Fumes

Datilloom onless

Kitchen Odors

Cleaning Compounds

•Paint & Redecorating Odors

Cooking Odors

\*Ask for our complete activity recommendation chart from Columbus Industries, Inc. which includes general performance levels from 1-4 (best).

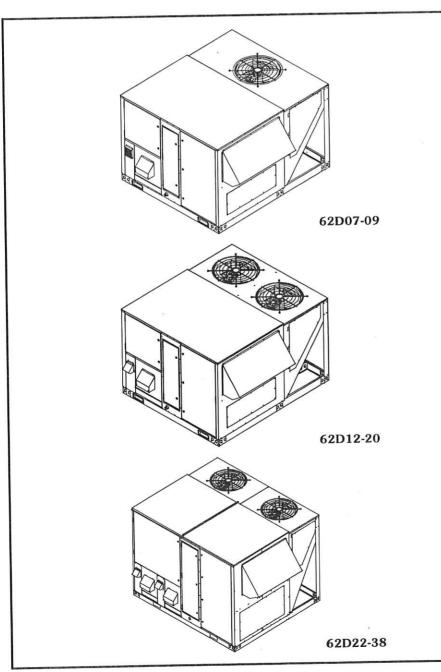
Reorder #: DST-317 Rev: 7/2017



## Product Data

# 62DA,DB,DC,DD07-38 Dedicated Vertical or Horizontal Outdoor Air Unit with Optional Energy Wheel

6 to 35 Nominal Tons



Carrier's 62D Series commercial dedicated outdoor air units offer:

- · Capacities up to 35 nominal tons
- Vertical or horizontal configurations
- Puron® environmentally balanced refrigerant (R-410A) as standard
- · Double wall construction
- Optional AHRI (Air-Conditioning, Heating, and Refrigeration Institute) listed energy recovery wheel
- Multiple heating options
- Multiple fan options
- Microprocessor control with accessory keypad and easy to view display
- Multiple reheat option
- Remote communication capability
- · Digital compressor option
- 100% outdoor air operation

### Features/Benefits

Carrier's 62D commercial packaged, dedicated, outdoor air unit offers efficiency, application flexibility, quality, reliability and easy maintenance.

#### High efficiency

The Carrier dedicated outdoor air unit utilizes highly efficient scroll compressors that have been optimally designed for use with Puron refrigerant (R-410A). Operating efficiency of the unit may be increased by adding the optional energy recovery system.

## Features/Benefits (cont)



The energy recovery system uses an AHRI listed energy recovery wheel to transfer sensible and latent heat between the incoming air and the exhaust air, reducing energy consumption and improving indoor conditions.

## Flexibility to suit many applications

The Carrier 62D units are designed to meet customer's requirements for new construction, replacement opportunities, and special applications. The customer can choose from vertical or horizontal supply configurations and over 6 supply fan motor horsepower ratings, with backward curved, forward curved, airfoil or backward inclined supply fans.

Supply fans may be provided with spring isolation and seismic restraints to address earthquake design requirements.

Staged or modulating heat sources are available, including gas furnace, electric insert, hot water coil or steam coil.

Also available are digital compressor, hot gas reheat, power exhaust, 2 or 4-in. filters, and rotary energy recovery wheel.

Roof curbs that follow the NRCA (National Roofing Contractors Association) guidelines are available for vertical applications in 14-in. and 24-in. heights and are installed and weather-proofed by the roofing contractor. Units with horizontal connections may be either curb or slab mounted.

All 62DA and DB units bring in 100% outdoor air through the outdoor air intake hood and do not have a return air connection. The 62DA units have a vertical supply duct opening in the bottom of the unit. The 62DB units have a horizontal supply duct opening in the side of the unit.

All 62DC and DD units bring in 100% outdoor air through the outdoor air intake hood. They may also be equipped with factory-installed power exhaust and/or an energy conservation wheel. The return air to these units is not re-circulated or mixed with the incoming outdoor air. The return air may be used to transfer energy to the incoming air via the energy conservation wheel and is then exhausted. The 62DC units have a vertical supply

and return duct opening in the bottom of the unit. The 62DD units have a horizontal supply duct opening in the side of the unit and a vertical return opening in the bottom of the unit.

#### **Durable construction**

Cabinets are constructed of heavy gage galvanized steel with a pre-painted exterior finish to protect the cabinet and preserve the appearance through a long operating life.

The cabinet features a double wall design with a galvanized inner liner. The double wall design is insulated with closed-cell foam which adds rigidity to the structure and resists moisture intrusion.

#### Quality and reliability

All units are run tested prior to leaving the factory to help ensure proper operation and enhance life expectancy of key components. Components undergo numerous checks and inspections throughout the manufacturing process to eliminate components that do not meet Carrier's high quality standards.

Reliable, hermetic scroll compressors, equipped with crankcase heaters, are mounted on rubber isolation mounts for smooth, quiet operation.

Mechanically and electrically independent dual refrigeration circuits (size 12 and larger) provide redundancy in the event that one circuit should require service. All refrigerant circuits utilize a thermostatic expansion valve (TXV) to ensure proper refrigerant metering throughout the unit's broad operating envelope. The refrigeration

circuits are protected by filter driers specifically designed for Puron<sup>®</sup> refrigerant (R-410A).

Standard warranty coverage provides a one-year parts warranty and 5 years on the stainless steel gas heat exchanger.

## Easy to install, maintain and service

Maintaining and servicing a dedicated outdoor air unit is critical in maximizing the life expectancy and efficient operation of the unit. The Carrier unit has been designed for easy access with simple maintenance procedures.

Hinged access panels provide easy access to controls, fans, coils and filters. Slide-out supply fan system allows easy maintenance of belts, bearings, blower wheels and motors.

A dedicated vertical or horizontal design does not require conversion time during the unit installation. Through the curb power connection minimizes roof penetrations.

Power connections are in a protected area, away from harsh environmental conditions. All units feature heavy gage formed galvanized steel base rails with rigging openings to simplify handling and lifting at the job site.

#### Indoor air quality

The Carrier dedicated outdoor air unit offers 2 and 4-in. filter tracks that accept a variety of filter types and filter MERV ratings.

The condensate drain pan is double sloped to eliminate standing water per ASHRAE (American Society of

Dage

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Controls
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Guide Specifications



Heating, Refrigerating, and Air-Conditioning Engineers) Standard 62-1089R. The drain pan is fabricated of heavy gage stainless steel to resist corrosion and is insulated on the bottom with closed cell insulation.

The double wall design of the unit with galvanized interior liners allows easy cleaning of the interior surfaces.

#### Energy recovery

The Carrier dedicated outdoor air unit may be optionally equipped with an energy recovery (enthalpy) wheel. The enthalpy wheel meets the requirements of AHRI standard 1060 and is certified by AHRI. This energy recovery wheel is sized to provide increased energy recovery and humidity control based on the application requirements. The energy wheel is mounted in a slide-out cassette for simplified maintenance.

#### **Heating systems**

Carrier dedicated outdoor air units may be equipped with a variety of heat system types: gas heat (natural gas or liquefied petroleum gas), electric, steam, or hot water. Precise leaving air temperature control is provided via staged or modulating heat control systems.

The gas heating systems are of the induced-draft design that draws hot combustion gases through the heat exchanger at the ideal rate for maximum heat transfer. Induced-draft systems are an inherently safer design than forced draft, positive pressure designs.

Induced-draft designs operate the heat exchanger under negative pressure, helping to prevent leakage of flue gases into the supply airstream. The gas heat system utilizes a direct-spark ignition and is protected by numerous safety circuits.

#### Microprocessor control

The microprocessor-based controller provides complete system control of unit operation. The controller monitors all system sensors and makes operating decisions based upon the user's configuration inputs.

Local access to the microprocessor control may be accomplished via the accessory BACview handheld keypad/display unit. The BACview handheld keypad/display features a numeric keypad, direction keys, four

programmable function keys, and a backlit LCD (liquid crystal diode) display. The display is a large 4-line by 40-character display that is easy to read, even in low light conditions. Access to the microprocessor may also be accomplished via a PC using Carrier software.

In addition, the microprocessor control has the following features:

- simple access to set points, time schedules, status values, and unit configuration parameters
- supports communications with BACnet\*, Modbus†, and optionally with LonWorks\*\* building automation protocols
- alarm conditions are indicated via an alarm LED and an audible signal
- alarm history is recorded and may be accessed via the BACview handheld keypad/display
- · password protection
- compressor minimum off time (5 minutes) feature
- service test and a service diagnostic mode

<sup>\*</sup> Sponsored by ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers).

<sup>†</sup> Registered trademark of Schneider Electric.

\*\* Registered trademark of Echelon
Corporation.

## Model number nomenclature



0 34 - E 4 6 3 1 - C CA

62 - Dedicated Outdoor Air Unit

#### Configuration

Configuration
DA - 100% OA Vertical Supply / No Return
DB - 100% OA Horizontal Supply / No Return
DC - 100% OA Vertical Supply / Vertical Return
DD - 100% OA Horizontal Supply / Vertical Return

#### Heat Options\*

None75,000 Btuh G - 400,000 Btuh 3 - 15 / 20 kW Gas Heat Elect Heat Gas Heat 100,000 Btuh H - 500,000 Btuh 4 -18.8 / 25 kW Gas Heat Flect Heat Gas Heat 600,000 Btuh 5 - 22.6 / 30 kW 150,000 Btuh Gas Heat Elect Heat W - Hot Water Heating Coil† 6 - 26.3 / 35 kW Gas Heat 200,000 Btuh Elect Heat Y - Steam Heating Coil† Gas Heat 30 / 40 kW 250,000 Btuh Elect Heat 1 - 7.5 / 10 kW Elect Heat Gas Heat 8 - 35.7 / 50 kW - 300,000 Btuh Elect Heat 2 - 11.3 / 15 kW 9 - 45 / 60 kW Gas Heat Elect Heat Elect Heat

#### Energy Conservation Wheel (ECW) Options \*\*

ECW (36 in.) with VFD TDECW (42 in.) with VFD TD - None NoneECW (36 in.)ECW (42 in.) L - ECW (48 in.) with VFD TD M - ECW (54 in.) with VFD TD - ECW (48 in.) - ECW (54 in.) M - ECW (54 in.) with VFD TD
N - ECW (36 in.) with Byp and VFD TD
P - ECW (42 in.) with Byp and VFD TD
Q - ECW (48 in.) with Byp and VFD TD
R - ECW (54 in.) with Byp and VFD TD - ECW (36 in.) with Byp - ECW (42 in.) with Byp - ECW (48 in.) with Byp - ECW (54 in.) with Byp

#### Unit Size - Nominal Tons

<b>07 –</b> 6	<b>14</b> - 12	20 - 18	30 - 27
08 - 7	<b>15</b> - 14	22 - 19	34 - 30
09 - 8	<b>16</b> - 15	24 - 20	38 - 35
12 - 10			

SEE NEXT PAGE FOR REMAINDER OF MODEL NUMBER NOMENCLATURE

#### Supply Fan Motor Options

- 1/2 HP - 3/4 HP - 1 HP 7 1/2 HP - 3 HP with VFD - 5 HP with VFD - 7 1/2 HP with VFD J K L - 10 HP - 15 HP - 1 HP - 1 1/2 HP - 2 HP - 3 HP - 5 HP - 20 HP - 1 HP v V - 10 HP with VFD W - 15 HP with VFD D 1 HP with VFD 1 1/2 HP with VFD 2 HP with VFD X - 20 HP with VFD

#### **Control Options**

None
 Filter Status Switch

Firestat

- BA Smoke Detector

- Filter Status Switch and Firestat

Filter Status Switch and RA Smoke Detector
 Firestat and RA Smoke Detector
 Filter Status Switch and Firestat and RA Smoke Detector



#### 62 DA F 0 34 - E 4 6

#### SEE PREVIOUS PAGE FOR REMAINDER OF MODEL NUMBER NOMENCLATURE

#### Coil Ontions

Al/Cu Cond, Al/Cu 4-Row Evap, no HGRH, with Cycling Cond Fan Al/Cu Cond, Al/Cu 4-Row Evap, no HGRH, with Vari-Speed Cond Fan

Al/Cu Cond, Al/Cu 4-Row Evap, Cycling HGRH on Lead Circuit with Vari-Speed Cond Fan

Al/Cu Cond, Al/Cu 4-Row Evap, Cycling HGRH on Both Circuits, with Vari-Speed Cond Fan

Al/Cu Cond, Al/Cu 4-Row Evap, Modulating HGRH on Lead Circuits, with Vari-Speed Cond Fan

Al/Cu Cond, Al/Cu 4-Row Evap, Modulating HGRH on Both Circuits,

with Vari-Speed Cond Fan

Al/Cu Cond, Al/Cu 6-Row, no HGRH, with Cycling Cond Fan Al/Cu Cond, Al/Cu 6-Row Evap, no HGRH, with Vari-Speed

Cond Fan

Al/Cu Cond, Al/Cu 6-Row Evap, Cycling HGRH on Lead

Circuit with Vari-Speed Cond Fan

Al/Cu Cond, Al/Cu 6-Row Evap, Cycling HGRH on Both Circuits with Vari-Speed Cond Fan

Al/Cu Cond, Al/Cu 6-Row Evap, Modulating HGRH on Lead Circuit with Vari-Speed Cond Fan

Al/Cu Cond, Al/Cu 6-Row Evap, Modulating HGRH on Both Circuits, with Vari-Speed Cond Fan

Both Circuits, with Vari-Speed Cond Fan
Al/Cu Cond, Al/Cu 6-Row Evap, Cycling HGRH on Both
Circuits, with Vari-Speed Cond Fan, with Sub Cooling on All Circuits
Al/Cu Cond, Al/Cu 6-Row Evap, Modulating HGRH on Both
Circuits, with Vari-Speed Cond Fan, with Sub Cooling on All Circuits

#### **Voltage Options**

208-3-60 with Std Compressor 230-3-60 with Std Compressor

460-3-60 with Std Compressor 208-3-60 with Digital Compressor

230-3-60 with Digital Compressor 460-3-60 with Digital Compressor

208-3-60 with Std Compressor and LonWorks 230-3-60 with Std Compressor and LonWorks

460-3-60 with Std Compressor and LonWorks

208-3-60 with Digital Compressor and LonWorks

230-3-60 with Digital Compressor and LonWorks 460-3-60 with Digital Compressor and LonWorks

М

#### **Factory Installed Options** Refer to price pages for available option codes

#### Fan Size

Standard FC Supply Fan \_

Standard BC Supply Fan Standard AF Supply Fan B

Oversize AF Supply Fan

Standard BI Supply Fan

Oversize BI Supply Fan

Standard FC Supply Fan and Standard FC Exhaust Fan Standard FC Supply Fan and Oversize FC Exhaust Fan

Standard FC Supply Fan and Standard BC Supply Fan Standard FC Supply Fan and Standard AF Exhaust Fan

Standard BC Supply Fan and Standard FC Exhaust Fan Standard BC Supply Fan and Oversize FC Exhaust Fan

Standard BC Supply Fan and Oversize FC Exhaust Fan Standard BC Supply Fan and Standard BC Exhaust Fan Standard BC Supply Fan and Standard AF Exhaust Fan Standard AF Supply Fan and Standard FC Exhaust Fan Standard AF Supply Fan and Oversize FC Exhaust Fan Standard AF Supply Fan and Standard BC Exhaust Fan Standard AF Supply Fan and Standard AF Exhaust Fan Standard AF Supply Fan and Standard AF Exhaust Fan Fan AF Supply Fan and Standard AF Exhaust Fan AF Supply Fan and Standard AF Exhaust Fan AF Supply Fan and Standard AF Supply Fan AF Standard AF Standard AF Supply Fan AF Standard A

Standard AF Supply Fan and Standard AF Exhaust Fan Standard AF Supply Fan and Oversize AF Exhaust Fan Oversize AF Supply Fan and Standard BC Exhaust Fan Oversize AF Supply Fan and Standard AF Exhaust Fan Oversize AF Supply Fan and Oversize AF Exhaust Fan Standard BI Supply Fan and Standard FC Exhaust Fan Standard BI Supply Fan and Oversize FC Exhaust Fan Standard BI Supply Fan and Standard BC Exhaust Fan Standard BI Supply Fan and Standard AF Exhaust Fan Standard BI Supply Fan and Standard AF Exhaust Fan Oversize BI Supply Fan and Oversize AF Exhaust Fan Oversize BI Supply Fan and Oversize FC Exhaust Fan Oversize BI Supply Fan and Oversize FC Exhaust Fan Oversize BI Supply Fan and Standard BC Exhaust Fan Oversize BI Supply Fan and Standard BC Exhaust Fan Oversize BI Supply Fan and Standard BC Exhaust Fan

Oversize BI Supply Fan and Standard BC Exhaust Fan Oversize BI Supply Fan and Standard AF Exhaust Fan

Oversize BI Supply Fan and Oversize AF Exhaust Fan

#### **Exhaust Fan Motor Options**

- 20 HP - None

- 1/2 HP N - 1 HP with VFD

3/4 HP 1 1/2 HP with VFD2 HP with VFD

- 1 HP Q

- 1 1/2 HP

- 3 HP with VFD - 5 HP with VFD - 2 HP

- 3 HP - 7 1/2 HP with VFD

 10 HP with VFD
 15 HP with VFD - 5 HP G

- 7 1/2 HP - 10 HP - 15 HP w

- 20 HP with VFD

#### Packaging / Filter Options

1 - Domestic / 2" MERV 8 Filter

A - Domestic / 2" Metal Mesh Filter

B - Domestic / 4" MERV 8 Filter C - Domestic / 4" MERV 11 Filter

Domestic / 4" MERV 14 Filter

E - Domestic / 2" MERV 8 Filter and 2" MERV 8 ECW Filter

F - Domestic / 2" Metal Mesh Filter and 2" MERV 8 ECW Filter

Domestic / 4" MERV 8 Filter and 2" MERV 8 ECW Filter
 Domestic / 4" MERV 11 Filter and 2" MERV 8 ECW Filter

Domestic / 4" MERV 14 Filter and 2" MERV 8 ECW Filter

#### Design Series

3 - Revision E Controls

LEGEND

— Airfoil Aluminum AI BC

- Backward Curve Backward Inclined - Bypass Byp

Forward Curve

HGRH — OA — RA — Hot Gas Reheat Outdoor Air Return Air

Temperature Defrost Variable Frequency Drive

Horizontal units with heat require a BI fan.

Control valves must be field supplied.

Energy Conservation Wheel (ECW) options are not available on DA and DB

# Ratings and capacities



#### GAS HEAT CAPACITIES

UNIT SIZE 62D	INPUT (Btuh)	OUTPUT (Btuh)	NO. OF GAS HEAT SECTIONS	NO. OF STAGES	MODULATION RANGE (%)	MINIMUM ENTERING AIR TEMP (F)	MAXIMUM ENTERING AIR TEMP (F)	MINIMUM TEMP RISE	MAXIMUM TEMP RISE	MINIMUM LEAVING AIR TEMP	MAXIMUM LEAVING AIR TEMP
	75,000	60,000	1	2	25-100	(.)	(1)	(F)	(F)	(F)	(F)
07-09	100,000	80,000	1	2	25-100					1	
07-03	150,000	120,000	1	2	25-100		W-1				
	200,000	160,000	1	2	25-100						
	150,000	120,000	1	2	25-100	-20	75	25	90	50	165
12-20	200,000	160,000	1	2	25-100						
12 20	250,000	200,000	1	2	25-100						
	300,000	240,000	1	2	25-100						
22-38	300,000	240,000	1	2	25-100						
	400,000	320,000	1	2	25-100				1		
	500,000	400,000	2	4	12.5-100	1			1		
	600,000	480,000	2	4	12.5-100	1			1		

#### HYDRONIC HEATING COIL CAPACITIES

UNIT		ENTERING AIR TEMP (F)		AM COI		HOT WATER COIL							
SIZE 62D	CFM		Steam Temp at 5 psig (F)	Total Btuh (1000)	Leaving Air Temp (F)	Entering Water Temp (F)	Entering Water Flow (gpm)	Total Btuh (1000)	Leaving Air Temp	Leaving Water Temp	Water Pressure		
07-09	1,300	70	180	87.7	132.2	180	10.9		(F)	(F)	Drop (ft wg)		
01 03	3,000	70	180	200.0	130.1			106.2	145.3	160.5	1.1		
	1,300	70				180	20.1	200.4	131.6	160.1	1.9		
10.00			180	87.7	132.2	180	10.9	106.2	145.3	160.5			
12-20	3,900	70	180	255.0	130.3	180	26.2				1.1		
	6,500	70	180	345.2				260.6	131.6	160.1	2.1		
	5.000	70			118.9	180	35.7	346.7	119.2	160.6	3.7		
			180	370.3	138.3	180	48.9	475.5	157.6				
22-38	8,000	70	180	493.9	126.9	180				160.6	1.4		
1	11,000	70	180				68.0	662.0	146.3	160.5	2.7		
	,500	, 0	100	590.2	119.5	180	84.4	810.9	137.9	160.8	3.9		

## STEAM HEATING COIL CAPACITIES

UNIT SIZE	CFM			-A	ENTERING A	IR TEMPERAT	URE — EDB (F	1	
62D			-20	-10	0	10	20	30	T 40
	1,300	TC LDB	155.1 89.6	148.9 95.1	142.6 100.7	136.3 106.3	130.0	123.8 117.4	117.5
07-09	2,100	TC LDB	206.3 70.2	197.9 76.5	189.6 82.9	181.2 89.3	172.9 95.6	164.6 102.0	123.0 156.2 108.3
	3,000	TC LDB	250.5 56.7	240.4 63.6	230.2 70.5	220.1 77.1	210.0 84.3	199.9 91.2	189.7 98.1
	1,300	TC LDB	155.1 89.6	148.9 95.1	142.6 100.7	136.3 106.3	130.0 111.9	123.8 117.4	117.5
12-20	3,900	TC LDB	297.7 40.1	286.1 47.4	263.0 61.9	251.4 69.2	239.9 76.5	228.3 83.8	216.8
	6,000	TC LDB	349.8 33.5	335.7 41.4	321.5 49.2	307.4 57.0	293.3 64.9	279.1 72.7	91.0 265.0 80.6
	5,000	TC LDB	441.2 61.0	423.4 67.8	405.5 74.5	387.7 81.2	369.9 87.9	352.0 94.7	334.2 101.4
22-38	8,000	TC LDB	560.5 44.3	537.8 51.7	515.2 59.1	492.5 66.5	469.9 73.9	447.2 81.3	424.6 88.7
	12,000	TC LDB	674.7 31.6	647.4 39.5	620.1 47.5	592.9 55.4	565.6 63.3	538.3 71.2	511.1 79.1

Entering Air Temperature (F)
Leaving Dry Bulb Temperature (F)
Total Capacity (1000 Btuh)

NOTE: 6500 cfm is 542 ft per minute velocity (face).



## ENERGY CONSERVATION WHEEL CAPACITIES

C. Charles and C. Charles						HEATIN	IG	
UNIT SIZE	WHEEL DIAMETER	WHEEL THICKNESS (in.)	MAXIMUM AIRFLOW (cfm)	AIR PRESSURE DROP (in. wg)	Return Air Temp (db/wb)(F)	Entering Outdoor Air Temp (F)	Leaving Air Temp (F)	Sensible Btuh
62DC,DD	(in.)	(/		1.07	70.0/58.0	0.0	42.5	144,892
07-09	36	4	3000	1.37		0.0	42.5	136,215
07-03	36	4	2700	1.23	70.0/58.0	2003.00	47.3	233,423
12-20			4500	1.15	70.0/58.0	0.0	47.3	
12-20	48	4			70.0/58.0	0.0	43.1	183,432
	42	4	3600	1.20			47.3	233,423
		A	4500	1.15	70.0/58.0	0.0		
22-38	48	4		1.15	70.0/58.0	0.0	48.4	368,300
	54	4	8000	1.15	70.0/00.0			

LEGEND

db — Dry Bulb Temperature wb — Wet Bulb Temperature

#### ELECTRIC HEAT CAPACITIES

			AMPS	Т	MINIMUM	MAXIMUM	MINIMUM TEMP	MAXIMUM TEMP	MINIMUM LEAVING	MAXIMUM LEAVING
UNIT SIZE 62D	ELECTRIC HEAT kW (240,480 / 208)	240 v	480 v	208 v	ENTERING AIR TEMP (F)	ENTERING AIR TEMP (F)	RISE (F)	RISE (F)	AIR TEMP (F)	AIR TEMP (F)
	10.0 / 7.5	24.1	12.0	20.8						
	15.0 / 11.3	36.1	18.0	31.4						
)	20.0 / 15.0	48.1	24.1	41.6						
07-09	25.0 / 18.8	60.1	30.1	52.2						
· *** := := :	30.0 / 22.6	72.2	36.1	62.5					1	
	35.0 / 26.3	84.2	42.1	73.0						
	40.0 / 30.0	96.2	48.1	83.3						
	10.0 / 7.5	24.1	12.0	20.8			1			
	15.0 / 11.3	36.1	18.0	31.4						T .
	20.0 / 15.0	48.1	24.1	41.6						1
	25.0 / 18.8	60.1	30.1	52.2		75	N/A	76	N/A	151
12-20	30.0 / 22.6	72.2	36.1	62.5	-20	/5	18/73			
	35.0 / 26.3	84.2	42.1	73.0						_
	40.0 / 30.0	96.2	48.1	83.3	1	1				
	50.0 / 37.5	120.3	60.1	104.1	1					
	60.0 / 45.0	144.3	72.2		1					
	10.0 / 7.5	24.1	12.0		1					
	15.0 / 11.3	36.1	18.0							1
	20.0 / 15.0	48.1	24.1	41.6	4					
22-38	30.0 / 22.6	72.2			4					1
700	40.0 / 30.0	96.2	48.1		4		1			
	50.0 / 37.5	120.3	_		-		1			
	60.0 / 45.0	144.3	72.2	124.9						

#### AIRFLOW LIMITS

	DO DD#	6200	C,DD†
62DA,DI	B,DC,DD*	Min CEM	Max. CFM
Min. CFM	555500000000000000000000000000000000000	1.500	2,500
700	1,500		3,000
800	1,800	F. ( ( * ( * ( * ( * ( * ( * ( * ( * ( *	The state of the s
	2.100	2,100	3,500
		2,200	3,700
		2.900	4,600
			5,800
1,700			6,500
2,000			6,500
2.400	4,400		6,500
	4,400		
	6.000	6,000	9,000
		7,000	11,000
		8.000	12,000
4,000	9,000	9,000	12,000
	Min. CFM 700 800 900 1,100 1,350 1,700	Min. CFM         Max. CFM           700         1,500           800         1,800           900         2,100           1,100         2,200           1,350         2,900           1,700         3,600           2,000         4,400           2,400         4,400           2,400         4,400           2,400         6,000           3,400         9,000           4,000         8,000	Min. CFM         Max. CFM         Min. CFM           700         1,500         1,500           800         1,800         1,800           900         2,100         2,100           1,100         2,200         2,200           1,350         2,900         2,900           1,700         3,600         3,600           2,000         4,400         4,400           2,400         4,400         4,400           2,400         4,400         4,400           2,400         6,000         6,000           3,400         9,000         7,000           4,000         8,000         8,000

<sup>\*</sup>Units without ECW.

† 62DC and DD with ECW.

# Physical data — 62DA,DB units



TIME CONTRACTOR							
UNIT 62DA,DB NOMINAL CAPACITY (TONS)	07	08	09	12	14	15	10
COMPRESSOR	6	7	8	10	12	14	16 15
Quantity/Unit Model	1 ZP51	1 ZP61	1 ZP72	0 704	N= 645-195900		10
Number of Refrigerant Circuits		. 1	1 ZP72	2 ZP42	2 ZP51	2 ZP67	2 ZP83
REFRIGERANT TYPE		Pre-Charged				2 harged	
CONDENSER COIL		R-410A				10A	
Rows Fins/in. Face Area (sq ft)		2 16				11	
CONDENSER FAN		12.38			2 24	. 16 .75	
Nominal Cfm (total)	4000	55	20				
Quantity Diameter (in.) Motor Hp	1 24	1		80 2		11,0	
HIGH-PRESSURE SWITCH (PSIG)	1/2	3/	4	1/		2	26
Cutout Reset (Manual)				640			
EVAPORATOR COIL				640 595			
Tube Size (in.)							
Rows Fins/in. _ Face Area (sq ft)				<sup>3/8</sup> 6 12			
SUPPLY FAN	3.00	6.2	5	8.0	01	12	.0
Backward Curved (mm) Forward Curved (in.)		180					
Airfoil (in.)	1	12 x 9			N/. N/.		
Oversize Áirfoil (in.) Backward Inclined (in.)	1	12 x 12 N/A	1		12 x	12	
Oversize Backward Inclined (in )		15			15 x 15		
Nominal Cfm 100% OA Motor Hp Range	1000	18.5 1200 <b>I</b>	1400	1500 I	18.	5	
OPTIONAL HOT GAS REHEAT AND LIQUID	<u> </u>	1/2 - 5	. 100	3/4-	5 1900	2300	2800
SUBCOOLING COIL							
Face Area (sq ft) Tube Size (in.)	3	6.2	5 1	8	1	10	
LOW-PRESSURE SWITCH (PSIG)				3/8	ı	12	
Cutout Reset (Auto)				99			
CONDENSATE DRAIN CONNECTION (NPT) (in.)				135			
OPTIONAL GAS HEAT FURNACE SECTION				1 1/4			
Gas Input Sizes (Btuh x 1000) Control Type	75,	100, 150, 200			150,000,0		
Staged (no. of stages)					150, 200, 2	250, 300	
Modulating (% range) Efficiency (Steady State) (%)		2 10 - 100			2	0.0	
Supply Line Pressure Pange (in)	5.0 n	82 nin 13.0 max			10 - 1 82		
Rollout Switch Cutout Temp (F) Gas Valve Quantity		350	3000		5.0 min 1: 350		
Manifold Pressure (in. wg)	1 Std - 2 wi	th Modulating	Option	1 St	d - 2 with Mod	lulating Optior	1
Natural Gas Std LP Gas Special Order		3.5			3,5		
OPTIONAL ELECTRIC HEAT		10.0			10.0		
Size Range (kW) Control Type	10,15	,20,25,30,35,4	0	10	15 20 25 22	05.40.55.55	
Staged (no. of stages)				10	,15,20,25,30,	ა5,40,50,60	
SCR (% range)	001000E	2 0 - 100			2	0	
OPTIONAL HOT WATER HEAT COIL			8 in., 2 Row,	10 FPI, with 1/	o - 10	0	
OPTIONAL STEAM HEAT COIL OUTDOOR AIR FILTERS		24 x 3	38 in., 1 Row,	8 FPI, with 5/8	in. Tube Size	3	
Quantity Size (in.)					20 0120		
Standard 2 in. MERV 8 Optional 2 in. Metal Mesh	4	20x24			4 20	·0.4	
Optional 4 in.	4	20x24			4 20x		
MERV 8 MERV 11		20x24			4 20x	204	
MERV 14		20x24 20x24			4 20x	24	
		20124			4 20x	24	

#### LEGEND

FPI — Fins per Inch
LP — Liquid Propane
OA — Outdoor Air
SCR — Silicon-Controlled Rectifier



	20	22	24	30	34	38
UNIT 62DA,DB	18	19	20	27	30	35
NOMINAL CAPACITY (TONS)					0 70100	2 7P90/2 7P90
COMPRESSOR Comprise Model	2 ZP90	2 ZP90	2 ZP103	2 ZP137	2 ZP 180	2ZP90/2 ZP90
Quantity/Unit Model Number of Refrigerant Circuits	Westernam :		Pre	-Charged		
Oil				R-410A		
REFRIGERANT TYPE						3 12
CONDENSER COIL	2 16		2 .	16	6	3 12
Rows Fins/in. Face Area (sq ft)	24.75			4Z	.0	
CONDENSER FAN		4-1	000,1		20,0	
Nominal Cfm (total)	11,000 2 26		26		2	
Quantity Diameter (in.)	3/4		1		11/	2
Motor Hp				640		
HIGH-PRESSURE SWITCH (PSIG) Cutout				595		
Reset (Manual)						The second secon
EVAPORATOR COIL				3/8		
Tube Size (in.)	212000	nger I	15.0	6 12	23	.0
Rows Fins/ln. Face Area (sq ft)	12.0		15.3			
SUPPLY FAN				N/A		
Backward Curved (mm)				N/A	x 15	
Forward Curved (in.) Airfoil (in.)	12 x 12				x 18	
Oversize Airfoil (in.)	15 x 15 15			2	4.5	
Backward Inclined (in.) Oversize Backward Inclined (in.)	18.5			1 4600	27 I 5300	6200
Nominal Cfm 100% OA	3100	2900	3600	/ <sub>2</sub> - 15		2 - 20
Motor Hn Range	1 1/2 - 10	1 72 - 10	<u> </u>			
OPTIONAL HOT GAS REHEAT AND LIQUID					9	.3
SUBCOOLING COIL	12	1	15.3	l <sub>3/8</sub>	2	.5
Face Area (sq ft) Tube Size (in.)				-78		1
LOW-PRESSURE SWITCH (PSIG)				99		
Cutout				135		
Reset (Auto) CONDENSATE DRAIN CONNECTION (NPT) (in.)				1 1/4		
OPTIONAL GAS HEAT FURNACE SECTION		1			200	
	150, 200, 250,			300, 40	0, 500, 600	
Gas Input Sizes (Btuh x 1000)	300			0 /1 11	14 (High Ho	at)
Control Type Staged (no. of stages)	2	1		2 (Low Heat 10 - 100	) / 4 (High He	acj
Modulating (% range)				82		
Efficiency (Steady State) (%)	122		5.0	min 13.0 m 350	ax.	
Supply Line Pressure Range (in.wg) Rollout Switch Cutout Temp (F)	1		1 Std - 2 V	vith Modulatir	ng Option	
Coc Valve Quantity			, 514 2			
Manifold Pressure (in. wg) Natural Gas Std				3.5 10.0		
LP Gas Special Order						
OPTIONAL ELECTRIC HEAT	15 15 22 25 2	٠ ١		10 15 00	00 40 E0 E0	
Size Range (kW)	10,15,20,25,3 35,40,50,60	o,		10,15,20	,30,40,50,60	
	00,40,00,00	1		200		
Control Type				2 0 - 100		
Staged (no. of stages) SCR (% range)			00 in 0 Day		h <sup>5</sup> / <sub>8</sub> -in. Tube	Size
OPTIONAL HOT WATER HEAT COIL		45 x	38 In., 2 HOV	W 8 FPI with	<sup>5</sup> / <sub>8</sub> -in. Tube	Size
OPTIONAL STEAM HEAT COIL		45	x 38 m., 1 Ho	vv, O 1 1 1, vviti		
OUTDOOR AIR FILTERS						
Quantity Size (in.)	4 20x24			2 20x	24, 2 24x2	4
Standard 2 in. MERV 8 Optional 2 in. Metal Mesh	4 20x24				24, 2 24x2	
Optional 4 in.	4 20x24			2 20x	24, 2 24x2	4
MEDV 0	4 20x24 4 20x24			2 20x	24, 2 24x2 24, 2 24x2	4
MERV 8 MERV 11	4 20x24					

#### LEGEND

FPI — Fins per Inch
LP — Liquid Propane
OA — Outdoor Air
SCR — Silicon-Controlled Rectifier

# Physical data — 62DC,DD units



UNIT 62DC,DD WITH ECW	07	08	T 00				<u> </u>	United Technologies	
NOMINAL CAPACITY (TONS)	6	7	09 8	12	14	15	16	20	
COMPRESSOR Quantity/Unit Made			8	10	12	14	15	18	
Quantity/Unit … Model Number of Refrigerant Circuits	1 ZP51	1 ZP61	1 ZP72	2 ZP42	2 ZP51	2 ZP67	2 ZP83	0 7000	
OII		1 Pre-Charged		The second second second second		. 2	2 21703	2 ZP90	
REFRIGERANT TYPE		R-410A				Pre-Charged			
CONDENSER COIL Rows Fins/in.						R-410A			
Face Area (sq ft)		2 16				2 16			
CONDENSER FAN		12.38				24.75			
Nominal Cfm (total) Quantity Diameter (in.)	4000	55	00	80	00		44.000		
Motor Hp	1 24	1		2	24		11,000 2 26		
HIGH-PRESSURE SWITCH (PSIG) Cutout			4	1/	2		3/4		
Reset (Manual)				64					
EVAPORATOR COIL*				59	5				
Tube Size (in.) Rows Fins/in,	1	<sup>3/</sup> 8 4 12			3/8				
Face Area (sq ft)	4.0	4 12 7.	_		4 12		3/ <sub>1</sub> 6	10	
SUPPLY FAN	<del>  1.0</del>	7.5	0		12.0		12.		
Backward Curved (mm) Forward Curved (in.)	1	180				N/A			
Airfoil (in.)		12 x 9 12 x 12				N/A			
Oversize Áirfoil (in.) Backward Inclined (in.)		N/A	1			12 x 12			
Oversize Backward Inclined (in )	*	15 18.5				15 x 15 15			
Nominal Cfm 100% OA Motor Hp Range	1000	1200	1400	1500	1900 I	18.5 2300 I	0000		
OPTIONAL HOT GAS REHEAT AND LIQUID		1/2 - 5		3/4 -	5	2300	2800	3100 1 ½ - 10	
SUBCOOLING COIL Face Area (sq ft)									
Tube Size (in.)	4	7.5				12			
LOW-PRESSURE SWITCH (PSIG)				3/8					
Cutout	ı								
Reset (Auto) CONDENSATE DRAIN CONNECTION (NPT) (in.)				99 135					
OPTIONAL GAS HEAT FURNACE SECTION				1 1/.	4				
	75	100, 150, 200							
Control Type Staged (no. of stages)	1		'		150	200, 250, 30	0		
Modulating (% range)  Efficiency (Steady State) (%) Supply Line Pressure Range (in. wg)		2 10 - 100				2			
Supply Line Pressure Range (in. wg)		82				10 - 100 82			
Rollout Switch Cutout Temp (F) Gas Valve Quantity		nin 13.0 max 350		5.0 min 13.0 max.					
Gas Connect Size (in )	1 Std - 2 w	th Modulating	Option	350 1 Std - 2 with Modulating Option					
Manifold Pressure (in. wg) Natural Gas Std		3/4	1			3/4	Option		
LP Gas Special Order		3.5 10.0				3.5			
OPTIONAL ELECTRIC HEAT		10.0				10.0			
Size Range (kW) Control Type	10,15	20,25,30,35,4	.0		10 15 20	,25,30,35,40,	ED 60		
Staged (no. of stages) SCR (% range)	1	2			. 0110120		50,00		
OPTIONAL HOT WATER HEAT COIL		0 - 100				2 0 - 100			
OPTIONAL STEAM HEAT COIL			24 x 38 in., 2	Row, 10 FPI,	with 1/2-in. Tu	ıbe Size			
OUTDOOR AIR FILTERS	-		24 x 38 in.,	1 Row, 8 FPI,	with 5/8-in. Tu	be Size			
Quantity Size (in.) Standard 2 in, MERV 8									
Optional 2 in. Metal Mesh				4 20x	24				
Optional 4 in. MERV 8				4 20x	24				
MERV 11	1			4 20x					
MERV 14 OPTIONAL ECW				4 20x 4 20x					
Type	1								
Size (in.)	Mole	ecular Sieve 36				ecular Sieve			
OPTIONAL ECW FILTERS Quantity Size (in.)						36 or 48			
with 36 in. ECW '	2 20	24, 2 20x2							
with 42 in. ECW with 48 in. ECW	2 20/	N/A	0		2 20	x24, 2 20x2	.0		
with 54 in. ECW		N/A N/A			4 202	N/A <24, 2 12x2	4		
OPTIONAL EXHAUST FAN Backward Curved (mm)						N/A			
Forward Curved (in )	1 1	80 mm	1			180 mm			
Oversize Forward Curved (in.) Airfoil (in.)		9 x 7 12 x 9				N/A			
Oversize Áirfoil (in.)		12 x 12				N/A 12 x 12			
Motor Hp Range		N/A 1/ <sub>2</sub> - 5				N/A			
LEGEND			ODC DDit-	without the E		1/2 - 10			

Fins per Inch Liquid Propane Outdoor Air Silicon-Controlled Rectifier

\* 62DC,DD units without the ECW (Energy Conservation Wheel) option use a 6-row evaporator coil.



					- 20
WHIT COPO DD WITH FOW	22	24	30	34	<b>38</b> 35
UNIT 62DC,DD WITH ECW	19	20	27	30	35
NOMINAL CAPACITY (TONS)			2 ZP137	2 ZP180	2ZP90/2 ZP90
COMPRESSOR Quantity/Unit Model	2 ZP90	2 ZP103	. 2	No.	
Number of Refrigerant Circuits	1		Pre-Chargeo		
Oil			R-410A		1
REFRIGERANT TYPE		1000	10		3 12
CONDENSER COIL Rows Fins/in.	1	2	16	100000000000000000000000000000000000000	L and the same
Face Area (sq ft)			T		
CONDENSER FAN	1	1,000		20,000 2 30	
Naminal Cfm (total)	2	26		1 1/2	
Quantity Diameter (in.) Motor Hp		1		,	
HIGH-PRESSURE SWITCH (PSIG)			640		
Cutout	1		595		
Reset (Manual)			21		3/8
EVAPORATOR COIL*	1	Λ	<sup>3/8</sup> 12		6 12
Tube Size (in.) Rows Fins/in.	1	4	23.0		23.0
Face Area (sq ft)			2222		
SUPPLY FAN			N/A N/A		
Backward Curved (mm) Forward Curved (in.)			15 x 15		
Airfoil (in.)	1		18 x 18		
Oversize Áirfoil (in.) Backward Inclined (in.)	1		24.5 27		
Oversize Backward Inclined (In.)	2900	3600	4600	5300	l <sub>2-20</sub> 6200
Nominal Cfm 100% OA	1 1/2 - 10	1	1/2 - 15		L LV
Motor Hp Range OPTIONAL HOT GAS REHEAT AND LIQUID					
OPTIONAL HOT GAS REHEAT AND LIGORAL SUBCOOLING COIL	10	Tr.		23	
Face Area (sq ft)	12	1	3/8		
Tube Size (in.)					
LOW-PRESSURE SWITCH (PSIG)			99		
Cutout			135		
Reset (Auto) CONDENSATE DRAIN CONNECTION (NPT) (in.)			1 1/4		
OPTIONAL GAS HEAT FURNACE SECTION			300, 400, 500	0, 600	
Gas Input Sizes (MBtun)			2240000 F - 8040000 CS-00		
Control Type			2 (300 and 400) / 4 (	500 and 600)	
Staged (no. of stages) Modulating (% range)			82		
Modulating (% range) Efficiency (Steady State) (%)			5.0 min 13.	0 max.	
Supply Line Pressure Range (in. wg) Rollout Switch Cutout Temp (F)			350 1 Std - 2 with Modu	lating Option	
Cac Valve Quantity	1		1 Std - 2 With Wood		
Gas Connect Size (in.)	1		3.5		
Manifold Pressure (in. wg) Natural Gas Std	1		10.0		
LP Gas Special Order					
OPTIONAL ELECTRIC HEAT			10,15,20,30,4	0,50,60	
Size Range (kW) Control Type			2		
Staned (no. of stages)			0 - 100		
SCR (% range)		45 x	38 in., 2 Row, 10 FPI,	with 5/8-in. Tube Siz	e
OPTIONAL HOT WATER HEAT COIL		45 x	38 in., 1 Row, 8 FPI,	with 5/8-in. Tube Size	)
OPTIONAL STEAM HEAT COIL		701.			
OUTDOOR AIR FILTERS			2 20x24, 2	24x24	
Quantity Size (in.) Standard 2 in. MERV 8			2 20x24, 2	24x24	
Optional 2 in. Metal Mesh					
Optional 4 in. MERV 8			2 20x24, 2 2 20x24, 2	24x24	
MERV 11			2 20x24, 2	24x24	
MERV 14			2020 Day 1000 Day 100	0	
OPTIONAL ECW	1		Molecular 42, 48, 0		
Type Size (in.)			42, 40, 0		
OPTIONAL ECW FILTERS					
Quantity Size (in.)			N/A	12v24	
with 36 in. ECW with 42 in. ECW			4 20x24, 2 6 18	x24	
with 48 in, ECW			6 18	x24	
with 54 in. ECW					
OPTIONAL EXHAUST FAN	1		180 N/A		
Backward Curved (mm) Forward Curved (in.)	1		N/A	A	
Oversize Forward Curved (in.)			15 x	15	
Airfoil (in.) Oversize Airfoil (in.)			18 x	20	
Motor Hp Range		* 600	OC DD units without th	e ECW (Energy Con	servation Wheel) option use
LEGEND		- 62L 6-row	v evaporator coil.		
EDI — Fins per Inch		0.00	2 M		
LP — Liquid Propane		970			
OA — Outdoor Air SCR — Silicon-Controlled Rectifier					
0011					

# Physical data (cont)



## UNIT AND COMPONENT WEIGHTS (Ib)

COMPONENT						621	D UNIT S	IZE					
	07	08	09	12	14	15	16	20	22	24	1 20		
Base Unit	1650	1690	1710	1910	1960	2120	2060	2080	3375		30	34	38
Hot Gas Reheat	35	35	35	75	75	75	75			3475	3575	3655	4075
Liquid Subcooling Coil	25	25	25	55	55	55		75	120	120	120	120	120
Gas Furnace (Btuh)				- 00		55	55	55	100	100	100	100	100
75,000	140	140	140					1					
100,000	150	150	150		-	_		_	-	_	-	-	_
150,000	160	160	160	100			_	_		_	_		
200,000	170	170		160	160	160	160	160	_	-	-	_	
250,000		3007 CB	170	170	170	170	170	170	_	_			_
300,000	_		_	210	210	210	210	210	_	_	_		_
400,000	_	-	_	250	250	250	250	250	250	250	250	250	250
500,000	_	-	_		-		-		275	275	275	275	275
600,000	_	_		-	-		-	_	420	420	420	420	420
Electric Heater	75							_	500	500	500	500	500
Steam Coil	60		75	75	75	75	75	75	100	100	100	100	100
Hot Water Coil		60	60	60	60	60	60	60	120	120	120	120	120
Wheel Bypass Dampers	75	75	75	75	75	75	75	75	150	150	150	150	150
	60	60	60	60	60	60	60	60	125	125	125	125	125
Energy Conservation Wheel Power Exhaust	350	350	350	420	420	420	420	420	470	470	470	470	
	345	345	345	375	375	375	375	375	525	525	525		470
Curb 14-in.	275	275	275	275	275	275	275	275	305	305		525	525
Curb 24-in.	375	375	375	375	375	375	375	375	425		305	305	305
							0.0	0/0	423	425	425	425	425

# Options and accessories



	OPTION*	ACCESSORY†		
ITEM				
leat Options	X			
Staged Gas Heat (LP or NG)	X			
Modulating Gas Heat (10:1 or 5:1 Turndown)	X			
Staged Electric Heat	X			
SCR Controlled Electric Heat	Х			
Hot Water Heating Coil	X			
Steam Heating Coil		X		
NG to LP Conversion Kit	X			
Energy Conservation Wheel	X			
Wheel VFD Defrost Control	X			
Wheel Bypass Dampers				
Control Options	X			
Filter Status Switch	X			
Return Air Smoke Detector	X			
Convenience Outlet	X			
Fused Disconnect Switch	X			
Lead Circuit Digital Compressor	^	X		
BACview Keypad/Display	X			
LonWorks Communication	X			
Variable Speed Condenser Fans				
Coil Options	X			
Hot Gas Reheat	X			
Liquid Subcooling Coil	X			
Corrosion Protection	^			
	X	X		
Filter Options 2-in. MERV 8 Filters	X	$\frac{x}{x}$		
	and the state of t	$\frac{\lambda}{x}$		
4-in. MERV 8 Filters	X			
4-in. MERV 11 Filters 4-in. MERV 14 Filters	X			
2-in. Metal Mesh Filters	X			
2-in. Metal Mesh Filters				
Supply Fan Options  Backward Curved Fan	X			
Backward Curved Fan	X			
Forward Curved Fan	X			
Airfoil Fan	X			
Oversize Airfoil Fan	X			
Backward Inclined Fan Oversize Backward Inclined Fan	X			
	X			
VFD Control				
Exhaust Fan Options	X			
Backward Curved Fan	X			
Forward Curved Fan	X			
Oversized Forward Curved Fan	X			
Airfoil Fan	X			
Oversize Airfoil Fan	Х	- V		
VFD Control		X		
14-in. Factory-Assembled Roof Curb		X		
24-in. Factory-Assembled Roof Curb		X		
14-in. Field-Assembled Roof Curb		X		
24-in. Field-Assembled Roof Curb	X			
Spring Type Fan Isolation	X			

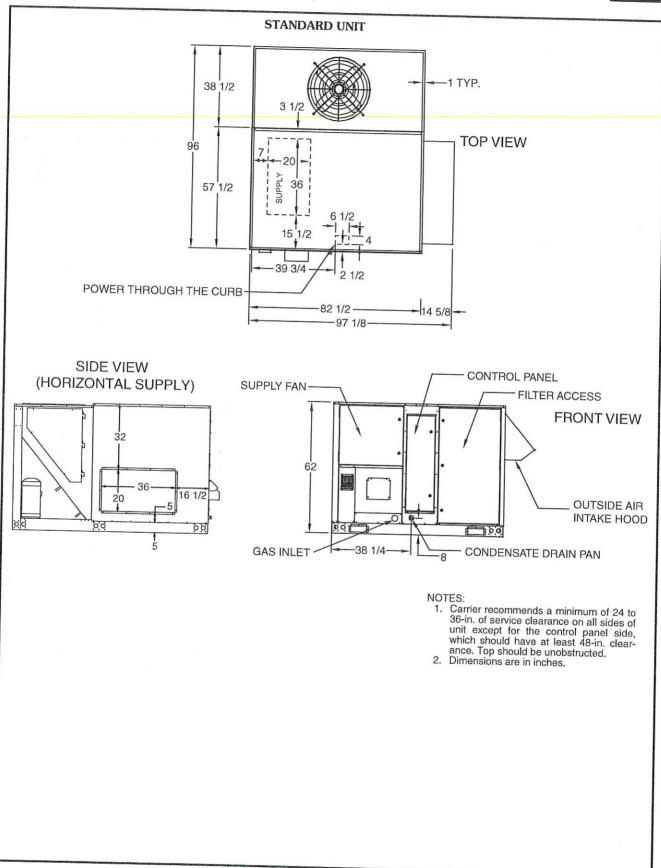
**LEGEND** 

LP — Liquid Propane
NG — Natural Gas
SCR — Silicon Controlled Rectifier
VFD — Variable Frequency Drive

\*Factory installed. †Field installed.

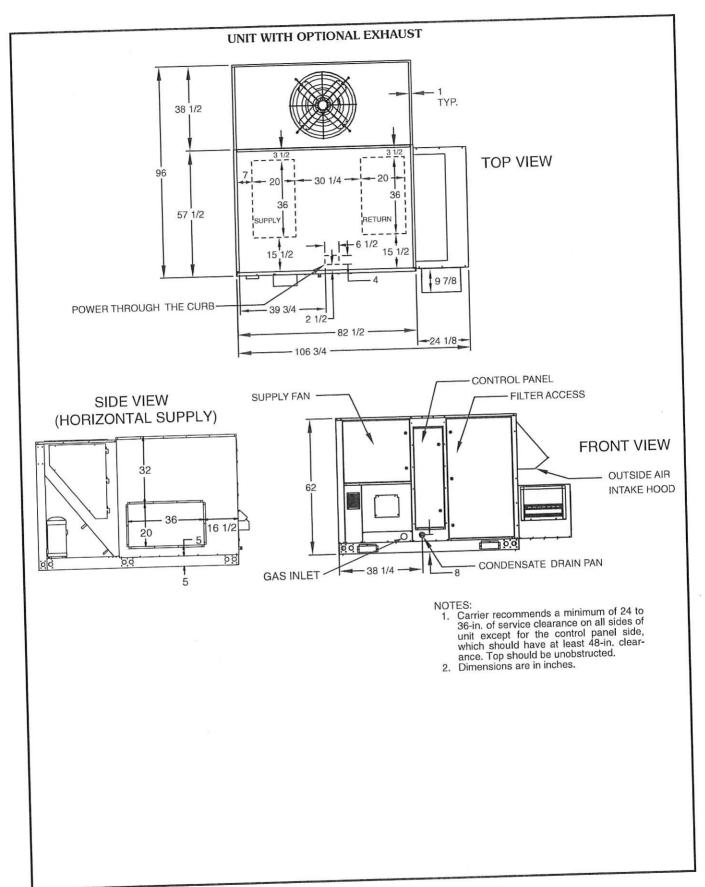
# Base unit dimensions — 62DA,DB07-09





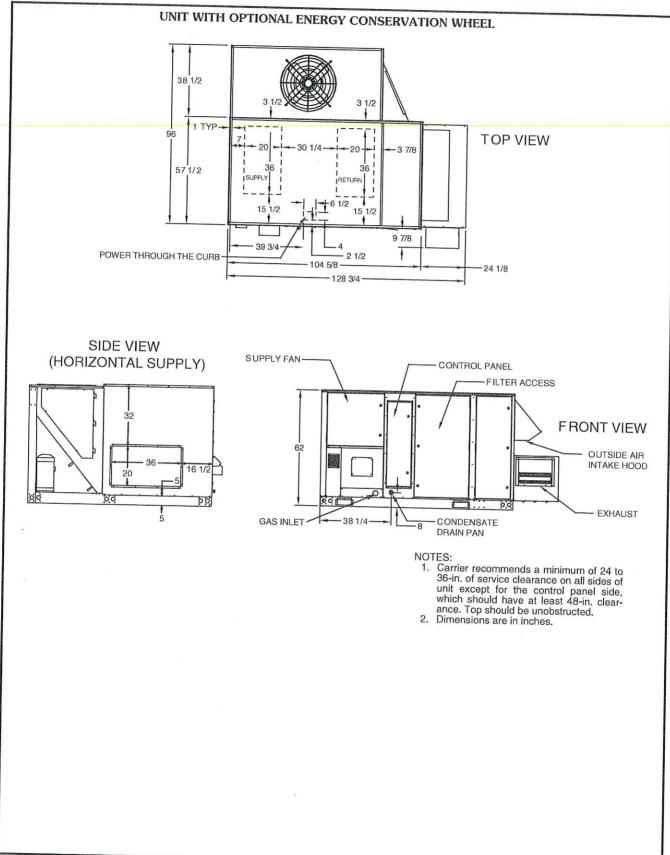
# Base unit dimensions — 62DC,DD07-09





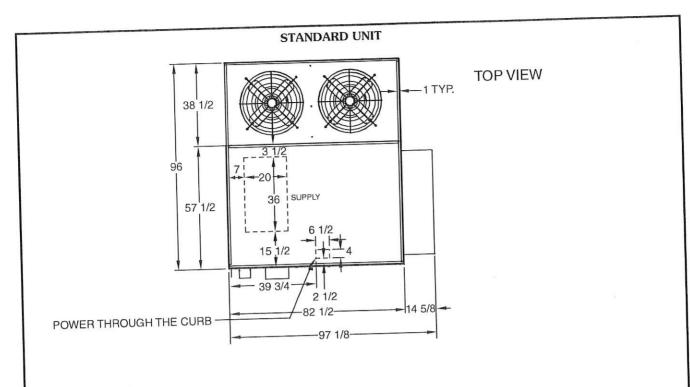
# Base unit dimensions — 62DC, DD07-09 (cont)

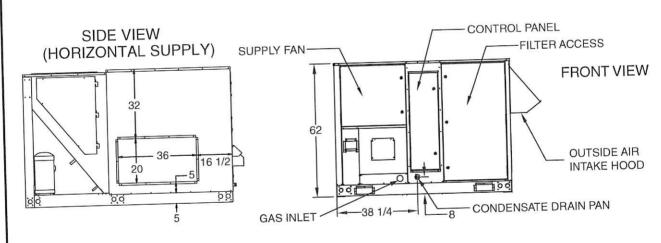




# Base unit dimensions — 62DA,DB12-20





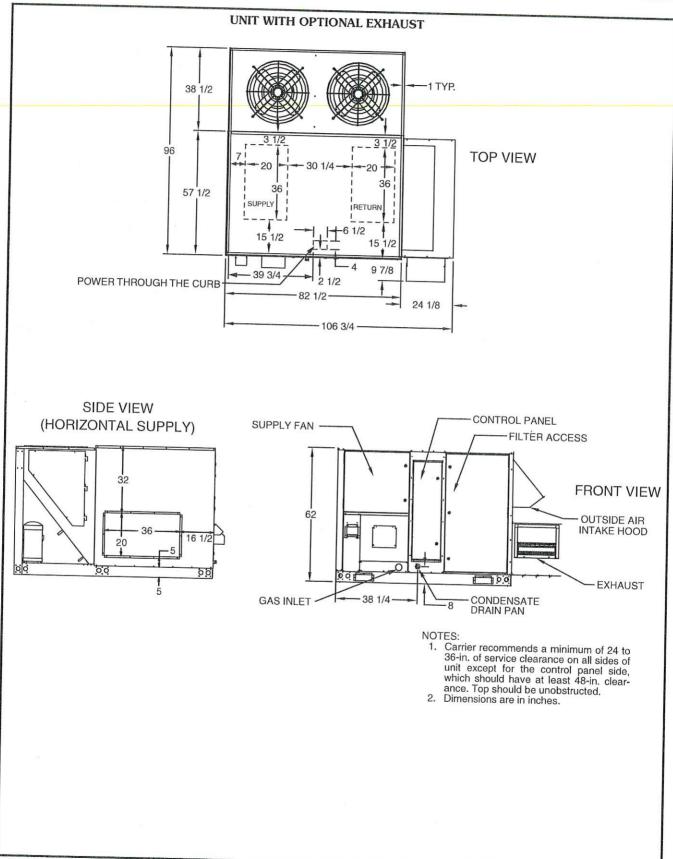


#### NOTES:

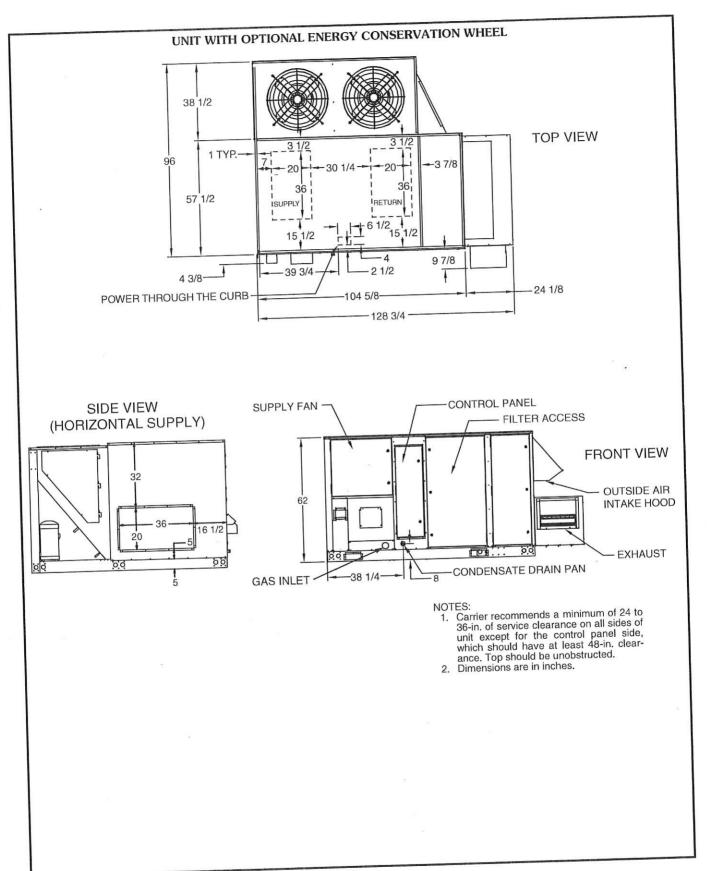
- Carrier recommends a minimum of 24 to 36-in. of service clearance on all sides of unit except for the control panel side, which should have at least 48-in. clearance. Top should be unobstructed.
   Dimensions are in inches.

# Base unit dimensions — 62DC,DD12-20



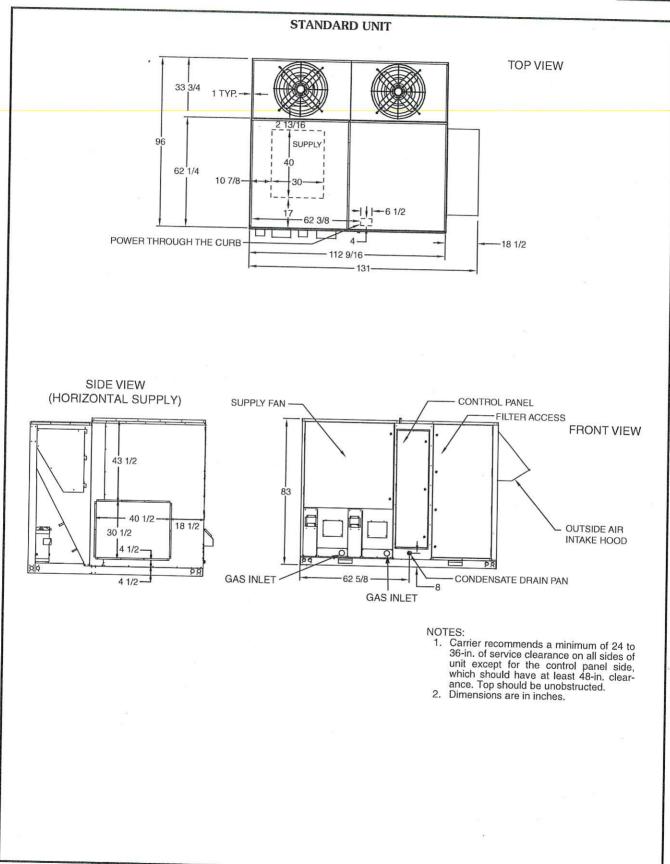






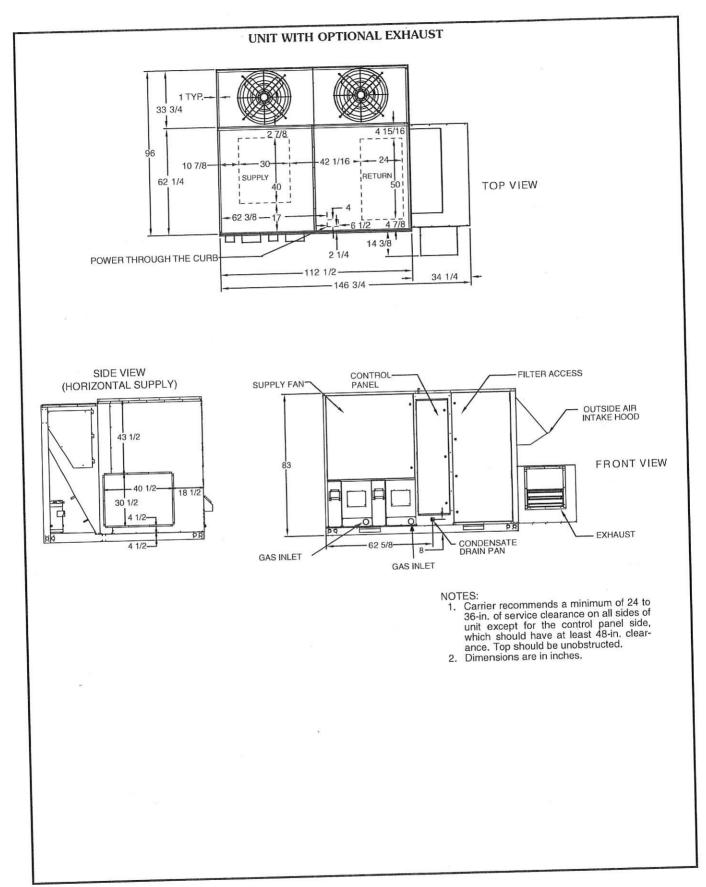
# Base unit dimensions — 62DA,DB22-38





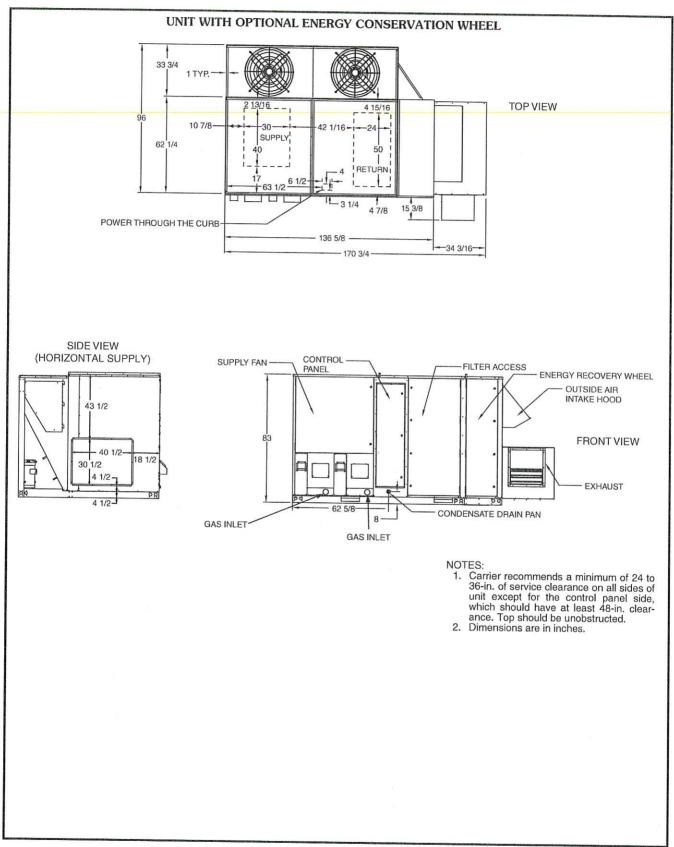
# Base unit dimensions — 62DC,DD22-38





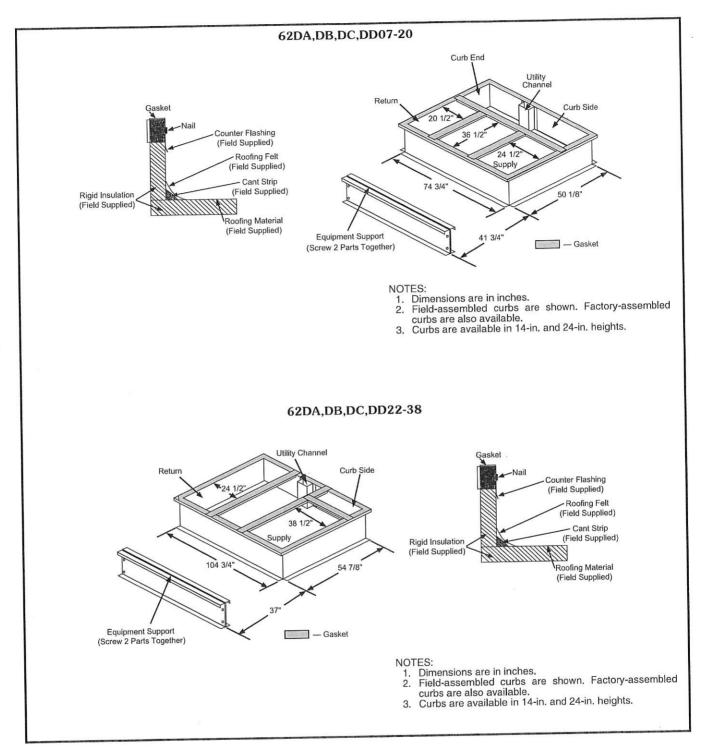
# Base unit dimensions — 62DC, DD22-38 (cont)





## **Accessory dimensions**





# Selection procedure

Refer to the Applied Rooftop Builder to select unit.

# Performance data



### COOLING CAPACITIES

Enteri	ing Air Quantity			00	T	emp (F) Air	Entering (Ed	lb)			
	(Cfm)			80					90		
		70	74	75		Entering A	ir — Ewb (F)				
700	TC	55,818	59,797	75	76	78	70	74	75	76	
700	SHC W	28,835 3,804	25,326 3,839	60,819 24,422 3,849	61,852 23,551 3,854	63,944 21,691	53,844 35,572	57,803 32,221	58,819 31,370	59,845 30,499	<b>78</b> 61,91
950	TC SHC	61,617 32,270	65,773	66,844	67,907	3,874 70,055	4,232 59,230	4,268	4,278	4,289	28,69 4,31
	W	3,954	27,523 3,992	26,309 4,003	25,099 4,014	22,604	41,761	63,318 37,042	64,369 35,874	65,439 34,712	67,57
1250	TC SHC	65,784 35,796	69,992	71,066	72,140	4,037 74,278	4,383 63,010	4,431	4,443	4,456	32,31 4,48
	W	4,111	29,568 4,157	27,987 4,169	26,400 4,181	23,195	48,544	67,163 42,432	68,225 40,896	69,296 39,349	71,44
1500	TC SHC	67,946	72,192	73,256	74,326	4,206 76,440	4,542	4,595	4,608	4,623	36,244 4,652
	w	38,458 4,231	31,071 420	29,201 4,292	27,323 4,305	23,557 4,331	65,023 54,005 4,666	69,218 46,930 4,714	70,273 45,103 4,729	71,336 43,284	73,442 39,509

Enteri	ng Air Quantity			400	Т	emp (F) Air	Entering (E	db)			
	(Cfm)			100					105		
		70	74	75		Entering A	ir — Ewb (F	)	100		
700	TC	51,638	55,466	75	76	-78	70	74	75	76	
700	SHC W	42,199 4,734	38,929 4,776	56,450 38,084 4,787	57,445 37,231 4,799	59,441 35,431	50,452 45,437	54,129 42,134	55,137 41,397	56,107	<b>78</b> 58,064
950	TC SHC	56,503 50,902	60,414 46,387	61,423 45,265	62,449	4,823 64,573	5,024 56,353	5,071 58,845	5,079	40,547 5,093	38,818 5,121
	W	4,892	4,941	4,955	44,124 4,969	41,898 4,995	56,074	51,001	49,853	60,796 48,732	62,807 46,501
1250	TC SHC	61,484 61,484	63,876	64,930	65,927	67,862	5,208	5,240	5,255	5,270	5,300
	W	5,089	55,025 5,110	53,616 5,127	52,113 5,136	48,993 5,173	62,799 62,799	62,405 60,415	63,255 58,981	64,058 57,385	66,077
500 TC SHC W		65,431	65,806	66,728	67,776	69,628	5,436	5,415	5,430	5,450	55,475 5,474
		65,431 5,232	60,774 5,235	59,054 5,253	57,576 5,265	54,928 5,302	66,819 66,819 5,594	66,977 66,977 5,592	67,018 67,018	66,077 64,563	67,780 61,206

P.4					T	emp (F) Air	Entering (E	-IL-V			
Enterii	ng Air Quantity (Cfm)			75		omp (i ) Aii	Tittering (E	ab)			
	(OIIII)					Entoring A			85		
		57	62	67	72		ir — Ewb (F	)			
1500	TC	51,900	56,500	61,400		75	57	62	67	72	75
1300	SHC W	51,400 4,701	42,900 4,734	34,100 4,783	66,100 24,900	68,900 19,300	58,400 58,400	58,500 58,500	61,800 51,000	66,800	69,90
1800	TC	55,300	58,200	63,100	4,836	4,869	4,756	4,757	4,785	42,100 4,839	36,40
1000	SHC W	55,300 4,840	47,300 4,861	36,700 4,916	67,700 25,600 4,970	70,500 19,000	61,900 61,900	62,000 62,000	63,300 56,700	68,500 46,200	71,600
2200	TC	58,300	59,500	64,400		5,004	4,900	4,901	4,922	4,976	39,600
	SHC W	58,300 5,017	52,500 5,030	40,100 5,074	69,100 26,600 5,139	71,700 18,400 5,174	65,200 65,200	65,300 65,300	65,000 62,800	69,800 51,400	73,000 43,600
2500	TC SHC	59,900	60,200	65,000	69,700		5,089	5,090	5,085	5,150	5,192
	W	59,900 5,147	54,900 5,147	42,500 5,198	27,500 5,258	72,300 18,300 5,293	67,200 67,200 5,226	67,300 67,300	67,400 67,400	70,400 55,500	73,700 46,900

ECW — Energy Conservation Wheel
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
SHC — Sensible Heat Capacity (Btuh)
TC — Total Capacity (Btuh) Gross
W — Compressor Motor Power Input (W)



### COOLING CAPACITIES (cont)

2DA DB	AND 62DC,DD0	8 WITHOUT	ECW		Ter	mp (F) Air E	ntering (Edi	o)			
LDM		=			101	IIP (1.71			90		
Enterin	g Air Quantity			80	E	Entering Air		74	75	76	78
	(Cfm)	70	74	75	76	78	<b>70</b> 64,098	74 69,000	70,236	71,510	74,058
	W	66,638	71,484 30,404	72,775 28,409	74,033 28,355	76,603 26,330	41,968 5,385	38,234 5,384	37,256 5,384	36,252 5,385	34,223 5,390
800	800 SHC	34,460 4,938	4,940	4,941	4,942 83,722	4,943 86,431	72,615	77,876	79,212 44,059	80,538 42,651	83,261 39,771
1150	TC SHC	75,798 39,543	84,071 33,931	82,404 32,469	30,947 5,084	27,998 5,086	50,861 5,521	45,476 5,523	5,524	5,525	5,526 87,901
1130	W	5,077 80,669	5,082 86,035	5,083 87,389	88,739	91,427 28,715	77,190 58,044	82,406 50,911	83,752 49,127	85,106 47,330 5,640	43,909 5,640
1450	TC SHC	43,262 5,197	36,138 5,201	34,300 5,201	32,450 5,202	5,203	5,635 80,610	5,639 85,921	5,639 87,138	88,530	91,259 48,315
1800	TC SHC	84,407 47,247	89,794 38,349 5,333	91,148 36,111 5,334	92,499 33,856 5,334	95,159 29,320 5,334	65,907 5,768	57,295 5,770	54,838 5,772	52,708 5,771	5,77

2DA.DB	AND DC,DD08 \	VITHOUT E	CW (cont)		Ter	np (F) Air E	ntering (Ed	b)			
				100					105		
Enterin	g Air Quantity			100	I	ntering Air	— Ewb (F)		75	76	78
	(Cfm)		74	75	76	78	70	74		66,998	69,466
		70	74	67,307	68,595	71,108	59,845	64,573 49,456	65,766 48,528	47,580	45,650
	TC	61,364	66,088 45,643	44,704	43,819	41,879	52,914 6,193	6,192	6,194	6,196	6,200
800	SHC	49,392 5,895	5,899	5,899	5,900	5,900	68,694	72,108	73,447	74,595	77,272 56,768
T N		69,217	74,102	75,416	76,692	79,328 51,010	68,080	62,072	60,900	59,337 6,347	6,345
1150 TC SHO		62,109	56,519	55,212 6,042	53,800 6,044	6,046	6,338	6,342	6,343	78,573	81,155
		6,038	6,042		80,947	83,415	75,812	76,128	77,420 70,930	69,118	65,683
	TC	73,339	78,207 65,352	79,495 6,368	62,145	58,390	75,812	72,636 6,466	6,468	6,468	6,44
1450	SHC	72,256 6,154	6,158	6,158	6,159	6,163	6,465	82,563	82,636	81,841	82,92
	W	80,418	81,541	82,624	83,979	86,392	82,352 82,352	82,563	82,636	80,619	74,46 6,57
	TC	80,418	75,679	73,275	71,367 6,293	66,807 6,297	6,578	6,573	6,578	6,572	0,07
1800	SHC W	6,292	6,291	6,293	0,293	1 0,20,					

							· · · · / [ d]	2)			
62DC,DE	008 WITH ECW				Ter	np (F) Air E	ntering (Edl	0)	85		
Enterir	g Air Quantity			75			— Ewb (F)	62	67	72	75
	(Cfm)	57	62	67	<b>72</b> 77,560	<b>75</b> 82,100	<b>57</b> 69,700	69,900	73,450 60,900	79,550 50,000	83,300 43,500
	TC	61,600 60,300	67,110 51,000	72,900 40,500	31,800	22,800 6,015	69,700 6,002	69,900 6,005	6,008	6,013	6,015
1800	SHC W	5,994	5,999	6,004	6,010 79,700	84,200	74,200	74,350	75,600 67,000	81,780 55,800	85,500 47,960
	TC	66,300 66,300	69,100 56,700	75,000 43,900	33,500	22,700	74,200 6,150	74,350 6,151	6,154	6,160	6,164
2200	SHC W	6,144	6,147	6,153 76,500	6,158 81,000	6,163 85,400	77,500	77,660	77,300 74,000	82,970 60,900	86,830 52,000
	TC	69,200 69,200	70,700 60,800	47,500	34,900	22,300 6,311	77,500 6,300	77,660 6,305	6,307	6,309	6,312
2600	SHC W	6,293	6,294	6,300	6,306 81,800	86,200	80,100	80,190	80,300 80,300	84,100 64,500	87,675 56,100
3000	TC SHC W	71,300 71,300 6,442	71,500 65,100 6,445	77,370 50,700 6,448	36,400 6,453	21,900 6,458	80,100 6,450	80,190 6,452	6,454	6,455	6,460

### LEGEND

ECW — Energy Conservation Wheel
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
SHC — Sensible Heat Capacity (Btuh)
TC — Total Capacity (Btuh) Gross
W — Compressor Motor Power Input (W)



### **COOLING CAPACITIES (cont)**

Entar:	n = 1 . 0				T	emp (F) Air	Entering (E	db)			
Enten	ng Air Quantity (Cfm)			80				,	90		
	,,		<del></del>			Entering A	ir — Ewb (F	)			
-	TC	70	74	75	76	78	70	74	75	70	
900	SHC W	75,277 38,936 5,647	80,741 34,355 5,728	82,146 33,198 5,749	83,552 32,027 5,770	86,430 29,735 5,811	72,682 47,523	78,051 43,205	79,429 42,103	76 80,808 40,951	83,646 38,674
1300	TC SHC W	85,683 44,821 5,962	91,515 38,308 6,053	92,985 36,604 6,078	94,493 34,938	97,490 31,545	6,208 82,172 57,521	6,292 87,987 51,387	6,313 89,430 49,769	6,336 90,899 48,163	6,383 93,842
1600	TC SHC	90,591 48,575	96,479	97,988	6,102 99,497	6,152	6,526 86,594	6,622 92,502	6,648 93,977	6,674	44,837 6,728
	TC	6,159	50,445 6,260	38,428 6,284	36,378 6,310	32,224 6,361	64,444 6,725	56,956 6,824	54,968 6,851	95,462 52,977 6,878	95,446 48,985
2100	SHC W	95,723 54,041 6,444	101,757 43,897 6,544	103,249 41,276 6,570	104,741 38,631 6,597	107,603 33,001 6,653	91,258 75,601 7,004	97,211 65,778 7,109	98,518 62,904 7,142	100,177	6,933 103,148 55,593

Entori	na Air O				T	emp (F) Air	Entering (E	db)			
Linen	ng Air Quantity (Cfm)			100					105		
	1 Nation Manage	70				<b>Entering A</b>	ir — Ewb (F	)			
	ТС	70	74	75	76	78	70	74	75	70	
900	SHC W	69,743 55,953 6,861	74,852 51,576 6,957	76,182 50,510 6,981	77,535 49,444 7,006	80,281 47,235 7,057	68,071 60,006 7,238	73,110 55,840	74,405 54,782	76 75,693 53,678	78 78,431 51,478
1300	TC SHC W	78,432 70,210 7,192	83,740 64,017 7,295	85,061 62,334 7,327	86,559 60,923 7,352	89,362 57,510 7,404	76,359 76,282 7,577	7,341 81,686 70,396	7,369 83,051 68,855	7,396 84,360 67,122	7,437 87,352 64,178
1600	TC SHC W	82,513 80,472 7,392	87,827 72,902 7,489	89,036 70,614 7,525	90,600 68,866 7,536	93,536 64,948 7,584	83,387 83,387 7,788	7,639 85,668 80,687	7,666 87,220 79,054	7,695 88,566 77,051	7,730 91,126 72,996
2100	TC SHC W	91,872 91,872 7,765	92,242 87,061 7,765	93,530 84,468 7,791	94,186 80,876 7,830	98,193 77,380 7,842	94,128 94,128 94,128 8,178	7,837 94,365 94,365 8,176	7,848 94,428 94,428 8,175	7,868 94,479 93,616	7,918 95,494 87,945

Fate d					T	emp (F) Air	Entering (Ed	db)			
Enteri	ng Air Quantity (Cfm)			75			1		85		
	()					<b>Entering Ai</b>	ir — Ewb (F	)			
	TC	57	62	67	72	75	57	62	67	72	75
2100	SHC W	71,000 69,600 6,857	77,000 59,000 6,939	83,500 46,900 7,025	89,900 33,800 7,129	93,700 26,000 7,186	80,300 80,300 6,985	80,500 80,500	83,900 70,100	90,900 57,900	95,10 50,30
2550	TC SHC W	76,100 76,100 7,097	78,900 65,200 7,137	85,600 50,400 7,234	92,000 35,200 7,329	95,700 25,500	85,000 85,000	6,987 85,200 85,200	7,038 86,500 77,100	7,137 93,000 63,900	7,200 97,200 54,700
3050	TC SHC W	79,400 79,400 7,339	80,600 69,600 7,353	87,100 54,700 7,442	93,500 36,400 7,543	7,393 97,000 24,800	7,227 88,900 88,900	7,229 89,000 89,000	7,242 88,200 85,000	7,347 94,400 68,300	7,417 98,700 59,800
3500	TC SHC W	81,600 81,600 7,543	81,500 74,500 7,538	87,900 58,200 7,629	94,300 37,500 7,729	7,609 97,800 24,500 7,788	7,473 91,500 91,500 7,687	7,475 91,600 91,600 7,689	7,460 91,700 91,700 7,691	7,566 95,400 73,400	7,631 99,400 64,200

#### LEGEND

ECW — Energy Conservation Wheel
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
SHC — Sensible Heat Capacity (Btuh)
TC — Total Capacity (Btuh) Gross
W — Compressor Motor Power Input (W)

#### NOTES:



### COOLING CAPACITIES (cont)

2DA,DE	AND 62DC,DD1	Z WITHOUT			Ter	np (F) Air E	ntering (Ed	0)			
				80				10-21-22	90		
Enterin	g Air Quantity			- 00		Entering Air	— Ewb (F)			70 1	78
	(Cfm)			75	76	78	70	74	75	76	
4400	TC	90,454 97,036 98 46,780 41,236 39	98,722 39,836	100,390 38,360	103,884 35,608 6,634	88,900 58,800 6,834	95,600 53,600 6,866	97,300 52,300 6,868	99,100 50,900 6,874	102,700 48,200 6,888	
1100	SHC W TC	6,608	6,650	6,654 109,622	6,660	115,014 37,426	99,500 69,600	106,700 62,500	108,500 60,600	110,300 58,800	114,10 55,10
1500	SHC	52,532 6,814	45,188 6,788	43,268 6,786	41,334 6,784	6,776	6,886	6,902 112,200	6,904	6,906 115,900	6,90
1800	TC SHC	106,066 56,340	113,232 47,518	115,040 45,242	116,860 42,938 6,886	120,484 38,258 6,872	77,100 6,884	68,500 6,886	66,300 6,884	64,100 6,908	59,70 6,90
	TC	6,930 110,966	6,896 118,226	6,890 120,040	121,870	125,478 39,028	110,000 86,500	117,400 76,200	119,300 73,500	121,100 70,800	124,90 65,50
2200	SHC W	60,898 7,056	50,124 7,040	47,358 7,034	44,592 7,028	7,010	6,888	6,888	6,884	6,882	6,8

Air Oughtity	DB AND 62DC,DD12 WITHOUT ECW (cont)  Temp (F)						,			
Ata Quantity			100			k can a san an an an an an		105		
Entering Air Quantity (Cfm)			100		Entering Air	— Ewb (F)			T	70
Cfm)	т		75	76	78	70	74	75	76	78
1	70	74		95,300	98,800	83,600	89,700	91,400	93,100	96,600 64,000
1100 TC SHC W	85,300 69,200	91,700 64,000	93,600 62,800	61,456	58,800 7,720	74,400 8,060	69,100 8,110	67,800 8,118	66,600 8,128	8,16
	7,630	7,664	7,692	7,696		92,800	99,300	101,000	102,700	106,30
ГС	95,000 84,000	101,800 77,000	103,600 75,300	105,400 73,500	108,900 69,800	90,900	84,100	82,504 8,180	80,700 8,188	77,20 8,20
W	7,704	7,720						105,700	107,500	110,90
TC	100,000 94,400	106,800 86,300	84,200	82,000	77,700	100,600	94,800 8,198	92,600 8,208	90,900 8,210	86,60 8,23
W	7,714	7,744					109 100	110,300	111,900	115,60
TC SHC	106,500 106,500	111,500 97,700	95,800	93,200	88,000	109,100	109,100	105,900 8,232	103,400 8,238	99,10 8,2
TSWT	HC C HC /	HC 84,000 7,704 C 100,000 HC 94,400 7,714 C 106,500	HC 84,000 77,000 7,704 7,720 C 100,000 106,800 94,400 86,300 7,714 7,744 C 106,500 111,500	HC 84,000 77,000 75,300 7,704 7,720 7,726	95,000   77,000   75,300   73,500   77,700   75,300   73,500   77,700   77,720   7,726   7,732   7,732   7,744	S	CHC         95,000 84,000 7,704         101,000 77,000 7,720         103,600 75,300 7,726         73,500 7,32         69,800 7,748         90,900 8,148           C         100,000 94,400         106,800 86,300 7,714         108,600 7,748         110,400 7,740         114,014 7,700         100,600 77,700         100,600 100,600 7,762         82,000 7,762         77,700 7,762         8,202           J         7,714         7,744         7,748         7,754         7,762         8,202           HC         106,500 106,500         97,700 97,700         95,800 93,200         93,200 8,000 93,200         109,100 7,772         8,250	CHC         95,000 84,000 7,700 7,704         101,000 75,300 7,726         103,500 73,500 7,732         69,800 7,748         90,900 81,488         84,100 8,172           C         100,000 94,400 7,714         106,800 86,300 7,714         108,600 7,748         110,400 7,748         114,014 7,700         100,600 100,600 77,700         104,000 94,800 82,000 7,762         94,800 82,000 7,762         82,000 82,000 7,762         7,762 8,202         8,198 8,198           I         106,500 106,500         111,500 97,700         113,400 95,800 95,800         115,200 93,200 88,000 93,200 88,000 109,100 109,100 109,100 109,100 109,100 109,100         109,100 109,100 109,100 109,100	CHC         95,000 84,000 7,700 7,704         101,000 75,300 7,726         103,500 7,3500 7,732         69,800 7,748         90,900 81,448         84,100 8,172         8,180 8,180           C         100,000 94,400 7,714         106,800 86,300 7,744         108,600 7,748         110,400 7,754         114,014 7,700         100,600 94,800 7,700         104,000 94,800 92,600         105,700 94,800 92,600           HC         94,400 7,744         84,200 7,744         7,754 7,748         7,762 7,762         8,202 8,202         8,198 8,198         8,208 8,208           HC         106,500 106,500         111,500 97,700         113,400 95,800 95,800         115,200 93,200 93,200 88,000 109,100 109,100 109,100 109,100 109,100 109,100 109,100 109,100 109,100 109,100 109,100 109,100 109,100 109,100 105,900	CHC         95,000 84,000 7,700 7,704         101,000 77,000 77,000 77,720         103,500 7,732         69,800 7,748         90,900 8,148         84,100 8,172         8,180 8,188         8,188           C         100,000 94,400         106,800 86,300         108,600 84,200         110,400 82,000         114,014 7,762         100,600 82,000         104,000 77,700         105,700 94,800         107,500 92,600         90,900 90,900           HC         94,400 7,744         84,200 7,744         7,754 7,748         7,762 7,762         8,202 8,202         8,198 8,198 8,208         8,210 8,210           C         106,500 106,500         111,500 97,700         113,400 95,800         115,200 93,200 88,000 109,100         109,100 109,100 109,100         105,900 105,900 103,400 103,400 103,400           HC         106,500 106,500         97,700 95,800         93,200 93,200 93,200 7,700 95,800         88,000 109,1

2DC,DD	12 WITH ECW				Te	mp (F) Air E	ntering (Ed	b)			
				75					85		
Enterin	g Air Quantity			75		Entering Air	— Ewb (F)				75
	(Cfm)				72	75	57	62	67	72	75
		57	62	67		110,300	91,500	90,500	98,300	106,800	111,900
2200	TC SHC	82,400 78,700	89,900 66,300	97,800 53,400	105,700 39,900	31,500 8,208	91,500 8,126	89,300 8,128	78,000 8,152	65,100 8,188	56,900 8,208
LLUU		8,066	8,114	8,152	8,190		96,800	97,000	102,300	109,700	114,700
2600 TC SHC	TC	86,700 87,400	92,500 71,800	100,600 56,900	108,400 41,000	113,000 31,300 8,362	96,800 8,308	97,000 8,310	86,000 8,324	70,700 8,358	60,900 8,380
2000	W	8,246	8,290	8,310	8,348	2000	102,900	103,100	104,200	112,300	117,500
3200	TC SHC	91,900 91,900	95,200 80,200	103,200 61,500	111,100 42,600	115,500 30,700 8,588	102,900 102,900 8,548	103,100 8,548	95,500 8,560	78,500 8,594	67,100 8,60
	W	8,504	8,524	8,568	8,576		106,700	106,900	106,000	113,900	118,90
3700	TC SHC	95,100 95,100 8,710	96,800 84,900 87,123	104,800 66,100 8,748	112,600 43,900 8,762	116,800 30,200 8,780	106,700 106,700 8,746	106,900 8,748	103,800 8,752	85,800 8,776	72,10 8,78

#### **LEGEND**

ECW — Energy Conservation Wheel
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
SHC — Sensible Heat Capacity (Btuh)
TC — Total Capacity (Btuh) Gross
W — Compressor Motor Power Input (W)



### COOLING CAPACITIES (cont)

					Te	emp (F) Air	Entering (E	db)			
Enteri	ng Air Quantity (Cfm)			80					90		
	(Cilli)					<b>Entering Ai</b>	ir — Ewb (F	)			
	T	70	74	75	76	78	70	74	75	76	70
1350	TC SHC W	108,528 56,096 7,968	116,324 49,220 8,078	118,318 47,480 8,100	120,324 45,742 8,124	124,376 42,308 8,134	107,000 71,100 8,168	115,000 64,700 8,260	117,000 63,100	119,200 61,400	78 123,400 58,000
1900	TC SHC W	121,478 63,652 8,354	129,662 54,280 8,420	131,732 51,844 8,446	133,808 49,420 8,472	137,972 44,412 8,526	120,300 85,600 8,326	128,800 76,500	8,282 130,900 74,200	8,304 133,100 71,800	8,34 130,70 62,30
2400	TC SHC W	128,634 69,568 8,636	136,922 57,810 8,712	138,994 54,656 8,750	141,080 51,594 8,778	145,232 45,412 8,836	127,900 97,700 8,416	8,420 136,400 86,300 8,520	8,446 138,600 83,300	8,472 140,800 80,400	8,43 145,20 74,40
2900	TC SHC W	133,296 75,052 8,868	141,612 60,720 8,984	143,696 57,122 9,012	145,752 53,454 9,042	149,854 46,122 9,102	133,100 109,000 8,460	141,600 95,600 8,570	8,548 143,800 92,100 8,620	8,576 146,000 88,600 8,648	8,634 150,400 81,500 8,692

62DA,D	B AND 62DC,DD	14 WITHOU	T ECW (cor	nt)							
					To	emp (F) Air	Entering (E	db)			
Enteri	ng Air Quantity (Cfm)			100					105		
	(CIIII)					<b>Entering Ai</b>	ir — Ewb (F	)			
	Table	70	74	75	76	78	70	74	75	76	78
1350	TC SHC W	102,700 84,000 9,156	110,500 77,500 9,256	112,500 76,000 9,278	114,500 74,400 9,300	118,700 71,100 9,350	100,600 90,000 9,734	108,000 83,830 9,788	110,000 82,300	111,900 80,700	116,100 77,500
1900	TC SHC W	115,000 103,800 9,316	123,000 95,200 9,412	125,100 92,900 9,440	127,200 90,700 9,464	125,400 78,100 9,436	113,000 113,000 9,878	120,000 104,200	9,810 122,000 102,200	9,832 124,100 100,000	9,902 122,500 85,800
2400	TC SHC W	122,200 120,800 9,388	123,000 95,200 9,412	132,000 107,000 9,520	134,100 104,600 9,550	138,400 98,900 9,598	125,000 125,000 10,182	9,940 127,000 121,700 10,062	9,966 128,790 118,800 10,064	9,988 130,900 116,300	9,988 135,000 111,100
2900	TC SHC W	131,200 131,200 9,532	130,100 124,000 9,564	136,800 120,700 9,592	138,800 117,344 9,620	143,200 111,600 9,672	134,300 134,300 10,182	134,500 134,500 10,176	134,400 134,400 10,172	10,086 135,800 132,100 10,194	10,144 139,400 125,100 10,228

	- 100 W				Te	emp (F) Air	Entering (E	db)			
Enteri	ng Air Quantity (Cfm)			75					85		
	(Cilli)					<b>Entering Ai</b>	ir — Ewb (F	)			
************	Tec	57	62	67	72	75	57	62	67	72	75
2900	TC SHC W	100,000 97,400 9,806	108,600 82,700 9,910	117,800 65,500 10,002	126,800 47,800 10,130	132,000 36,900 10,210	112,500 112,500 9,958	112,700 112,700 9,962	118,600 98,100	128,200 80,900	134,100 70,100
3400	TC SHC W	105,800 105,800 10,064	111,300 90,000 10,096	120,600 69,800 10,230	129,400 49,000 10,364	134,600 36,400 10,444	118,100 118,100 10,224	118,300 118,300	10,004 121,300 105,300	10,142 130,800 87,500	10,280 136,900 75,600
4000	TC SHC W	110,200 110,200 10,348	113,500 95,700 10,368	122,700 75,000 10,478	131,500 50,300 10,630	136,600 35,500 10,710	123,200 123,200 10,494	10,228 123,400 123,400 10,496	10,256 123,500 115,200	10,396 133,200 96,100	10,472 139,100 81,800
4600	TC SHC W	113,700 113,700 10,622	115,100 102,700 10,600	123,900 79,200 10,754	133,000 52,100 10,884	137,800 35,100 10,964	127,300 127,300 10,818	127,500 127,500 10,822	10,536 127,600 127,600 10,790	10,652 134,600 100,800 10,906	10,748 140,300 87,300 11,016

LEGEND

ECW — Energy Conservation Wheel
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SHC — Sensible Heat Capacity (Btuh)
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W — Compressor Motor Power Input (W)



### **COOLING CAPACITIES (cont)**

ZUA,UE	3 AND 62DC,DD1		or guide		Te	mp (F) Air E	ntering (Ed	lb)			
				80					90		
Enterin	ng Air Quantity (Cfm)					Entering Air	r Ewb (F)				70
	(Cilli)	70	74	75	76	78	70	74	75	76	78
1700	TC SHC	143,266 74,148	153,674 65,570	156,344 63,386 10,656	159,044 61,190 10,670	164,492 56,768 10,692	138,266 90,276 11,614	148,622 82,200 11,674	151,302 80,148 11,690	153,942 77,978 11,706	159,416 73,726 11,744
2300	TC SHC	10,586 159,700 82,970	10,642 170,712 71,594	173,526 68,624	176,346 65,618 11,000	182,002 59,576 11,036	153,630 105,704 11,952	164,462 94,416 12,026	167,246 91,558 12,046	170,050 88,692 12,066	175,730 82,920 12,11
3000	TC SHC	10,908 171,770 91,766	10,966 183,030 76,830	10,382 185,884 73,028	188,742 69,180 11,354	194,404 61,366 11,392	164,736 122,206 12,296	175,714 107,332 12,382	178,574 103,636 12,404	181,434 99,910 12,428	187,27 92,71 12,47
3600	TC SHC W	11,246 178,510 98,392 11,518	11,318 189,884 80,670 11,594	11,336 192,726 76,132 11,612	195,574 71,586 11,632	201,220 62,468 11,672	170,808 135,306 12,574	182,134 118,372 12,654	184,962 113,944 12,678	187,806 109,448 12,704	193,44 100,39 12,75

	3 AND 62DC,DD1				Te	mp (F) Air E	Intering (Ed	ID)			
				100					105		
Enterin	g Air Quantity		-	100		Entering Air	r — Ewb (F)				
	(Cfm)	70	74	75	76	78	70	74	75	76	78
1700	W	132,748 142,674	142,674 98,058	2,674 145,272 3,058 96,054	147,952 94,078 12,916	153,254 89,914 12,958	129,742 113,922 13,496	139,516 106,102 13,572	142,038 104,120 13,594	144,644 102,094 13,618	149,820 97,922 13,660
2300	TC SHC	146,660 127,572	157,156 116,796	160,020 114,376	162,708 111,580 13,288	168,190 105,910 13,340	143,026 138,584 13,854	153,080 127,748 13,946	155,890 125,376 13,958	158,598 122,698 13,970	163,86 116,68 14,01
3000	W TC SHC	13,160 157,084 151,924	13,246 167,238 137,316	13,264 170,138 134,066	172,826 130,440	178,334 123,156 13,708	161,024 161,024 14,282	162,950 152,134 14,276	165,880 149,054 14,276	168,646 145,544 14,288	173,95 138,03 14,33
3600	W TC SHC	13,510 168,538 168,538	13,614 172,766 154,380 13,904	13,634 175,394 150,082 13,930	13,662 178,136 145,782 13,954	184,096 137,794 13,972	172,716 172,716 172,716 14,552	173,310 173,310 14,672	171,632 168,756 14,554	174,296 164,730 14,540	179,26 155,74 14,58

2DC,DL	D15 WITH ECW				- Te	mp (F) Air E	ntering (Ed	b)			
				75					85		
Enterin	ng Air Quantity (Cfm)					Entering Air	r — Ewb (F)				
	(Cilli)	57	62	67	72	75	57	62	67	72	75
3600	TC SHC	130,800 123,900	142,300 105,900	154,600 85,100 12,806	166,800 62,800 12,878	174,100 49,300 12,916	146,200 146,200 12,772	143,900 142,400 12,770	155,300 124,900 12,818	168,800 104,100 12,880	176,700 90,800 12,926
4300	TC SHC	12,726 138,400 138,400	12,760 146,200 113,200	158,800 91,000	171,000 64,500 13,162	178,200 48,700 13,202	154,600 154,600 13,070	154,900 154,900 13,070	159,900 135,100 13,100	172,800 113,200 13,166	180,90 98,20 13,21
5300	TC SHC	13,894 145,900 145,900	13,036 150,000 124,800	13,086 162,600 99,400	174,700 67,300 13,548	181,700 47,400 13,598	163,400 163,400 13,480	163,600 163,600 13,482	164,300 151,600 13,486	176,800 123,400 13,558	184,60 107,90 13,61
5800	W TC SHC W	13,398 148,800 148,800 13,596	13,422 151,400 130,200 13,614	13,476 163,700 102,800 13,676	175,900 68,500 13,742	182,800 46,700 13,972	166,800 166,800 13,686	167,100 167,100 13,686	166,000 159,100 13,682	177,800 128,200 13,760	186,80 113,40 13,79

#### LEGEND

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SHC — Sensible Heat Capacity (Btuh)
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W — Compressor Motor Power Input (W)



### COOLING CAPACITIES (cont)

Enteri	ng Air Quantity				T	emp (F) Air	Entering (Ed	db)			
	(Cfm)			80					90		
		70	74	75		Entering Ai	r — Ewb (F				
0000	TC	169,556	181,388	75	76	78	70	74	75	76	78
2000	SHC W	87,768 12,992	77,376 13,208	184,424 74,750 13,262	187,498 72,084 13,318	193,720 66,720	163,804 106,814	175,464 97,000	178,522 94,496	181,562 91,944	187,73 86,8
2800	TC SHC	190,150	202,652	205,824	209,010	13,432	14,282	14,504	14,566	14,626	14,75
	W	98,920 13,694	84,886 13,926	81,214 13,988	77,524 14,052	215,402 70,076 14,184	182,966 126,820	195,242 112,886	198,448 109,532	201,624 105,976	207,9° 98,5°
3600	TC SHC	202,660	215,344	218,538	221,732	228,100	15,002	15,254	15,332	15,402	15,5
	W TC	108,520 14,256	90,540 14,512	85,910 14,578	81,234 14,644	71,794 14,782	194,480 145,302 15,566	207,002 127,684	210,172 123,172	213,386 118,646	219,94 109,64
400	SHC	210,622	223,318	226,486	229,662	235,966	201,572	15,850	15,924	16,000	16,13
	W	117,140 14,742	95,234 15,010	89,652 15,078	84,078 15,146	72,880 15,286	162,510 16,050	214,044 140,986 16,358	217,362 135,650 16,426	220,994 131,038	227,52 119,8

Enteri	ing Air Quantity		- 1	100	T	emp (F) Air	Entering (E	db)			
	(Cfm)			100					105		
		70	74			Entering A	ir — Ewb (F	)	100		
	TC	157,270	74 168,566	75	76	78	70	74	75	76	T ===
2000	SHC W	125,464 15,824	115,836 16,080	171,402 113,218 16,134	174,398 110,840 16,204	180,526 105,870	153,580 134,554	165,058 125,304	168,008 122,912	171,000 120,526	177,11
2800	TC	174,716	186,704	189,920	193,148	16,324	16,714	16,904	16,956	17,010	115,61 17,11
2000	SHC W	153,932 16,560	140,132 16,794	136,846 16,846	133,560 16,900	199,628 126,628 17,020	170,876 167,188 17,378	182,942 154,428	186,006 151,106	188,816 147,228	195,56 141,02
3600	TC SHC	185,646	197,742	200,894	204,122	211,014	191,952	17,548	17,604	17,684	17,77
	TC	180,720 17,092	163,598 17,312	159,246 17,370	154,928 17,444	146,834 17,526	191,952 191,952 18,090	193,888 182,420 18,074	196,412 177,462	199,534 173,156	205,946 164,556
4400	SHC	201,470 201,470	204,902	208,110	211,166	217,556	206,798	207,318	18,148	18,208	18,350
	W	17,720	186,420 17,768	181,374 17,838	175,950 17,886	165,386 18,012	206,798 18,706	207,318 207,318 18,700	207,454 205,504 18,700	206,772 198,900 18,688	213,052

Entavia	A!- O				Te	emp (F) Air	Entering (E	dh)			
Enterir	ng Air Quantity (Cfm)			75			T T	ub)	0.5		
	(0)					Entering A	ir — Ewb (F	1	85		
	TO	57	62	67	72	75	57	1			
4400	TC SHC	161,200	175,000	189,200	203,800	212,200		62	67	72	75
	W	155,200 15,616	130,000 15,850	103,700 16,096	76,756 16,372	60,000	179,400 179,400	179,800 180,600	190,400 153,400	205,800 126,700	215,40
5100	TC	169,100	179,200	193,500		16,540	15,926	15,384	16,112	16,426	110,80 16,60
3100	SHC W	171,000 16,008	140,100 16,196	109,500 16,448	208,000 78,400 16,734	216,400 59,400	188,000 188,000	188,300 188,300	194,900 167,200	210,100 136,100	219,70
5800	TC	175,100	182,300	196,600		16,900	16,354	16,360	16,456	16,788	117,80 16,98
3000	SHC W	175,100 16,390	149,500 16,522	115,500 16,776	211,100 80,000 17,070	219,300 58,500 17,238	195,000 195,000	195,400 195,400	198,000 176,300	213,700 146,500	222,80 124,70
5500	TC	180,100	184,500	199,100	213,400		16,756	16,762	16,816	17,108	17,32
,,,,,	SHC W	180,100 16,750	159,600 16,816	121,500 17,086	82,200 17,386	221,300 57,300 17,560	200,900 200,900 17,124	201,200 201,200 17,130	200,900 188,800 17,144	215,500 155,000 17,444	225,10 131,70

#### LEGEND

ECW — Energy Conservation Wheel
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Ewb — Entering Wet Bulb
SHC — Sensible Heat Capacity (Btuh)
TC — Total Capacity (Btuh) Gross
W — Compressor Motor Power Input (W)



### COOLING CAPACITIES (cont)

2DA,DB	AND 62DC,DD2	.U WITTIOU			Ter	mp (F) Air E	ntering (Ea	0)	- 00		
				80				•	90		
Entering	g Air Quantity				1	Entering Air	— Ewb (F)		75	76	78
	(Cfm)		T	75	76	78	70	74	75		209,290
		70	74		209,458	216,428	182,674	195,758	199,098	202,472 103,370	97,152
- 100	TC	189,252 97,788	202,584 85,516	206,012 82,410	79,310	73,112	121,016 16,008	109,364 16,258	106,406 16,322	16,388	16,52
2400	SHC	14,588	14,816	14,874	14,932	15,042		211,322	214,810	218,354	225,53
	TC	205,842	219,612 91,654	223,172 87,928	226,704 83,904	233,730 75,720	197,936 138,366 16,602	122,936 16,858	119,288 16,934	115,496 16,980	107,63 17,07
3100	SHC	107,298 15,156	15,388	15,446	15,506	15,626		220,622	224,194	227,784	235,01
20010000000	TC	215,634 114,668	229,604 96,340	233,114 91,604	236,626 86,804	243,636 77,076	206,822 152,270 17,018	134,386 17,248	129,814 17,296	125,194 17,344	115,90 17,43
3700	SHC W	15,562	15,800	15,860	15,920	16,040	213,794	228,020	231,596	235,222	242,45
4400	TC SHC	223,766 122,500	237,742 100,818	241,230 95,218 16,282	244,708 89,598 16,340	251,788 78,338 16,452	167,194 17,454	146,068 17,658	140,662 17,706	135,278 17,752	124,45 17,83

2DA,DB	AND 62DC,DD2	O WITHOUT	ECW (com		Ter	np (F) Air E	ntering (Edl	b)	105		
	2-6-6								105		
Entering	g Air Quantity			100	1	Entering Air	— Ewb (F)		<del></del>	76	78
	(Cfm)			75	76	78	70	74	75		197,256
		70	74		194,604	201,304	171,206	183,802	187,070	190,352 137,840	132,422
	TC	175,048 143,742	187,956 132,514	191,262 129,608	126,648	120,448	154,662 18,560	143,556 18,764	140,722 18,814	18,864	18,940
2400	SHC	17,702	17,902	17,954	18,006	18,106	185,040	197,974	201,238	204,492	211,33
	TC	189,298 168,618	202,512 153,882	205,638 149,676	209,142 146,008	216,076 138,294	183,332 19,054	169,148 19,240	165,466 19,292	161,662 19,346	154,19 19,44
3100	SHC	18,204	18,408	18,480	18,528	18,632		205,780	208,894	212,602	218,82
	TC	197,904	210,598 170,978	213,948 166,466	217,406 161,988	224,400 152,916	202,648 202,648 19,614	189,496 19,632	185,012 19,678	181,138 19,708	171,51 19,84
3700	SHC	189,098 18,580	18,792	18,842	18,890	19,006		216,962	216,250	218,976	225,69
	W		217,504	221,100	224,250	231,112	216,396 216,396	215,196	208,848	202,902	192,81
4400	TC SHC	211,252 211,252 19,100	190,910	186,060 19,200	180,416 19,266	169,902 19,356	20,108	20,098	20,042	20,128	20,2

62DC,DD	20 WITH ECW				Ter	np (F) Air E	ntering (Edl	0)			-
				75		.,,			85		
Enterin	g Air Quantity			73		Entering Air	— Ewb (F)			72	75
	(Cfm)			67	72	75	57	62	67		229,400
	TC SHC W	170,300	62 185,200 135,100	200,900 108,700	216,800 81,900	226,100 65,000	188,100 188,100 17,268	186,600 181,800 17,220	202,100 158,000 17,494	219,000 131,600 17,750	115,800 17,912
4400	W	159,800 16,982 175,600	17,200	17,476 206,200	17,702 221,900	17,848 231,000	197,800 197,800	198,200 198,200	207,600 172,200	224,400 141,800	234,500 122,600
5100	TC SHC W	175,600 171,400 17,336	145,400 17,550	115,200 17,814	83,500 18,068	64,400 18,208	17,690	17,696	17,834 211,600	18,096 228,300	18,264 238,400
5800	TC SHC	184,500 184,500	193,900 155,000	210,000	225,600 85,100 18,398	234,500 63,600 18,536	205,800	206,200 18,094	186,000 18,164	151,700 18,428	130,40 18,58
	W	17,750 190,200	17,890	18,144 212,700	228,400	237,100 62,700	212,400 212,400	212,800 212,800	214,700 194,700	231,200 161,200	241,400 137,900 18,90
6500	TC SHC W	190,200	165,000 18,188	126,500 18,454	87,400 18,706	18,846	18,462	18,468	18,472	18,744	10,90

#### **LEGEND**

ECW — Energy Conservation Wheel
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
SHC — Sensible Heat Capacity (Btuh)
TC — Total Capacity (Btuh) Gross
W — Compressor Motor Power Input (W)



### **COOLING CAPACITIES (cont)**

F					Te	emp (F) Air	Entering (Ed	db)			
Enteri	ng Air Quantity (Cfm)			80					90		
	()					<b>Entering Ai</b>	r — Ewb (F	)			
	TEO	70	74	75	76	78	70	74	75	70	
2400	TC SHC W	190,934 98,648 14,364	204,832 86,450 14,566	208,390 83,394 14,610	211,980 80,328 14,656	219,276 74,364 14,704	184,322 121,880 15,748	197,990 110,476	201,440 107,516	76 204,948 104,476	78 212,148 98,428
3100	TC SHC W	208,624 108,428 14,896	223,192 93,512 15,040	226,890 89,516 15,086	230,598 85,506 15,132	238,062 77,442 15,222	200,556 139,286	15,936 214,858 124,664	15,984 218,448 120,794	16,034 222,102 116,930	16,130 229,488 109,144
3700	TC SHC W	219,260 116,042 15,274	234,132 98,246 15,416	237,856 93,534 15,462	241,612 88,792 15,508	249,094 79,130 15,596	16,268 210,204 153,356 16,642	16,468 224,848 136,032	16,516 228,504 131,458	16,564 232,194 126,846	16,662 239,620 117,536
4400	TC SHC W	228,270 124,134 15,664	243,162 102,576 15,822	246,914 97,030 15,866	250,694 91,496 15,910	258,154 80,230 15,996	218,140 168,770 17,072	16,840 232,972 148,258 17,222	16,888 236,646 142,826 17,272	16,936 240,326 137,338	247,762 125,984

Entau!	A! O				Te	emp (F) Air	Entering (Ed	db)			J.
Enteri	ng Air Quantity (Cfm)			100					105		
	(=)					<b>Entering Ai</b>	r - Ewb (F	)			
	TO	70	74	75	76	78	70	74	75	76	70
2400	TC SHC W	176,958 144,654 17,342	190,056 133,424 17,542	193,298 130,252 17,590	196,714 127,376 17,638	203,746 121,530 17,738	172,788 155,438 18,232	185,664 144,450	188,922 141,566	192,292 138,732	78 199,272 133,186
3100	TC SHC W	191,776 169,692 17,852	205,048 154,528 18,070	208,574 150,888 18,118	212,320 147,558 18,154	219,160 139,478 18,270	186,822 183,860	18,430 200,310 170,048	18,482 203,622 166,366	18,532 207,026 162,646	18,620 213,962 155,112
3700	TC SHC W	200,594 189,922 18,244	214,228 172,848 18,424	217,744 168,398 18,474	220,938 163,344 18,538	227,940 154,042 18,672	18,840 204,732 204,732 19,302	18,926 208,656 190,612	18,978 212,474 186,806	19,028 215,442 182,084	19,132 221,792 172,440
4400	TC SHC W	214,036 214,036 18,834	221,634 192,576 18,852	225,140 187,762 18,856	228,182 181,810 18,918	235,740 171,954 19,000	218,946 218,946 19,806	19,316 219,542 216,104 19,796	19,352 219,260 209,554	19,394 222,170 203,900	19,510 229,358 193,896

Fatau!					To	emp (F) Air	Entering (Ed	db)			
Entern	ng Air Quantity (Cfm)			75					85		
	(•)					Entering A	ir — Ewb (F	)			
	TC	57	62	67	72	75	57	62	67	72	75
4400	SHC W	170,400 160,200 17,080	185,600 135,000 17,324	201,700 109,400 17,556	217,800 82,300 17,800	227,200 65,500 17,934	187,800 187,800 17,382	186,800 181,500	203,100 159,000	220,300 132,900	75 230,600 116,322
5100	TC SHC W	175,500 171,200 17,438	190,700 144,900 17,676	207,100 115,600 17,900	223,100 84,200 18,144	232,400 65,000 18,270	197,600 197,600	17,342 198,000 198,000	17,562 208,400 172,700	17,820 225,700 142,500	17,970 236,000 123,200
5800	TC SHC W	184,200 184,200 17,836	194,700 155,600 17,992	211,100 121,800 18,222	227,000 86,100 18,464	236,200 64,400 18,586	17,804 205,600 205,600 18,166	17,810 206,000 206,000 18,172	17,930 212,600 186,400	18,180 229,700 152,100	18,338 240,200 131,300
6500	TC SHC W	189,900 189,900 18,194	197,500 165,300 18,306	213,800 126,600 18,570	229,900 87,900 18,766	239,000 63,700 18,890	212,300 212,300 18,538	212,700 212,700 18,542	18,262 215,700 195,200 18,578	18,504 232,700 161,700	18,640 242,900 137,700

#### LEGEND

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Ewb — Entering Wet Bulb
SHC — Sensible Heat Capacity (Btuh)
TC — Total Capacity (Btuh) Gross
W — Compressor Motor Power Input (W)

#### NOTES:



### **COOLING CAPACITIES (cont)**

2DA,DE	3 AND 62DC,DD2	4 WITHOUT	LCVV		Tei	mp (F) Air E	ntering (Ed	b)			
				80					90		
Enterin	g Air Quantity					Entering Air	— Ewb (F)		T	76	78
	(Cfm)	70	74	75	76	78	70	74	75		
2400 TC SHC W	205,724 220,558 106,552 94,520	220,558 94,520	20,558 224,386 94,520 91,062	228,256 87,906 16,352	236,080 81,544 16,488	198,676 129,188 17,698	213,372 117,794 17,934	217,158 114,826 18,002	220,960 111,820 18,070	228,678 105,696 18,212	
3600	TC	15,932 236,784 123,340	16,174 252,612 105,172	16,284 256,646 100,486	260,812 96,510	269,054 87,104	227,472 159,394	243,254 142,134 18,992	247,296 137,694 19,070	251,348 133,236 19,140	259,56- 124,09 19,28
4800	SHC W	17,008 253,822 137,372	17,304 270,020 113,102	17,382 274,414 108,422	17,400 278,556 102,296	17,536 286,802 89,896	18,712 242,914 186,266	258,870 162,766 19,922	262,954 156,828 20,008	267,106 150,974 20,044	270,54 139,18 20,19
4600	SHC W	17,818	18,168	18,118 284,744	18,192 288,838	18,344 296,822	18,910 253,068	268,782 184,850	272,780 177,464	276,420 169,284	285,02 155,41
6000	TC SHC W	157,414 18,436	121,828 12,728	114,318 18,806	106,904 18,886	90,794 19,072	211,176 20,160	20,424	20,508	20,616	20,76

2DA,DE	B AND 62DC,DD2	4 WITHOUT	ECW (cont	)	Tei	mp (F) Air E	ntering (Edl	b)	100		
				100	10.				105		
Enterin	g Air Quantity			100		Entering Air	— Ewb (F)				70
	(Cfm)		74	75	76	78	70	74	75	76	78
2400	TC SHC	70 191,034 151,736	205,130 140,210	208,796 137,352	212,546 134,470	220,094 128,608 20,232	186,920 162,738 20,794	200,720 151,330 21,076	204,430 148,736 21,126	209,408 145,882 21,200	215,308 139,622 21,358
3600	TC SHC	19,690 217,720 194,634	19,952 231,952 176,898	20,018 235,862 172,750	20,088 239,948 168,774	247,480 159,338	212,712 211,946 21,834	226,586 194,832 22,100	230,418 190,842 22,176	233,694 185,982 22,280	241,576 177,556 22,426
	TC	20,722 237,886 237,144	21,022 246,560 211,640	21,098 250,428 205,998	21,164 254,274 200,856	21,354 261,214 188,258	243,270 243,270	241,056 236,682 22,912	244,378 230,402 23,026	247,470 224,196 23,192	254,866 212,746 23,35
4800	SHC W	21,698	21,920	21,926 258,486	21,960 262,360	22,250 269,858	23,086	262,726	262,898 262,898	262,964 262,964	262,470 247,410
6000	TC SHC W	256,524 256,524 22,556	245,806 22,610	238,254	231,494 22,772	215,568 22,982	262,074 23,980	262,726 23,966	23,962	24,258	24,14

200,00	24 WITH ECW				Te	mp (F) Air E	ntering (Ed	b)			
				75					85		
Enterin	g Air Quantity					Entering Air	— Ewb (F)			70	75
	(Cfm)		60	67	72	75	57	62	67	72	
		57	62		252,200	262,300	226,000	226,400	236,500	255,200	266,40 141,20
6000	TC SHC	200,100 197,400	216,900 167,500	234,900 131,800	95,000	72,600 21,348	22,600 20,644	226,400 20,652	199,500 20,778	163,800 21,172	21,51
	W	2,092	20,462	20,768	21,136		236,400	236,800	241,400	259,600	271,40
7000	TC SHC	211,900 211,900	221,800 182,000	239,200 139,600	256,800 97,300	266,700 71,300 21,862	236,400 236,400 21,242	236,800 21,250	213,600 21,278	176,600 21,710	152,30 21,94
, 000	W	20,748	20,868	21,316	21,636		244,400	244,800	244,500	263,300	274,30
8000	TC SHC	218,900 218,900	225,200 190,100	242,700 148,500	260,100	269,700 69,900 22,332	244,400 244,400 21,806	244,800 21,814	228,700 21,822	191,100 22,156	161,20 22,45
	W	21,282	21,342	21,698	22,092	-	251,000	251,300	251,700	265,000	276,50
9000	TC SHC	224,500 224,500	227,200 200,100 21,802	245,300 157,200 22,122	262,300 102,800 22,534	271,700 69,400 22,758	251,000 251,000 22,270	251,300 251,300 22,278	251,700 22,286	196,200 22,626	171,30 22,90

#### LEGEND

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### **COOLING CAPACITIES (cont)**

					Te	emp (F) Air l	Entering (Ed	db)			
Enteri	ng Air Quantity (Cfm)			80					90		
	(CIIII)					Entering Ai	r Ewb (F)	)			
	T=2	70	74	75	76	78	70	74	75	76	78
3400	TC SHC W	283,720 146,666 22,016	304,194 129,070 22,314	309,482 124,708 22,372	314,870 120,304 22,432	325,740 111,406 22,556	273,728 179,140 24,074	294,058 162,874 24,296	299,386 158,848 24,356	304,614 154,534	315,358 145,930
4600	TC SHC W	316,004 163,710 22,924	337,748 140,662 23,184	343,410 135,736 23,152	348,998 129,734 23,224	360,196 117,652 23,370	303,746 209,524 24,916	325,326 187,672	330,852 182,112	24,420 334,340 176,312	24,556 347,518 164,734
5800	TC SHC W	336,956 178,770 23,646	359,378 151,016 23,838	365,012 143,632 23,914	370,640 136,132 23,990	381,904 120,976 24,146	322,928 237,440 25,638	25,176 345,216 210,516 25,936	25,266 350,752 203,292 26,018	25,342 356,334 196,024	25,498 367,622 181,484
7000	TC SHC W	366,406 215,052 25,204	386,560 171,558 25,502	390,358 158,522 26,010	395,978 148,012 26,068	406,642 125,044 26,244	350,208 308,806 27,266	371,840 266,366 27,588	376,480 255,284 27,772	26,100 381,366 242,972 27,886	26,266 393,382 222,516 28,036

523 to se					Te	emp (F) Air I	Entering (Ed	db)			
Enteri	ng Air Quantity (Cfm)			100			J (		105		
	(Cilli)					<b>Entering Ai</b>	r — Ewb (F)	)			
		70	74	75	76	78	70	74	75	76	70
3400	TC SHC W	262,690 210,490 26,510	282,546 194,824 26,692	287,606 190,684 26,772	292,748 186,718 26,830	303,270 178,424 26,962	256,810 226,016 27,830	276,654 211,248 28,012	281,608 207,294 28,074	286,550 203,014	78 296,874 194,754
4600	TC SHC W	290,578 254,600 27,282	311,174 232,710 27,570	316,118 226,490 27,674	321,880 221,794 27,718	332,468 209,940 27,874	283,608 275,760 28,706	303,756 255,080	308,346 248,734	28,152 314,072 244,094	28,294 324,684 232,944
5800	TC SHC W	308,130 294,908 28,042	329,032 268,314 28,306	333,708 260,294 28,414	339,018 252,964 28,556	350,358 239,638 28,650	316,096 316,096 29,646	28,868 320,506 296,266 29,642	28,978 325,740 289,348	29,026 330,974 282,440	29,186 340,728 267,844
7000	TC SHC W	360,364 360,364 30,110	361,266 361,266 30,240	359,030 348,704 30,052	362,328 337,130 30,284	378,506 272,428 30,300	367,208 367,208 31,956	368,054 368,054 31,944	29,726 368,278 368,278 31,940	29,818 368,508 368,508 31,938	30,032 368,984 364,742 31,930

					Te	emp (F) Air	Entering (Ed	db)			
Enterir	ng Air Quantity (Cfm)			75					85		
	(CIIII)					Entering Ai	r — Ewb (F)				
	Tea	57	62	67	72	75	57	62	67	72	75
7,000	TC SHC W	256,800 242,200 26,482	278,600 206,900 26,796	301,800 165,700 27,144	324,900 123,100 27,468	338,600 96,300 27,698	285,700 285,700 26,950	281,600 277,900 26,884	303,700 244,400 27,158	328,500 202,700	343,300 176,600
8,400	TC SHC W	271,200 271,200 27,270	286,300 221,400 27,456	309,700 177,000 27,824	333,000 127,000 28,138	246,300 95,300 28,368	301,900 301,900 27,736	302,400 302,400 27,744	311,700 263,200	27,556 336,600 221,700	27,812 351,600 191,400
9,600	TC SHC W	280,500 280,500 27,866	290,800 235,100 27,990	314,800 188,000 28,326	337,400 129,200 28,720	350,700 92,800 28,986	312,800 312,800 28,364	313,300 313,300 28,372	27,864 316,800 282,600 28,404	28,236 341,300 238,100	28,492 356,400 203,700
11,000	TC SHC W	289,100 289,100 28,532	295,200 251,600 28,564	318,200 197,800 28,962	341,200 132,700 29,320	354,100 90,600 29,596	322,900 322,900 29,070	323,400 323,400 29,076	322,200 305,200 28,996	28,766 345,100 247,100 29,388	29,038 360,000 217,300 29,650

#### LEGEND

ECW — Energy Conservation Wheel
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W — Compressor Motor Power Input (W)



### **COOLING CAPACITIES (cont)**

ZDA,DL	3 AND 62DC,DD3				Te	mp (F) Air E	ntering (Ed	b)			
	100			80					90		
Enterin	g Air Quantity					Entering Air	— Ewb (F)				
	(Cfm)		74	75	76	78	70	74	75	76	78
4000	TC SHC	70 344,470 178,354	74 369,854 158,574	376,454 153,592	383,028 147,488	393,538 136,736 29,600	333,168 216,298 31,032	358,390 197,752 31,350	364,832 192,838 31,458	371,376 187,868 31,570	383,96 177,44 31,94
	TC	28,242 382,924	28,632 406,546	28,710 413,360 164,156	28,942 420,218 157,276	433,974 143.048	369,166 250,590	395,036 224,976	401,844 218,414	408,634 211,752	422,50 198,45
5300	SHC W	197,684 29,704	170,946 30,382	30,524	30,668	30,970	32,100 393,320	32,710 420,660	32,840 427,984	32,974 434,972	33,27 445,66
6700	TC SHC	406,926 215,394	434,102 182,294 31,538	440,974 173,868 31,692	447,976 165,318 31,854	147,138 32,208	283,036 33,292	251,016 33,852	243,748 33,960	235,384 34,118	217,50 34,50
8000	TC SHC W	30,980 423,776 229,924 31,888	451,114 190,402 32,514	457,988 180,232 32,680	464,968 170,052 32,852	478,968 150,010 33,164	409,304 312,640 34,122	436,664 274,118 34,742	442,082 261,240 35,430	448,350 256,108 35,026	461,23 234,23 35,87

ZUA,UL	3 AND 62DC,DD3				Te	mp (F) Air E	ntering (Ed	b)			
				100					105		
Enterin	ng Air Quantity					Entering Air	Ewb (F)				
	(Cfm)	70 1	74	75	76	78	70	74	75	76	78
4000	TC SHC	70 320,896 254,322	345,218 235,756	351,360 230,574	357,768 225,826 34,810	369,806 215,668 35,252	313,896 272,032 35,986	337,698 253,600 36,418	343,962 248,972 36,532	350,428 244,750 36,614	361,91 234,51 37,14
5300	W TC SHC	34,162 353,516 301,190	34,574 377,990 275,794	34,700 385,062 270,340	391,616 263,746	404,718 250,086 36,564	345,916 326,120 37,234	369,362 301,960 37,846	375,126 294,716 38,024	381,624 288,388 38,168	395,16 276,31 38,43
6700	TC SHC	35,324 376,804 349,972	36,016 401,302 317,424	36,102 407,752 309,222	36,248 415,210 302,246	428,288 284,916 37,724	382,518 382,518 39,020	391,332 349,804 39,170	398,442 342,548 39,170	405,670 335,612 39,286	417,64 319,10 39,5
8000	TC SHC	36,562 401,102 396,964	37,096 417,422 355,896 37,992	37,248 423,200 346,162 38,108	37,360 430,406 336,334 38,424	442,536 316,574 36,606	410,450 410,450 40,216	406,318 389,974 39,940	413,066 385,910 40,080	418,852 376,224 40,226	430,99 356,2 40,7

200,00	34 WITH ECW		32. 37.		Te	mp (F) Air E	ntering (Ed	b)			
				75					85		
Entering	g Air Quantity (Cfm)					Entering Air	— Ewb (F)				75
	(Cilli)	F.7	62	67	72	75	57	62	67	72	75
8,000	TC SHC	57 311,100 285,700	337,800 244,800	366,500 197,700	395,400 149,500 35,612	412,900 118,900 36,022	343,600 343,600 34,648	340,900 325,700 34,612	368,900 283,000 35,076	399,700 239,500 35,866	418,700 211,200 36,176
9,400	W TC SHC	33,956 321,100 309,500	34,552 347,100 259,100	35,126 376,100 209,200	405,100 153,200	422,500 117,818	361,900 361,900	362,500 362,500 35,578	379,200 307,600 35,812	409,800 259,400 36,552	429,000 226,100 36,97
	TC SHC	34,646 333,400 333,400	35,280 351,600 269,300	35,888 381,000 216,700	36,388 409,900 155,500	36,810 427,000 117,100	35,564 371,700 371,700	372,300 372,300 36,138	384,400 322,000 36,278	415,200 272,900 36,984	433,90 235,50 37,46
12,000	TC SHC	35,228 346,400 346,400	35,722 357,800 287,900	36,344 387,500 230,500	36,862 416,600 159,600	37,282 433,500 155,500	36,124 387,000 387,000	387,500 387,500 37,142	390,500 345,100 37,428	421,700 284,200 37,842	439,80 250,70 38,46

#### LEGEND

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### **COOLING CAPACITIES (cont)**

					Te	emp (F) Air	Entering (Ed	db)			
Enteri	ng Air Quantity (Cfm)			80					90		
	(Cilli)					<b>Entering Ai</b>	r — Ewb (F	)			
	1	70	74	75	76	78	70	74	75	76	
4800	TC SHC W	368,166 190,186 30,154	391,784 166,594 30,582	398,130 159,084 31,142	404,726 151,634 31,358	418,482 140,088 31,418	355,204 237,128 32,964	380,434 213,868	387,074 207,946	393,778 201,946	78 407,372 189,708
6200	TC SHC W	396,396 208,090 31,686	423,290 177,452 32,056	430,088 169,226 32,160	436,972 161,328 32,260	450,808 145,040 32,460	383,208 270,500 34,122	33,476 410,282 241,130	33,570 417,196 233,752	33,666 424,058 226,136	33,862 437,890 210,378
7600	TC SHC W	417,110 225,458 32,522	443,990 186,900 32,958	450,840 177,206 33,056	458,008 168,580 33,102	471,714 148,364 33,310	402,150 302,314 34,960	34,486 429,294 265,890 35,368	34,586 436,232 276,604	34,686 442,762 246,156	34,886 453,166 227,072
9000	TC SHC W	430,838 239,662 33,328	458,128 195,446 33,722	464,968 184,164 33,818	472,116 173,742 33,872	485,826 150,906 34,060	416,014 334,658 35,688	440,160 292,024 36.076	35,464 447,016 281,288 36,170	35,666 452,304 267,468 36,802	36,268 465,776 244,922

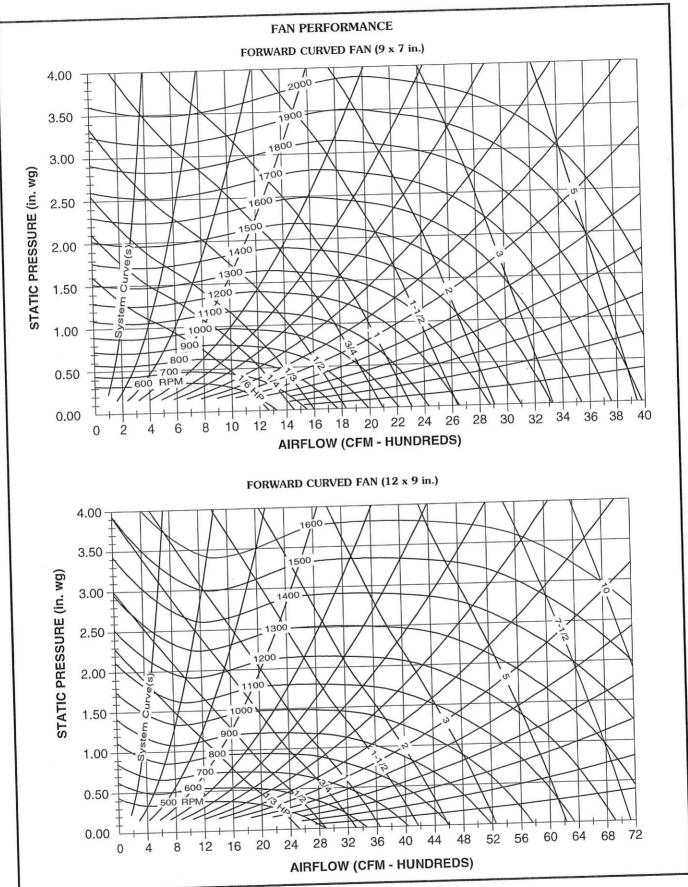
					Те	emp (F) Air	Entering (Ed	db)			
Enteri	ng Air Quantity (Cfm)			100					105		
	(OIIII)					<b>Entering Ai</b>	r Ewb (F	)			
	Tea	70	74	75	76	78	70	74	75	76	70
4800	TC SHC W	340,208 282,066 36,236	364,578 259,862 36,794	371,028 254,200 36,898	377,116 247,546 37,030	390,390 235,972 37,226	333,808 305,710 38,018	355,594 282,066 38,670	361,688 276,078	367,910 270,166	78 380,760 258,748
6200	TC SHC W	366,972 331,890 37,440	391,410 302,274 37,806	397,914 294,850 37,916	403,944 286,420 38,056	417,646 271,758 38,252	367,720 366,062 39,316	382,334 332,780	38,810 388,634 325,466	38,926 393,332 316,664	39,138 405,832 301,458
7600	TC SHC W	384,776 378,480 38,390	409,714 343,112 38,708	414,818 332,942 38,802	420,524 322,708 39,030	433,608 304,178 39,238	399,194 399,194 40,840	39,720 398,862 380,428 40,640	39,828 404,314 370,900	39,932 411,168 362,932	40,172 422,316 342,734
9000	TC SHC W	415,364 415,364 39,520	420,640 381,356 39,596	426,688 370,486 39,692	433,270 359,786 39,796	447,612 340,280 39,842	423,956 423,956 41,888	425,076 425,076 41,858	40,732 425,368 420,390 41,850	40,800 421,648 405,804	41,226 432,908 383,594

					Te	emp (F) Air	Entering (Ed	db)			
Enterir	ng Air Quantity (Cfm)			75					85		
	(OIIII)					<b>Entering Ai</b>	r — Ewb (F	)			
	TO	57	62	67	72	75	57	62	67	72	75
9,000	TC SHC W	328,500 312,100 36,024	357,200 266,400 36,492	387,000 211,800 37,160	417,300 157,500 37,570	434,800 123,100 37,866	366,900 366,900 36,796	367,700 369,300 36,696	389,200 312,500	421,500 258,900	75 441,500 227,200
10,000	TC SHC W	335,900 331,500 36,512	363,300 279,600 37,058	393,600 220,300 37,666	423,800 160,000 38,074	441,000 122,300 38,362	379,800 379,800	380,600 380,600	37,202 396,100 332,200	37,768 428,600 273,800	37,976 447,700 236,100
11,000	TC SHC W	350,900 350,900 37,276	368,400 293,900 37,536	399,400 230,300 38,022	429,100 163,000 38,542	445,800 120,300 38,868	37,410 391,000 391,000 37,996	37,424 391,700 391,700 38,010	37,708 401,900 352,400	38,140 434,100 288,100	38,604 453,400 247,600
12,000	TC SHC W	358,900 358,900 37,814	372,800 308,000 38,058	403,100 23,700 38,606	433,200 165,700 38,996	449,900 120,800 39,282	400,800 400,800 38,556	401,400 401,400 38,600	38,068 406,100 362,300 38,570	38,618 437,600 300,000 39,112	38,952 457,200 256,900 39,440

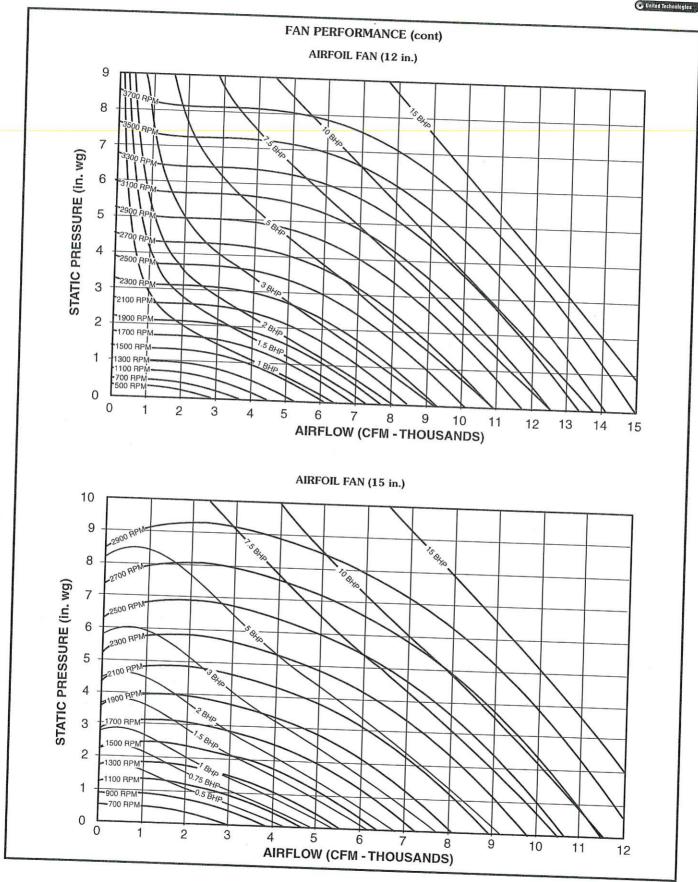
#### LEGEND

ECW — Energy Conservation Wheel
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
SHC — Sensible Heat Capacity (Btuh)
TC — Total Capacity (Btuh) Gross
W — Compressor Motor Power Input (W)

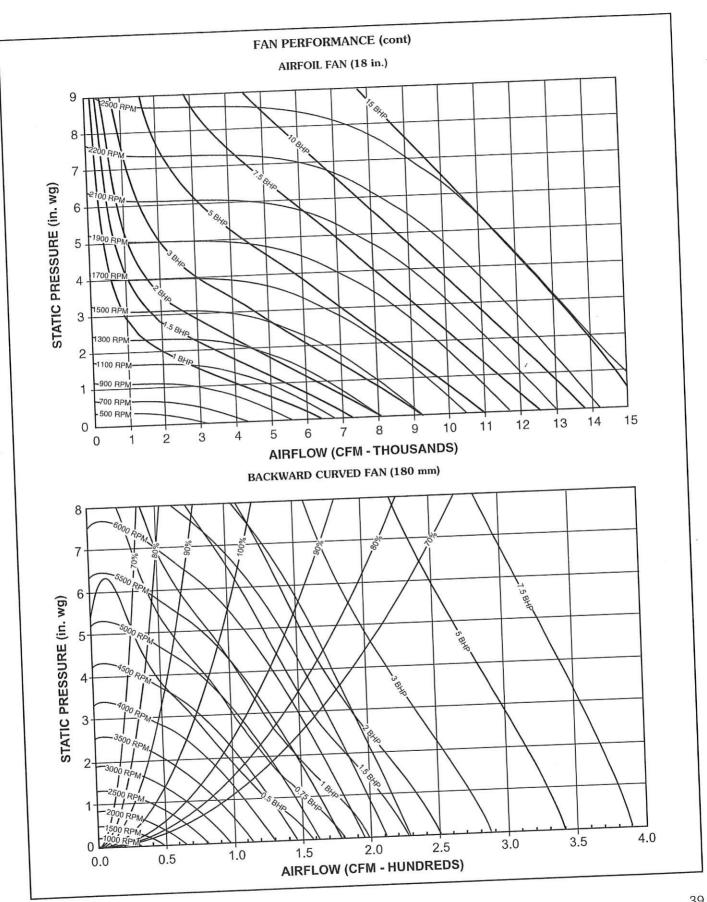




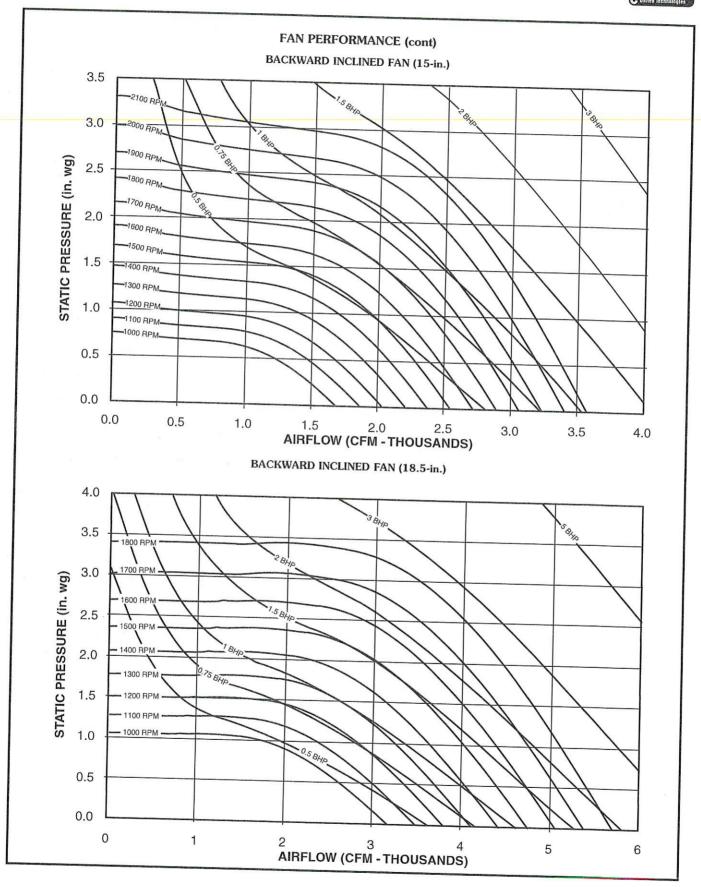




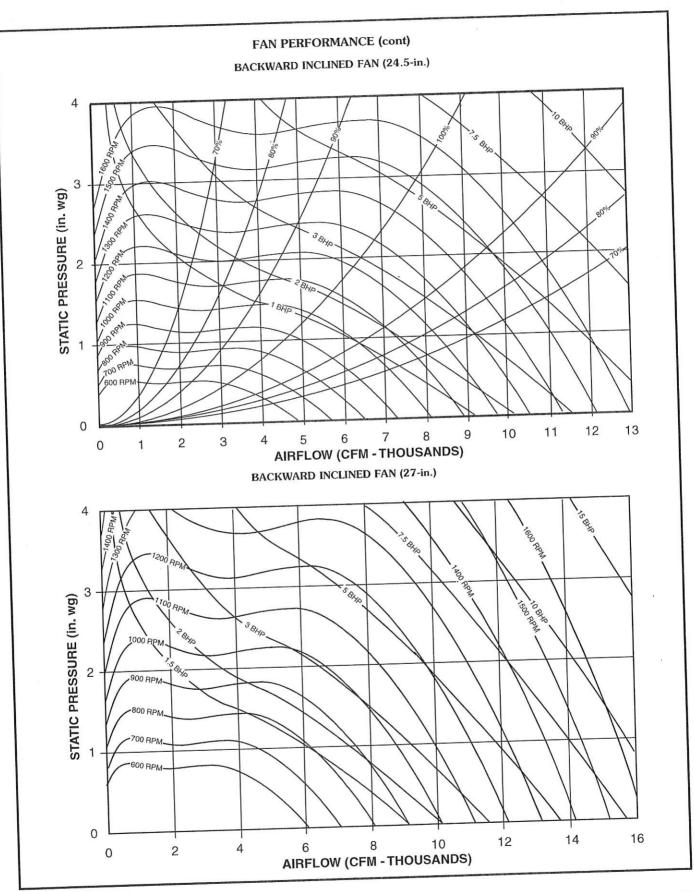














### COMPONENT PRESSURE DROPS (in. wg) UNITS 62DA,DB,DC,DD07-09

COMPONENT				S	SUPPLY AI	R CFM			
Cabinet Loss	500	900	1300	1700	2100	2500	2900	3300	3500
2-in. Cleanable Filters	0.02	0.03	0.05	0.07	0.09	0.12	0.15	0.18	
	0.01	0.01	0.01	0.02	0.03	0.03	0.04		0.20
2-in. Pleated MERV 8 Filters	0.03	0.04	0.05	0.08	0.10	0.11		0.05	0.05
4-in. Pleated MERV 8 Filters	0.03	0.04	0.05	0.06	0.08		0.11	0.12	0.13
4-in. Pleated MERV 11 Filters	0.04	0.06	0.07	0.10		0.08	0.09	0.09	0.10
4-in. Pleated MERV 14 Filters	0.07	0.10	0.15		0.12	0.11	0.14	0.15	0.16
Evaporator Coil (with ECW)		0.18		0.18	0.22	0.23	0.24	0.26	0.27
Evaporator Coil (without ECW)	0.16		0.22	0.25	0.30	0.32	0.36	0.40	0.42
Hot Gas Reheat Coil	0.10	0.20	0.24	0.28	0.32	0.36	0.40	045	_
Liquid Subcooling Coil		0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.07
Electric Heat 10-27 kW	0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.07
Electric Heat 30-60 kW	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.07
100% Outdoor Air Damper	0.31	0.31	0.31	0.31	0.32	0.33	0.34	0.35	
	0.01	0.01	0.01	0.02	0.03	0.04	0.05		0.37
Gas Heat 75,000 Btuh Input	0.01	0.02	0.03	0.05	0.06	0.07		0.07	0.07
Gas Heat 100,000 Btuh Input	0.01	0.02	0.04	0.05	0.07		0.09	0.10	0.12
Gas Heat 150,000 Btuh Input	0.01	0.03	0.05	0.06		0.08	0.10	0.12	0.13
Gas Heat 200,000 Btuh Input	0.01	0.03	0.06		0.08	0.09	0.11	0.13	0.15
Hot Water Coil	0.01	0.03		0.07	0.09	0.10	0.12	0.14	0.16
Steam Coil	0.01		0.01	0.02	0.02	0.03	0.05	0.06	0.06
Optional Energy Wheel		0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03
	0.26	0.47	0.66	0.88	1.09	1.29	1.50	1.70	0.00

### COMPONENT PRESSURE DROPS (in. wg) UNITS 62DA,DB,DC,DD12-20

COMPONENT				S	UPPLY All	RCFM			
Cabinet Loss	1300	1950	2600	3250	3900	4550	5200	5850	6500
2-in. Cleanable Filters	0.05	0.09	0.12	0.19	0.24	0.37	0.50	0.63	0.77
2-in. Pleated MERV 8 Filters	0.01	0.02	0.03	0.05	0.06	0.07	0.08	0.09	0.10
4-in. Pleated MERV 8 Filters	0.05	0.07	0.10	0.12	0.15	0.18	0.22	0.26	0.30
4-in. Pleated MERV 11 Filters	0.05	0.06	0.08	0.09	0.11	0.14	0.17	0.20	0.24
4-in. Pleated MERV 14 Filters	0.07	0.10	0.12	0.15	0.17	0.21	0.26	0.30	0.35
Evaporator Coil (with ECW)	0.15	0.18	0.22	0.26	0.30	0.37	0.45	0.53	0.60
Evaporator Coil (without ECW)		0.20	0.23	0.25	0.35	0.39	0.40	0.44	0.55
Hot Gas Reheat Coil	0.20	0.26	0.28	0.37	0.42	0.46	_		
Liquid Subcooling Coil	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.15
Electric Heat 10-27 kW	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.15
Electric Heat 30-60 kW	0.01	0.02	0.04	0.06	0.08	0.12	0.15	0.19	0.24
100% Outdoor Air Damper	0.31	0.32	0.34	0.36	0.38	0.42	0.45	0.49	0.54
Gas Heat 150,000 Btuh Input	0.01	0.02	0.04	0.07	0.10	0.13	0.17	0.22	0.27
Gas Heat 200,000 Btuh Input	0.01	0.03	0.04	0.07	0.11	0.15	0.20	0.25	0.31
Gas Heat 250,000 Btuh Input	0.01	0.03	0.05	0.08	0.12	0.17	0.22	0.27	0.34
Gas Heat 300,000 Btuh Input	0.01	0.03	0.06	0.09	0.13	0.18	0.24	0.30	0.37
lot Water Coil	0.02	0.04	0.07	0.10	0.15	0.20	0.26	0.33	0.40
Steam Coil	0.01	0.02	0.03	0.05	0.07	0.10	0.13	0.16	0.20
Standard Energy Wheel	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.10
Optional Energy Wheel	0.66	0.99	1.33	1.61	_	_		- 0.00	0.10
Sphonial Ellergy Wheel	0.37	0.56	0.74	0.93	1,11	1.30	1.48		



### COMPONENT PRESSURE DROPS (in. wg) UNITS 62DA,DB,DC,DD22-38

				SL	JPPLY AIR	CFM			
COMPONENT	2000	3400	4000	4400	5000	7000	8500	10000	12000
COMP CIVEIV	2800		0.22	0.30	0.38	0.42	0.50	0.61	0.72
Cabinet Loss	0.06	0.14	0.02	0.02	0.04	0.06	0.08	0.10	0.12
2-in. Cleanable Filters	0.01	0.01		0.02	0.10	0.17	0.25	0.32	0.38
2-in. Pleated MERV 8 Filters	0.04	0.05	0.07	0.09	0.08	0.15	0.21	0.27	0.32
I-in. Pleated MERV 8 Filters	0.02	0.03	0.05		0.12	0,20	0.29	0.36	0.44
4-in. Pleated MERV 11 Filters	0.05	0.06	0.08	0.10	0.12	0.30	0.40	0.50	0.60
4-in. Pleated MERV 14 Filters	0.08	0.10	0.12	0.14	0.18	0.33	0.39	0.45	0.98
Evaporator Coil (with ECW)				0.30	0.32	0.44	0.50	0.65	_
Evaporator Coil (without ECW)	0.28	0.30	0.32	0.34	0.07	0.08	0.10	0.13	0.25
Hot Gas Reheat Coil	0.04	0.04	0.05	0.06	0.07	0.08	0.10	0.13	0.25
Liquid Subcooling Coil	0.04	0.04	0.05	0.06		0.16	0.18	0.20	0.22
Electric Heat 10-27 kW	0.10	0.11	0.12	0.13	0.14	0.46	0.48	0,50	0.52
Electric Heat 30-60 kW	0.40	0.41	0.42	0.43	0.44	0.06	0.08	0.10	0.13
100% Outdoor Air Damper	0.01	0.02	0.03	0.04	0.05	0.40	0.52	<del>-</del>	_
Gas Heat 300,000 Btuh input	0.07	0.10	0.13	0.17	0.23	0.48	0.57	0.68	T -
Gas Heat 400,000 Btuh input	_	0.15	0.21	0.28	0.36	0.40	0.48	0.54	0.7
Gas Heat 500,000 Btuh input	-	_	0.19	0.25	0.32	0.40	0.45	0.52	0.6
Gas Heat 600,000 Btuh input	_	_			0.30		0.20	0.26	0.5
	0.06	0.08	0.10	0.12	0.14	0.16		0.13	0.2
Hot Water Coil	0.04	0.04	0.05	0.06	0.07	0.08	0.10	0.13	- 0.2
Steam Coil	1.04	1.27	1.49	1.64					
Standard Energy Wheel	0.80	0.97	1.14	1.25	1.42	1.99			
Optional Energy Wheel	0.00								



## ENERGY CONSERVATION WHEEL PERFORMANCE

36-in. WHEEL

				R	eturn Ai	LING Mo r = 75 dl	DDF	vh.							EATING		
db				95	- Taili 74	1 - 75 ui	0 / 03 V	VD						Return	Air = 70	db / 58	wb
wb	63	67	71	75	78	80	63	67	71	90	T ==		-10	0	10	20	30
							00		O CFM	75	78	80	-11	-1	9	19	29
Total MBH	-0.1	10.3	21.9	34.5	44.9	52.2	-0.1			34.6	1 45.6	T 50.6					
Sens. MBH		-	16.9	16.9	16.9						10.0					_	50.8
Lvg. DB	77.6		77.6	77.6	77.6	77.6						,				12.	
Lvg. WB	63.0	63.6	64.2	64.9	65.5	65.9	_		. 010								64.9
									0 CFM	1 00.0	05.5	65.9	52.1	52.7	53.4	54.1	55.0
Total MBH	0.0	1011	-		57.0	66.2	0.0			43.9	57.0	66.3	121.1	1400.6			
Sens. MBH	21.6					21.6	16.2	16.2		16.2			86.4	108.9	-		
Lvg. DB	78.3		78.3		78.3	78.3	77.5	77.5	77.5	77.5			56.7	1010	-		
Lvg. WB	63.0	63.7	64.6	65.6	66.2	66.7	63.0	63.8	64.6	65.5	-	66.8	50.7	58.4		0.117	
Total MDII	T	T						150	CFM	1	00.2	00.0	30.1	51.0	51.9	52.9	54.0
Total MBH Sens. MBH	0.2	16.9	35.2	55.3	67.8	83.4	0.1	16.9	35.2	55.3	67.8	83.5	144.4	129.8	1140	T 00 0	T ==
Lvg. DB	27.3	27.3	27.3	27.3	27.3	27.3	20.5	20.5	20.5	20.5	20.5	20.5	103.3	90.3	77.4		77.1
Lvg. WB	78.1	78.1	78.1	78.1	78.1	78.1	77.3	77.3	77.3	77.3	77.3	77.3	53.8	55.8	57.8		51.6
LVg. WD	62.9	63.7	64.5	65.4	66.0	66.6	63.0	63.7	64.5	65.4	66.0	66.6	48.2	49.3	50.4	1 00.0	61.9
Total MBH	0.4	100	T 00 4	T 50.0				1800	CFM				1 .0.2	1 40.0		51.6	53.0
Sens. MBH	29.6	18.3	38.1	59.8	77.5	89.9	0.3	18.3	38.0	59.7	77.4	89.9	165.3	148.6	130.7	110.9	T 00.0
Lvg. DB	79.8	79.8	29.6 79.8	29.6	29.6	29.6	22.2	22.2	22.2	22.2	22.2	22.2	118.5	103.7	88.9	74.0	88.2 59.2
Lvg. WB	62.9	64.0	65.2	79.8	79.8	79.8	78.6	78.6	78.6	78.6	78.6	78.6	51.0	53.3	55.7	58.1	60.5
	OL.O	04.0	03.2	66.5	67.5	68.2	63.0	64.1	65.3	66.5	67.5	68.2	46.3	47.6	49.0	50.4	52.1
Total MBH	0.6	20.6	42.4	66.5	00.0	00.0			CFM						.010	30.4	52.1
Sens. MBH	33.0	33.0	33.0	33.0	86.0 33.0	99.9	0.5	20.4	42.3	66.3	85.9	99.8	184.0	165.4	145.4	124.4	98.2
Lvg. DB	80.4	80.4	80.4	80.4	80.4	33.0	24.5	24.5	24.5	24.5	24.5	24.5	132.2	115.7	99.2	82.6	66.1
Lvg. WB	62.9	64.2	65.5	66.9	68.0	80.4 68.8	79.1	79.1	79.1	79.1	79.1	79.1	48.3	51.0	53.7	56.4	59.2
			00.0	00.0	00.0	00.0	63.0	64.2	65.5	67.0	68.1	68.9	44.5	46.0	47.6	49.3	51.2
Total MBH	0.9	22.6	46.3	72.4	93.7	108.7	0.7	<b>2400</b> 22.4		70.0							
Sens. MBH	36.1	36.1	36.1	36.1	36.1	36.1	27.1	27.1	46.1	72.2	93.5	108.6	200.7	180.4	158.6	134.6	107.1
Lvg. DB	81.1	81.1	81.1	81.1	81.1	81.1	79.5	79.5	27.1 79.5	27.1	27.1	27.1	144.6	126.5	108.5	90.3	72.3
Lvg. DB	62.8	64.3	65.8	67.3	68.6	69.4	62.9	64.3	65.8	79.5	79.5	79.5	45.8	48.8	51.8	54.9	57.9
						00.1	02.0	2700		67.4	68.6	69.5	42.6	44.4	46.2	48.2	50.4
Total MBH	1.3	24.4	49.8	77.7	100.4	117	1.0	24.1	49.5	77.4	100.0	1100	015				
Sens. MBH	38.9	38.9	38.9	38.9	38.9	38.9	29.2	29.2	29.2	29.2	100.2	116.3	215.6	193.7	170.3	144.5	115.0
Lvg. DB	81.7	81.7	81.7	81.7	81.7	81.7	80.0	80.0	80.0	80.0	29.2	29.2	155.6	136.2	116.7	97.3	77.8
Lvg. WB	62.8	64.4	66.0	67.7	69.1	70.0	62.9	64.5	66.1	67.8	80.0 69.1	80.0	43.4	46.7	50.0	53.4	56.7
								3000		07.0	09.1	70.1	40.9	42.8	44.9	47.1	49.6
Total MBH	1.6	26.1	52.9	82.4	106.4	123.4	1.2	25.7	52.6	82.0	106.0	123.1	000 0 1	005 - 1			
Sens. MBH	41.4	41.4	41.4	41.4	41.4	41.4	31.0	31.0	31.0	31.0	31.0	31.0	228.8	205.6	180.7	153.4	122.0
Lvg. DB	82.2	82.2		82.2	82.2		80.4	80.4	80.4	80.4	80.4	80.4	165.6	144.9	124.2	103.5	82.8
Lvg. WB	62.8	64.5	66.3	68.1	69.5	70.5	62.9	64.6	66.3	68.2	69.6	70.6	41.1	44.7	48.3	51.9	55.6
LEGE	ND										30.0	70.0	39.1	41.3	43.6	46.1	48.8



## ENERGY CONSERVATION WHEEL PERFORMANCE (cont)

#### 42-in. WHEEL

												$\overline{}$		HEAT	ING MO	DE	
	No. of Concessions				COOLING					-			Re	turn Air	= 70 db	/ 58 wb	
					n Air = 7	75 db / 6	dw E		9	0			-10	0	10	20	30
db				95			63	67	71	75	78	80	-11	-1	9	19	29
wb	63	67	71	75	78	80		1200 0		10							
V (100 mm m m m m m m m m m m m m m m m m m						00.0			29.4	46.3	60.2	70.0	127.5	114.7	100.9	85.6	52.8
Total MBH	-0.2	13.9	29.3	46.2	60.1	69.9			17.0	17.0	17.0	17.0	90.7	79.4	68.0	56.7	35.1
Sens. MBH	22.7	22.7	22.7	22.7	22.7	77.5			76.9	76.9	76.9	76.9	60.0	61.3	62.5	63.8	66.2
Lvg. DB	77.5	77.5	77.5	77.5	77.5 65.5	65.8	-		64.2	64.9	65.5	65.9	52.2	52.8	53.5	54.2	55.8
Lvg. WB	63.0	63.6	64.2	64.9	65.5	03.0	00.0	1600 (								100.0	86.6
			07.0		76.4	88.8	0.0	17.8	37.4	58.9	76.5	88.9	162.3	145.9	128.4	108.9	57.9
Total MBH	-0.1	17.7	37.3	58.8 28.9	28.9	28.9		21.7	21.7	21.7	21.7	21.7		101.3	86.8	72.3 61.9	63.5
Sens. MBH	28.9	28.9	28.9	78.2	78.2	78.2		77.4	77.4	77.4	77.4	77.4	57.0	58.6	60.3	53.0	54.1
Lvg. DB	78.2	78.2	78.2 64.5	65.4	66.1	66.6	63.0	63.8	64.6	65.6	66.2	66.7	50.3	51.1	52.0	55.0	34.1
Lvg. WB	63.0	63.7	04.5	05.4	00.1		-	2000	CFM			-		474.0	153.2	130.0	103.4
	0.1	21.3	44.6	70.1	91.0	105.7	0.1	21.3	44.6	70.1	91.0	105.8	193.7	174.2 121.2	103.9	86.5	69.3
Total MBH	0.1 34.6	34.6	34.6	34.6	34.6	34.6	25.9	25.9	25.9	25.9	25.9	25.9	138.5 54.1	56.1	58.1	60.1	62.1
Sens. MBH	79.0	79.0	79.0	79.0	79.0	79.0	78.0	78.0	78.0	78.0	78.0	78.0	48.4	49.5	50.6	51.8	53.2
Lvg. DB	62.9	63.9	64.9	65.9	66.8	67.4	63.0	63.9	64.9	66.0	66.8	67.4	40.4	43.5	00.0		
Lvg. WB	02.0	00.0	1 - 11-					2400			4040	120.9	222.0	199.6	175.5	148.9	118.5
Total MBH	0.5	24.6	51.1	80.3	104.0	120.9	0.3	24.5	51.1	80.2	104.0 29.8	29.8	159.1	139.2	119.4	66.4	79.5
Sens. MBH	39.8	39.8	39.8	39.8	39.8	39.8	29.8	29.8	29.8	29.8	78.5	78.5	51.4	53.7	56.0	58.4	60.7
Lvg. DB	79.7	79.7	79.7	79.7	79.7	79.7	78.5	78.5	78.5	78.5 66.4	67.4	68.1	46.6	47.8	49.2	50.6	52.3
Lvg. WB	62.9	64.0	65.2	66.4	67.4	68.1	63.0	64.0	65.2	00.4	07.4	0011					
9-							1 00	27.5	<b>CFM</b> 56.9	89.2	115.6	134.3	274.4	222.4	195.5	165.9	132.0
Total MBH	0.8	27.6	57.0		115.7	134.4	0.6	33.3	33.3	33,3	33.3	33.3	177.7	155.5	133.3	111.1	88.9
Sens. MBH	44.4	44.4	_		44.4	44.4	33.3 79.0	79.0	79.0	79.0	79.0	79.0	48.8	51.4	54.1	56.7	59.4
Lvg. DB	80.3	80.3			80.3	80.3 68.7	63.0	64.2	65.5	66.9	68.0	68.8	44.8	46.3	47.8	49.5	51.4
Lvg. WB	62.9	64.1	65.4	66.8	67.9	00.7	05.0		CFM							1	1111
				1 05 0	126.1	142.5	1.2	32.5	66.7	104.4	125.6	156.8	270.1	242.8	213.5	181.1	97.2
Total MBH	2.2				47.9	47.9		39.3	39.3	39.3	39.3	39.3	194.5	170.2		121.6 55.2	58.1
Sens. MBH			_			81.1		79.9	79.9	79.9	79.9	79.9	46.3	49.3		48.4	50.6
Lvg. DB	81.1					69.6		64.4	66.0	67.7	68.5	69.7	43.0	44.7	45.2	40.4	30.0
Lvg. WB	62.8	64.3	3   65.6	07.0	00.0			360	0 CFM				1 000 5	001.0	229.5	194.7	154.9
	2.8	3 32.	8 65.	8 101.9	135.4	152.3	2.1	32.2	65.1	101.3	135.1	156.8		261.0 183.4			104.8
Total MBH			_			-	38.7	38.7	38.7	38.7	38.7	38.7			_		57.0
Sens. MBI	81.						80.0	80.0	80.0	80.0	80.0			_			49.7
Lvg. DB	62.		_				62.8			67.9	69.0	69.9	43.0	43.2	- 1 -5.2	1	
Lvg. WB	02.	7 04.	0 00.						0 CFM		T 440.0	166.1	308.6	277.3	3 243.8	206.8	164.6
Total MBI	1 2.	1 35.	1 71.	3 111.	1 143.6	166.	_	_		110.7							111.6
Sens. MB			_	_	_	55.8	_	_									
Lvg. DB	82.	_	_	.1 82.	1 82.		_	_	_	_	_			_	_	9 46.3	49.0
Lvg. WB	62	_		.2 68.	0 69.4	4 70.	4 62.9	64.5	66.3	68.1	69.5	, 70.	00.0				
LVg. WD	LUL	-															

#### LEGEND



### ENERGY CONSERVATION WHEEL PERFORMANCE (cont)

48-in. WHEEL

				Pr	turn Air	ING MC		h							ATING I		
db	1			95	turn Air	= 75 ap	7 63 W	b						Return	Air = 70	db / 58	wb
wb	63	67	71	75	78	80	63	1 67	T = 4	90			-10	0	10	20	30
		1		1 /3	1 70	80	03	67	71	75	78	80	-11	-1	9	19	29
Total MBH	0.1	17.4	36.8	58.2	75.6	87.9	0.2		0 CFM	T 50.0	T	т					
Sens. MBH	28.5	28.5	28.5		28.5	28.5				58.3			159.1	144.3	126.9	107.7	85.6
Lvg. DB	77.4	77.4								21.4			114.1	99.8	85.6	71.3	57.0
Lvg. WB	63.0	63.6	64.2		65.4	65.7				76.8	76.8		60.5	61.6	62.8	64.0	65.2
	-				1 551.	00.7	1 00.0		0 CFM	64.9	65.4	65.8	52.6	53.1	53.7	54.4	55.2
Total MBH	0.1	22.3	47.0	74.2	96.3	112.0	0.1	22.4	47.1	74.3	06.4	1101	0040	T 1010	Т.		
Sens. MBH	36.5	36.5	36.5	36.5	36.5	36.5	27.4	27.4	27.4	27.4	96.4	112.1	204.6	184.0	161.9	137.4	109.2
Lvg. DB	78.1	78.1	78.1	78.1	78.1	78.1	77.3	77.3	77.3	77.3	77.3		145.9	127.6	109.4	91.2	72.9
Lvg. WB	63.0	63.7	64.5	65.3	66.0	66.5	63.0	63.7	64.5	65.4	66.1	77.3	57.6	59.1	60.7	62.2	63.8
				-			1 00.0		CFM	05.4	00.1	66.5	50.7	51.5	52.3	53.2	54.3
Total MBH	0.1	26.9	56.3	88.6	115.0	133.6	0.1	26.9	56.3	88.7	115.0	133.7	244.8	000 4	100.5	1	Τ.
Sens. MBH	43.7	43.7	43.7	43.7	43.7	43.7	31.8	32.8	32.8	32.8	32.8	32.8	174.9	220.1	193.6	164.2	130.6
Lvg. DB	78.8	78.8	78.8	78.7	78.7	78.8	77.9	77.9	77.9	77.9	77.9	77.8	54.8	153.0	131.2	109.3	87.4
Lvg. WB	63.0	63.8	64.8	65.8	66.6	67.2	63.0	63.9	64.8	65.9	66.7	67.3	48.9	56.7 49.9	58.6	60.5	62.4
						-			CFM	00.0		07.0	40.9	49.9	50.9	52.1	53.4
Total MBH	0.5	31.1	64.7	101.7	131.8	153.1	0.4	31.0	64.7	101.7	131.8	153.1	281.1	252,7	222.2	100.0	
Sens. MBH	50.3	50.3	50.3	50.3	50.3	50.3	37.7	37.7	37.7	37,7	37.7	37.7	201.3	176.1	151.0	188.6	150.0
Lvg. DB	79.5	79.5	79.5	79.5	79.5	79.5	78.3	78.3	78.3	78.3	78.3	78.3	52.1	54.4	56.6	125.8	100.6
Lvg. WB	62.9	64.0	65.1	66.3	67.2	67.9	63.0	64.0	65.1	66.3	67.3	67.9	47.1	48.3	49.6	58.8	61.1
<del>-</del>								3500	CFM			07.0	17.1	40.5	49.0	50.9	52.5
Total MBH	0.9	35.0	72.3	113.4	146.9	170.6	0.7	34.8	72.2	113.3	146.8	170.6	313.9	282.1	248.1	210.5	167.5
Sens. MBH	56.3	56.3	56.3	56.3	56.3	56.3	42.2	42.2	42.2	42.2	42.2	42.2	225.3	197.1	168.9	140.8	167.5 112.6
Lvg. DB	80.1	80.1	80.1	80.1	80.1	80.1	78.8	78.8	78.8	78.8	78.8	78.8	49.6	52.2	54.7	57.3	59.8
Lvg. WB	62.9	64.1	65.3	66.7	67.8	68.5	63.0	64.1	65.4	66.7	67.8	68.6	45.4	46.8	48.3	49.9	51.7
Total MBH	14	00.5	70.0					4000	CFM					10.0	10.0	43.3	31.7
Sens. MBH	1.4	38.5	79.2	123.9	160.4	186.3	1.1	38.2	78.9	123.7	160.2	186.1	343.4	308.7	271,4	230.3	183.2
Lvg. DB	61.7	61.7	61.7	61.7	61.7	61.7	46.3	46.3	46.3	46.3	46.3	46.3	247.0	126.1	185.3	154.4	123.5
Lvg. WB	80.7	80.7	80.7	80.7	80.7	80.7	79.3	79.3	79.3	79.3	79.3	79.3	47.2	50.0	52.9	55.7	58.6
Lvg. WD	62.8	64.2	65.6	67.1	68.3	69.1	62.9	64.3	65.7	67.2	68.3	69.2	43.7	45.3	47.0	48.8	50.9
Total MBH	1.9	41.7	05.4	100.4	1000			4500	CFM								
Sens. MBH	66.6	41.7 66.6	85.4 66.6	133.4	166.0	200.3	1.5	41.3	85.0	133.0	165.7	199.9	370.0	332.5	292.3	248.0	197.3
Lvg. DB	81.3	81.3		66.6	66.6	66.6	50.0	50.0	50.0	50.0	50.0	50.0	266.7	233.4	200.0	166.7	133.3
Lvg. WB	62.8	64.3	81.3 65.9	81.3	81.3	81.3	79.7	79.7	79.7	79.7	79.7	79.7	44.9	48.0	51.2	54.3	57.4
	02.0	04.0	05.9	67.5	69.2	69.6	62.9	64.4	65.9	67.5	69.2	69.7	42.0	43.8	45.7	47.8	50.1
Total MBH	2.5	44.7	91.0	144.9	102 0	010 7 1	4.7	5000									
Sens. MBH	71.1	71.1	71.1	71.1	183.3 71.1	212.7	1.9	44.1	90.5	141.4	182.8	212.2	393.8	353.9	311.1	263.9	210.0
Lvg. DB	81.8	81.8	81.8	81.8	81.8	71.1	50.0	50.0	50.0	50.0	50.0	53.3	284.5	248.9	213.4	177.8	142.3
Lvg. WB	62.8	64.4	66.1	67.8	69.2	81.8	79.7	79.7	79.7	79.7	79.7	80.1	42.7	46.1	49.5	52.9	56.3
LEGE		54.4	00.1	07.0	09.2	70.2	62.9	64.5	66.1	67.9	69.3	70.2	40.3	42.4	44.5	46.8	49.3



## ENERGY CONSERVATION WHEEL PERFORMANCE (cont)

### 54-in. WHEEL

					001 101	MODE									TING MO		
						G MODE							Re	eturn Ai	r = 70 db	/ 58 wb	
					n Air =	75 db / 6	3 WD		9	0			-10	0	10	20	30
db				5	70	80	63	67	71	75	78	80	-11	-1	9	19	29
wb	63	67	71	75	78	80		5500 C				-					
					2007	040.4	1.6			178.2	209.5	243.2	582.1	416.5	365.1	308.9	245.1
Total MBH	2.1		103.8	162.2	209.7	243.4 80.8	60.8	60.8	60.7	67.3	60.7	60.6	423.1	292.2	249.7	207.5	165.5
Sens. MBH	81.1	81.1	80.9	80.9	80.8	80.8	79.5	79.5	79.4	80.1	79.4	79.4	36.0	47.3	50.7	54.1	57.4
Lvg. DB	80.9	80.9	80.9	80.9	80.9	69.3	62.9	64.3	65.8	67.9	68.5	69.4	35.1	43.3	45.5	47.6	50.0
Lvg. WB	62.8	64.3	65.7	67.2	68.4	69.5		6000 C		0,10		-					
				.=	000 7	256.1	2.1	53.1	109.1	185.3	220.4	255.8	492.1	440.7	386.1	326.5	258.9
Total MBH	2.6	53.7	109.5	170.8	220.7	85.3	64.3	64.2	64.2	70.2	64.1	64.1	355.3	309.8	264.6	219.8	175.2
Sens. MBH	85.6	85.6	85.5	85.4	85.4	81.3	79.8	79.8	79.8	80.4	79.8	79.8	42.2	45.8	49.4	53.0	56.5
Lvg. DB	81.4	81.4	81.4	81.3	81.3	69.7	62.9	64.4	66.1	68.1	68.9	69.8	40.0	42.2	44.5	46.9	49.4
Lvg. WB	62.8	64.3	65.9	67.5	68.8	69.7	02.3	6500 C									
				1007	000.0	367.6	2.5	55.8	114.2	178.2	230.3	267.2	517.3	463.1	405.6	342.8	271.7
Total MBH	3.2	56.4	114.7	178.7	230.6		67.4	67.4	67.3	67.3	67.2	67.1	374.2	326.2	278.4	231.2	184.2
Sens. MBH	89.8	89.7	89.6	89.6	89.5	89.5	80.1	80.1	80.1	80.1	80.1	80.1	40.5	44.4	48.2	52	55.7
Lvg. DB	81.8	81.8	81.8	81.8	81.8	81.7 70.1	62.9	64.5	66.1	67.9	69.2	70.2	38.7	41.1	43.5	46.1	48.9
Lvg. WB	62.8	64.4	66.1	67.8	69.2	70.1	02.5	7000 (									
					000.0	278.1	2.9	58.3	118.8	185.3	239.4	277.6	540.6	483.7	423.5	357.7	283.5
Total MBH	3.8	59.1	119.5	185.9	239.9	93.3	70.4	70.3	70.2	70.1	70.1	70.1	391.7	341.3	291.3	241.7	192.5
Sens. MBH	93.7	93.6	93.5	93.4	93.3	82.2	80.4	80.4	80.4	80.4	80.4	80.4	39.0	43.0	47.1	51.0	54.9
Lvg. DB	82.2	82.2	_	82.2	82.2	70.5	62.9	64.6	66.3	68.1	69.6	70.6	37.5	40.0	42.6	45.4	48.3
Lvg. WB	62.8	64.5	66.2	68.1	69.5	70.5	02.3	7500 (									
			T	1 100 4	T 040 0	287.6	3.4	60.5	123.2	191.7	247.6	287.1	562.2	502.8	439.9	371.5	294.3
Total MBH	4.4	61.5	_		248.2		73.1	72.9	72.8	72.7	_		407.9	355.3	303.1	251.4	200.2
Sens. MBH	97.3	97.2	-	96.9			80.7	80.7	80.7	80.7		80.7	37.4	41.7	45.9	50.0	54.1
Lvg. DB	82.6	82.6			_		-	0.0000000000000000000000000000000000000	66.5	-		_	36.3	39.2	41.7	44.6	47.8
Lvg. WB	62.8	64.5	66.4	68.3	69.8	70.8	02.9	8000	-	1 00.							
			1	1 400 4	T 055 7	296.3	3.8			197.6	255.	295.6	582.1	520.3	455.1	384.2	304.2
Total MBH	4.9						-			-	_	_	423.1	368.3	314.1	260.4	207.3
Sens. MBH	100.5	100.4				-		-	81.0		_	_	36.0	40.4	44.8	49.1	53.4
Lvg. DB	83.0	83.1		_	-	_	_	-		_		_	35.1	38.0	40.9	43.9	47.2
Lvg. DB	62.8	64.6	66.6	68.6	70.1	/1.2	02.8	04.7	00.0	00.0							

LEGEND

# Electrical dața



### COMPRESSOR ELECTRICAL DATA

Number of Compressors 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Vo	LTAGE						UN	IIT SIZE	62D					
208-230/3/60 RLA (each) 16.0 19.0 23.2 13.7 16.0 22.4 25.0 29.5 29.5 30.1 48.1 55.8 460/3/60 RLA (each) 7.8 9.7 11.2 6.2 7.8 10.6 12.2 14.8 14.8 16.7 18.6 26.9 175/3/60 RLA (each) 5.7 7.4 7.9 4.8 5.7 7.7 90.0 12.2 12.2 12.2 12.2 14.7 23.7 16.0 16.0 17.0 17.0 17.0 17.0 17.0 17.0 17.0 17	Number of O		07	08	09	12	14	T			22	T 04	T		
208-230/3/60 RLA (each) 16.0 19.0 23.2 13.7 16.0 22.4 25.0 29.5 29.5 30.1 48.1 55.8 160/3/60 RLA (each) 7.8 9.7 11.2 6.2 7.8 10.6 12.2 14.8 14.8 16.7 18.6 26.9 17.5/3/60 RLA (each) 5.7 7.4 7.9 4.8 5.7 7.7 90.0 12.2 12.2 12.2 12.2 14.7 23.7 RA 1.6 12.2 14.8 14.8 16.7 18.6 26.9 17.5 18.6 18.6 18.6 18.6 18.6 18.6 18.6 18.6	Number of Com	pressors	1	1	1	2	2	0			- 22	24	30	34	38
LRA 110.0 123.0 164.0 83.1 110.0 149.0 164.0 195.0 195.0 225.0 245.0 340.0 RLA (each) 7.8 9.7 11.2 6.2 7.8 10.6 12.2 14.8 14.8 16.7 18.6 26.9 LRA 52.0 62.0 75.0 41.0 52.0 75.0 100.0 95.0 95.0 114.0 125.0 173.0 RLA (each) 5.7 7.4 7.9 4.8 5.7 7.7 90.0 12.2 12.2 12.2 12.2 14.7 23.7	200 220/0/00	RLA (each)	16.0	10.0	22.0	107		2	2	2	2	2	2	2	4
460/3/60 RLA (each) 7.8 9.7 11.2 6.2 7.8 10.6 12.2 14.8 14.8 16.7 18.6 26.9 LRA (each) 5.7 7.4 7.9 4.8 5.7 7.7 90.0 12.2 12.2 12.2 12.2 14.7 23.7 LRA 38.9 50.0 54.0 33.0 38.9 54.0 75.0 75.0 100.0 95.0 95.0 114.0 125.0 173.0	200-230/3/60					13.7	16.0	22.4	25.0	29.5	29.5	30.1	101	55.0	
460/3/60       RLA (each)       7.8       9.7       11.2       6.2       7.8       10.6       12.2       14.8       14.8       16.7       18.6       26.9         575/3/60       RLA (each)       5.7       7.4       7.9       4.8       5.7       7.7       90.0       12.2       12.2       14.0       125.0       173.0         LRA       38.9       50.0       54.0       33.0       38.9       54.0       78.0       20.0       20.0       20.0       14.7       23.7		LHA	110.0	123.0	164.0	83.1	110.0	1/00	1640		100,100,000			55.8	29.5
LRA         52.0         62.0         75.0         41.0         52.0         75.0         10.6         12.2         14.8         14.8         16.7         18.6         26.9           575/3/60         RLA (each)         5.7         7.4         7.9         4.8         5.7         7.7         90.0         12.2         12.2         14.0         125.0         173.0           LRA         38.9         50.0         54.0         33.0         38.9         54.0         78.0         20.0         2	460/3/60	RLA (each)	7.8	97	11.0					195.0	195.0	225.0	245.0	340.0	195.0
575/3/60 RLA (each) 5.7 7.4 7.9 4.8 5.7 7.7 90.0 12.2 12.2 14.7 23.7 LRA 38.9 50.0 54.0 33.0 38.9 54.0 78.0 78.0 78.0 78.0 78.0 78.0 78.0 78	400/3/00	IRΔ					7.8	10.6	12.2	14.8	14.8	16.7	18.6	26.0	14.8
575/3/60 RLA (each) 5.7 7.4 7.9 4.8 5.7 7.7 90.0 12.2 12.2 12.2 14.7 23.7 LRA 38.9 50.0 54.0 33.0 38.9 54.0 78.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 2			52.0	62.0	75.0	41.0	52.0	75.0	100.0	05.0	OF O	1110			14.0
LRA 38.9 50.0 54.0 33.0 38.9 54.0 78.0 20.0 12.2 12.2 14.7 23.7	575/3/60	RLA (each)	5.7	7.4	7.9	18	E 7					114.0	125.0	173.0	95.0
30.9 30.0 34.0 33.0 38.9 54.0 79.0 99.0 99.0	0.0.00	LRA	38.0						90.0	12.2	12.2	12.2	14.7	23.7	12,2
90.0   34.0   78.0   80.0   80.0   100.0   132.0			30.9	50.0	54.0	33.0	38.9	54.0	78.0	80.0	80.0	80.0	100.0		80.0

### CONDENSER FAN MOTOR ELECTRICAL DATA

VO	LTAGE						UN	IIT SIZE	62D					
Number of Fans		07	08	09	12	14	15	16	20	22	24	30	- 04	
	>	1	1	1	2	2	2	0			24	30	34	38
208/230-3-60	FLA	3.0	4.0	4.0	0.0			2	2	2	2	2	2	2
460-3-60	FLA				2.3	2.3	4.0	4.0	4.0	4.0	4.0	5.6	5.6	5.6
460-3-60 575-3-60		1.5	2.0	2.0	1.2	1.2	2.0	2.0	2.0	2.0	2.0	2.8		
575-3-60	FLA	0.8	1.8	1.8	0.8	0.8	0.8	1.8				2.8	2.8	2.8
					-10	0.0	0.0	1.8	1.8	1.8	1.8	2.3	2.3	2.3

## SUPPLY AND EXHAUST FAN MOTOR ELECTRICAL DATA

VOLTA	<b>IGE</b>					l	MOTOR H	IP				
208/230-3-60		1/2	3/4	1	1 1/2	2	3	5	7 1/2	10		
	FLA	2.8	3.4	3.2	4.8	0.0		-		10	15	20
460-3-60	FLA	1.4	4.7			6.3	9.8	15.7	22.3	29.0	43.4	57.0
575-3-60			1.7	1.5	2.0	2.9	4.1	6.8	10.0	12.9		
373-3-00	FLA	0.8	1.3	1.1	1.6	2.3					18.9	24.5
					1.0	2.0	3.3	5.2	7.6	10.1	15.1	19.6

### ENERGY CONSERVATION WHEEL ELECTRICAL DATA

VOI	WHEEL SIZE (in.)				
208/230-3-60	T=: -	36	42	48	54
460-3-60	FLA	2.5	2.5		
	FLA	1.2		2.5	3.0
575-3-60	FLA	1.3	1.3	1.3	1.5
LEGEND	ILA	1.0	1.3	1.0	1.5

**LEGEND** 

Full Load Amps
 Locked Rotor Amps
 Rated Load Amps

### **Controls**



### Control components

The 62D Series of dedicated outdoor air units use a micro-processor controller that has been specifically designed for Carrier dedicated outdoor air units. The controller monitors the operating conditions in the outdoor air unit and controls the compressors, fans, heating systems, and optional devices. The controller has the capability of communicating with all major building automation protocols including BACnet, Modbus, and LonWorks (option) protocols.

NOTE: The temperatures listed below are default values and may be adjusted to meet the needs of the application.

# Sequence of operation — 100% outdoor air units — 62DA,DB,DC,DD

The ALC controller is turned on by a switch located on its front upper left corner. Several options exist for starting the unit, such as the Resident Program Scheduler or the Building Automation System (BAS). These control source options can be selected from the BACview display pad on the Configuration Set-Up screen (requires Admin password). The Resident Program has an adjustable scheduler that uses the internal timeclock to allow for separate Sequences for Occupied and Unoccupied periods. This can be accessed from the BACview display pad on the Schedules screen (requires user password).

NOTE: All temperature-related events have an additional "delay on make" to allow temperatures to settle.

**Occupied mode** — When the program control source (scheduler, BAS) calls for the start of the Occupied mode, the ALC controller will verify that no fault or shutdown conditions exist, and a 60-second time delay begins, after which the unit goes into Occupied mode.

Outdoor air damper (OD) — Approximately 5 seconds (fixed) after the unit goes into Occupied mode the outdoor air (OA) damper will open. The OA damper will remain open while the unit is in Occupied mode.

Supply fan (SF) — Approximately 2 minutes (fixed) after the start of the Occupied mode, the supply fan (SF) will turn on. If the SF is equipped with the optional SF VFD, the VFD will modulate fan speed to maintain duct static pressure. The SF will operate continuously during Occupied mode.

Optional exhaust fan (EF) — Approximately 2 minutes (fixed) after the start of the Occupied mode, the exhaust fan (EF) will turn on. If the EF is equipped with the optional EF VFD, the VFD will modulate fan speed to maintain duct static pressure. The EF will operate continuously during Occupied Mode.

Optional energy conservation wheel (ECW) — Approximately 2 minutes after the start of Occupied mode, the ECW is enabled. The ECW will operate as stand alone, based on the ECW controller. The ECW operation is enabled continuously during Occupied mode.

ECW operation — If the outdoor-air temperature (OAT) is more than 3° F (adjustable) above or below the return-air temperature (RAT), the ECW will operate. If the OAT is less than 3° F above or below the RAT, the wheel will not operate. If the OAT drops below 15 F, the ECW will turn

off, to prevent frosting. When the OAT rises above 15 F, the wheel will operate normally.

Optional VFD defrost — When the OAT drops below 15 F, the VFD signal will begin to decrease, slowing the ECW rotation. When the OAT drops to 0° F, the VFD signal will stop the wheel. When the OAT rises above 0° F, the wheel speed will increase until an OAT of 15 F is reached.

Optional ECW bypass — When the ECW is off, the ECW bypass damper is open. When the ECW is operating, the ERW bypass damper is closed.

Cooling mode — When the OAT is 1° F (adjustable) or more above the cooling leaving air temperature (C-LAT) set point (70 F, adjustable) Cooling mode is enabled. Compressor 1 (C1 or DC1, if digital) and condenser fan motor 1 (OFM1) are enabled.

OFM operation — OFM1 will operate based on a stand alone controller to maintain condenser head pressure.

DC1 operation — Compressor no. 1 is modulated by the ALC controller to maintain a suction line temperature (SLT) set point (if HGRH exists) or the C-LAT (if no HGRH exists).

If the OAT is  $2^{\circ}$  F (adjustable) above the C-LAT set point, C2 and OFM 2 (if equipped) are enabled.

If the LAT is 1° F below the C-LAT set point, hot gas reheat (HGRH, if equipped) and liquid line subcooling reheat (LSRH, if equipped) are enabled.

HGRH operation — The HGRH valve is modulated by the ALC controller to maintain the C-LAT set point. When the LAT is 2° F above the C-LAT set point, HGRH (if equipped) is disabled.

LSRH operation — The LSRH coil is cycled by the ALC controller to maintain the C-LAT set point. When the LAT is 2° F above the C-LAT set point, LSRH (if equipped) is disabled.

When the OAT matches the cooling LAT set point, C2 and OFM 2 (if equipped) are disabled. When the OAT is 1° F below the C-LAT set point, C1 and OFM1 are disabled and the unit will run in Fan Only mode.

Room temperature reheat override (RTRHO) — This override is available only if the unit is equipped with HGRH or HGRH/LSRH and RTRHO mode is enabled in the control menu.

When the unit is in Cooling mode or Dehumidification mode, RTRHO is enabled in the control menu, and the cooling zone air temperature (C-ZAT) 1° F (adjustable) or more above or below the C-ZAT setpoint (72 F, adjustable), RTRHO mode is enabled.

For every 1° F (adjustable) the ZAT is above the C-ZAT set point, the C-LAT set point is decreased by  $3^{\circ}$  F (adjustable), up to a maximum of 15 F (adjustable).

For every 1° F (adjustable) the ZAT is below the C-ZAT set point, the C-LAT set point is increased by  $3^{\circ}$  F (adjustable), up to a maximum of 15 F (adjustable).

The unit HGRH or LSRH will operate to maintain the new C-LAT set point.

## Controls (cont)

When the ZAT equals the C-ZAT set point, RTRHO mode is disabled and Cooling or Dehumidification mode is enabled.

 $\frac{Dehumidification\ mode}{Dehumidification\ is\ available} - Dehumidification\ is\ available$  only if the unit is equipped with HGRH or HRGH/LSRH and Dehumidification mode is enabled in the controls menu.

When OAT is above 60 F (adjustable), and the zone relative humidity (Z-RH) is 1% (adjustable) or more above the Z-RH set point (55% RH, adjustable), and there is no call for heating, Dehumidification mode is enabled. C1 or DC1, HGRH and LSRH (if equipped), and OFM 1 are enabled.

 $DC1\ operation$  — Compressor no. 1 is modulated by the ALC controller to 100% operation.

 $HGRH\ operation$  —  $HGRH\ will\ modulate\ to\ maintain\ the\ LAT\ set\ point.$ 

 ${\it LSRH~operation} - {\it LSRH~will}$  cycle to maintain the LAT set point.

When the Z-RH is 2% above the Z-RH set point, C2 and OFM 2 (if equipped) are enabled.

When Z-RH is 2% below the Z-RH set point, Dehumidification mode is disabled and Cooling, RTRHO or Fan mode is enabled.

 $\underline{\text{Heating mode}}$  — When the OAT is 1° F (adjustable) or more above the heat OAT Heating enable set point, Heating Mode is enabled.

Staged heat (gas, electric) — The heat source is staged by the ALC controller based on the difference between the LAT and LAT set point.

Modulating heat (gas, electric, steam, hot water) — The heat source is modulated by the ALC controller to maintain the LAT set point.

When the OAT is  $1^\circ$  F above the OAT Heating enable set point, Heating Mode is disabled and the unit operates in Fan Only Mode.

Staged heat (gas, electric) — The heat source is staged by the ALC controller based on the difference between the LAT and LAT set point.



Modulating heat (gas, electric, steam, hot water) — The heat source is modulated by the ALC controller to maintain the LAT set point.

When the LAT is  $1^{\circ}\,\text{F}$  above the H-LAT set point, auxiliary heating is disabled.

When the OAT is above the HP-OAT enable set point, Heating mode is disabled.

Room temperature reheat override (RTRHO) — When the unit is in Heating mode, RTHO is enabled in the control menu, and the heating zone air temperature (H-ZAT) is 1° F (adjustable) or more above or below the H-ZAT set point (72 F, adjustable) RTHO mode is enabled.

For every 1° F (adjustable) the ZAT is above the H-ZAT set point, the H-LAT set point is decreased by 3° F (adjustable), up to a maximum of 15 F (adjustable).

For every 1° F (adjustable) the ZAT is below the H-ZAT set point, the H-LAT set point is increased by 3° F (adjustable), up to a maximum of  $15\ F$  (adjustable).

The unit heat pump or auxiliary heat source will operate to maintain the new H-LAT set point.

When the ZAT equals the H-ZAT set point, RTHO mode is disabled and Heating mode is enabled.

<u>Fan Only mode</u> — When the OAT is below the C-LAT set point, but above the OAT Heating enable set point and Dehumidification mode is not enabled, Fan Only mode is enabled.

No cooling or heat source is energized. Only the SF, EF (if equipped) and ECW (if equipped) will operate.

**Unoccupied mode** — When the program control source (Scheduler, BAS) or energy management relay (EMR) calls for the end of Occupied mode, the unit will enter Unoccupied mode.

The C1 or DC1 (if equipped), OFM1, C2 and OFM 2 (if equipped) and auxiliary heat sources will be disabled.

The SF and EF will continue to operate for 2 minutes, and then shut off.

After the SF and EF shut off, the ERW will shut off. The OA damper will close.



### TYPICAL CONTROLLER INPUTS

NAME	TYPE	SENSOR TYPE
	A 1	Type II Thermistor 10kΩ at 77 F
Outside Air Temperature	Analog	0-10 vdc
		Type II Thermistor 10kΩ at 77 F
		0-10 vdc
Zone Relative Humidity	Analog	0-10 vdc
2 For Static Pressure Transmitter	Analog	0-10 vdc
Supply Fair Static Pressure Transmitter	Analog	0-10 vac
Exhaust Fan Static Flessure Flanchister	_	- 10kO at 77 F
- Continue Tomperature	Binary	Type II Thermistor 10kΩ at 77 F
Compressor 2 Suction Line Temperature	Analog	Type II Thermistor 10kΩ at 77 F
Compressor 1 Suction Line Temperature	Analog	LP1-5kΩ, LP2-10kΩ, SD-20kΩ, EMR-40k
Smoke Detector (NC), EMR (NC), LPT (NO), LPZ (NO)	Avalog	C1CS-5k $\Omega$ , C2CS-10k $\Omega$ , CFD-20k $\Omega$
Clogged Filter Indicator (NO), C1 Current Sensor (NO),	Analog	
	Analog	ECWCS-5kΩ, SFAPS-10kΩ, EFAPS-20k
	Outside Air Humidity Leaving Air Temperature Zone Relative Humidity Supply Fan Static Pressure Transmitter Exhaust Fan Static Pressure Transmitter  Compressor 2 Suction Line Temperature Compressor 1 Suction Line Temperature Smoke Detector (NC), EMR (NC), LP1 (NO), LP2 (NO) Clogged Filter Indicator (NO), C1 Current Sensor (NO),	Outside Air Humidity Leaving Air Temperature Zone Relative Humidity Analog Supply Fan Static Pressure Transmitter Exhaust Fan Static Pressure Transmitter Analog  Compressor 2 Suction Line Temperature Compressor 1 Suction Line Temperature Analog Smoke Detector (NC), EMR (NC), LP1 (NO), LP2 (NO) Clogged Filter Indicator (NO), C1 Current Sensor (NO), C2 Current Sensor (NO) Analog  Analog Analog Analog Analog Analog Analog Analog Analog Analog Analog Analog Analog Analog Analog Analog Analog

### TYPICAL CONTROLLER OUTPUTS

	THEAL CONTROL	OUTPUT TYPE		
NUMBER	NAME	0-10 vdc		
AO-01	Supply Fan VFD Modulation	0-10 vdc		
AO-02	Exhaust Fan VFD Modulation	0-10 vdc		
AO-02	Digital Compressor 2 Modulation	0-10 vdc		
AO-04	Hot Gas Reheat (HGRH)/Discharge Valve Modulation	0-10 vdc		
AO-05	Digital Compressor 1 Modulation	0-10 vdc		
AO-06	SCR Heat or Modulating Gas Heat	Relay / Triac Output		
BO-01	Supply Fan, Exhaust Fan	Relay / Triac Output		
BO-02	Compressor (Y1)	Relay / Triac Output		
BO-03	Compressor (Y2)	Relay / Triac Output		
BO-04	Hot Gas Reheat Valve (HGRH)	Relay / Triac Output		
BO-05	Stage 1 Heat (W1) or Heat Pump Heat	Relay / Triac Output		
BO-06	OA Damper, ECW Motor, ECW Damper, Exhaust Fan			

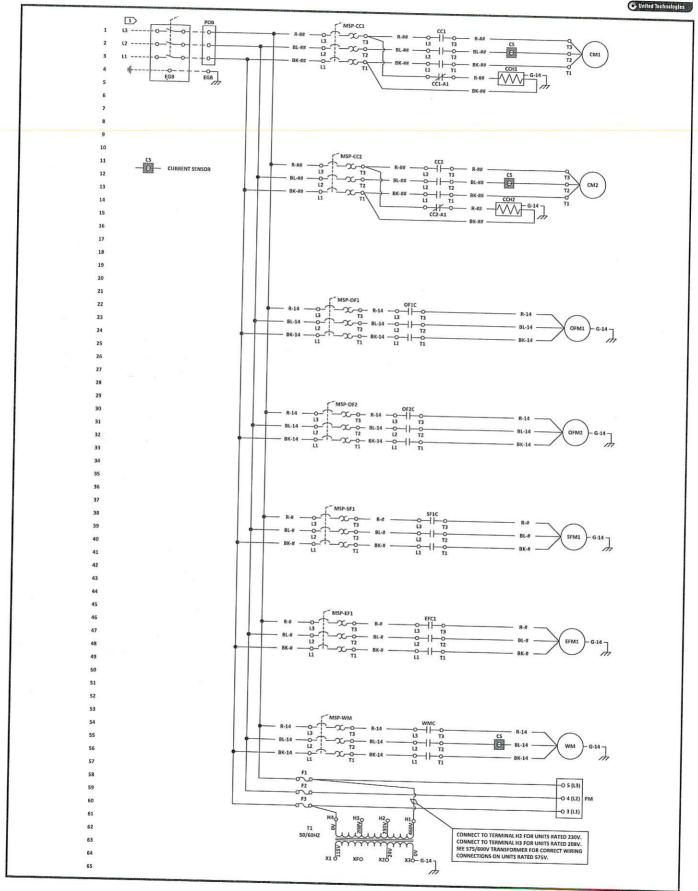
### LEGEND

LEGEND

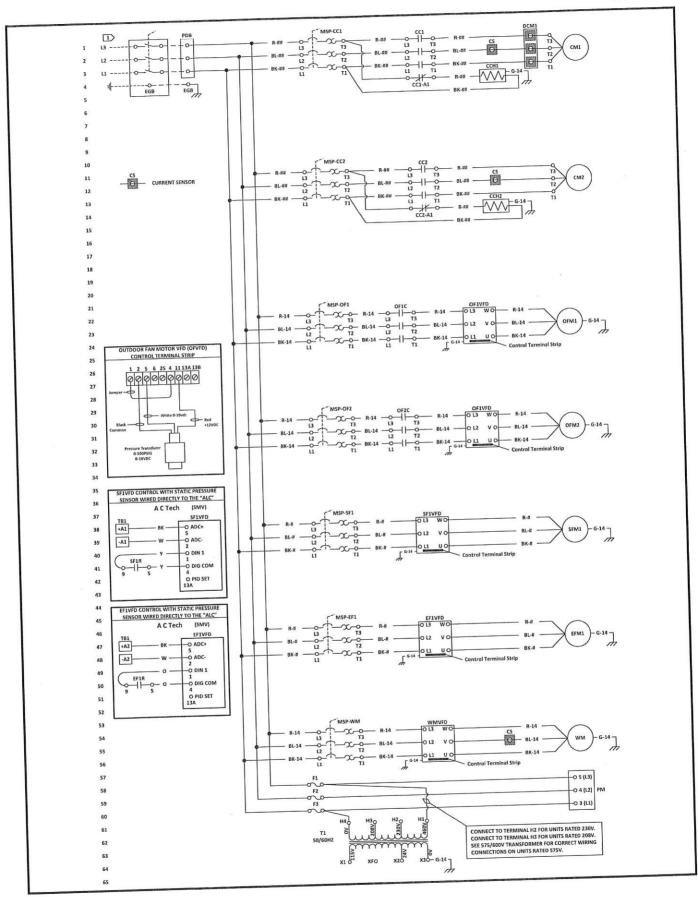
AO — Analog Output
BO — Binary Output
ECW — Energy Conservation Wheel
EF — Exhaust Fan
EMR — Energy Management Relay
HGRH — Hot Gas Reheat
LP — Low Pressure Switch
NC — Normally Closed (contact)
NO — Normally Open (contact)
OA — Outdoor Air
SF — Supply Fan
UI — Universal Input
VFD — Variable Frequency Drive

# Typical wiring schematics



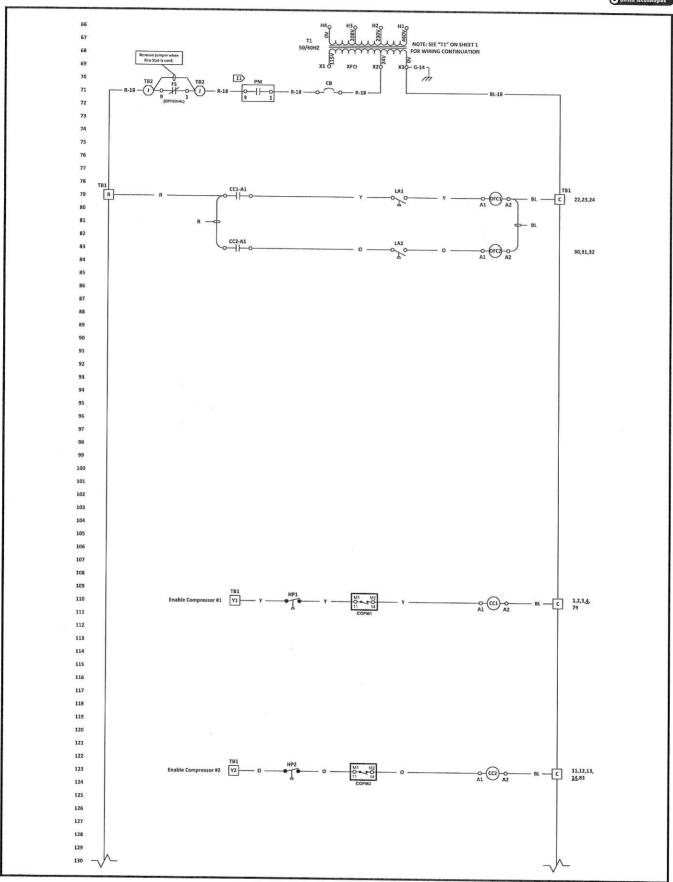




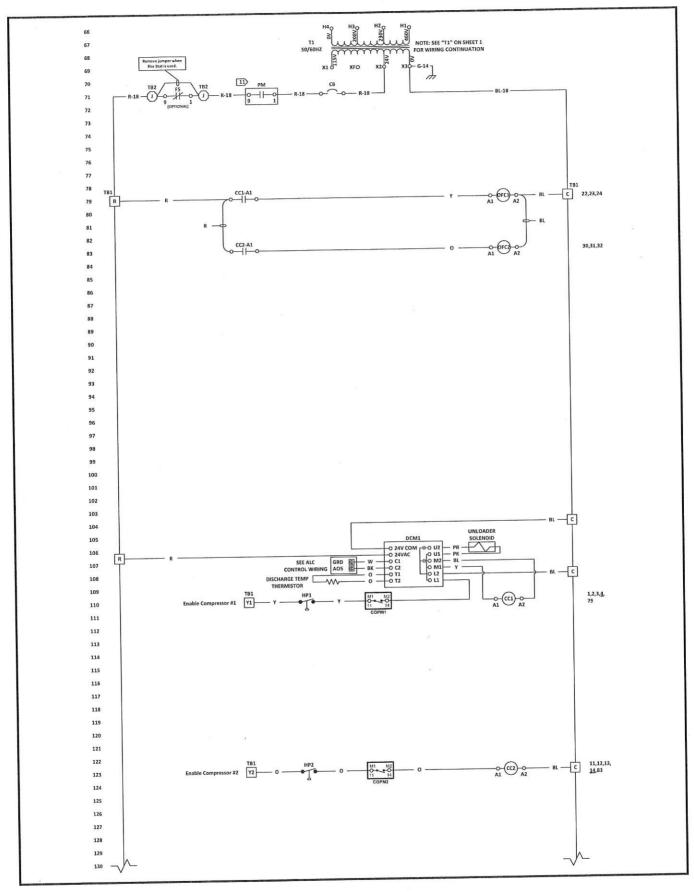


# Typical wiring schematics (cont)

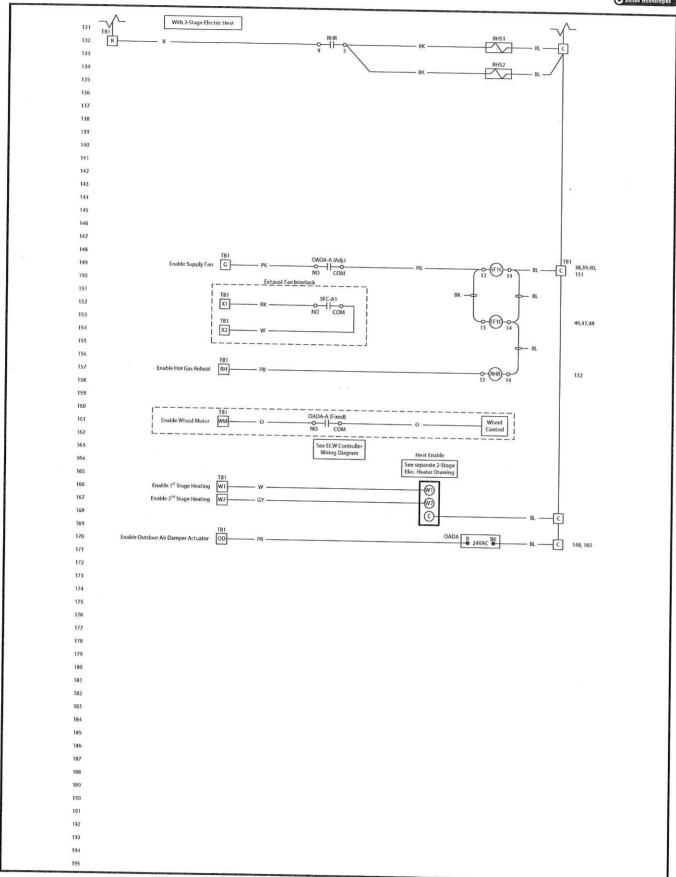




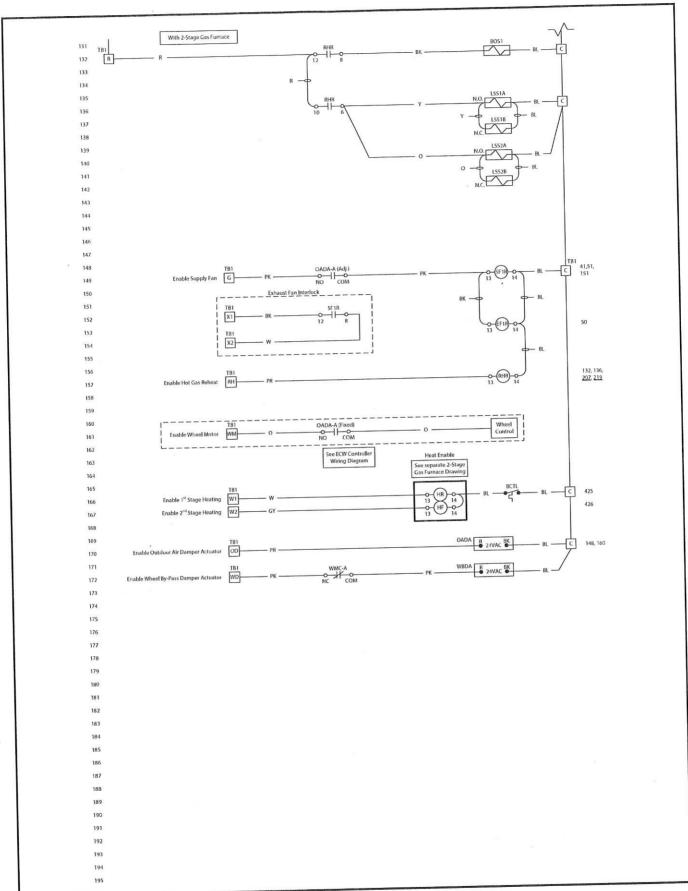




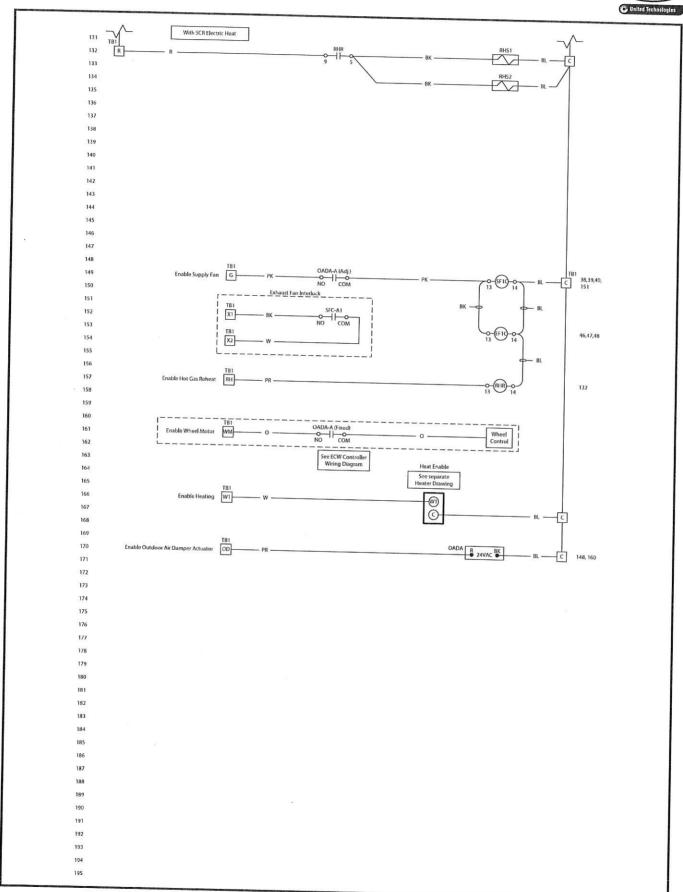




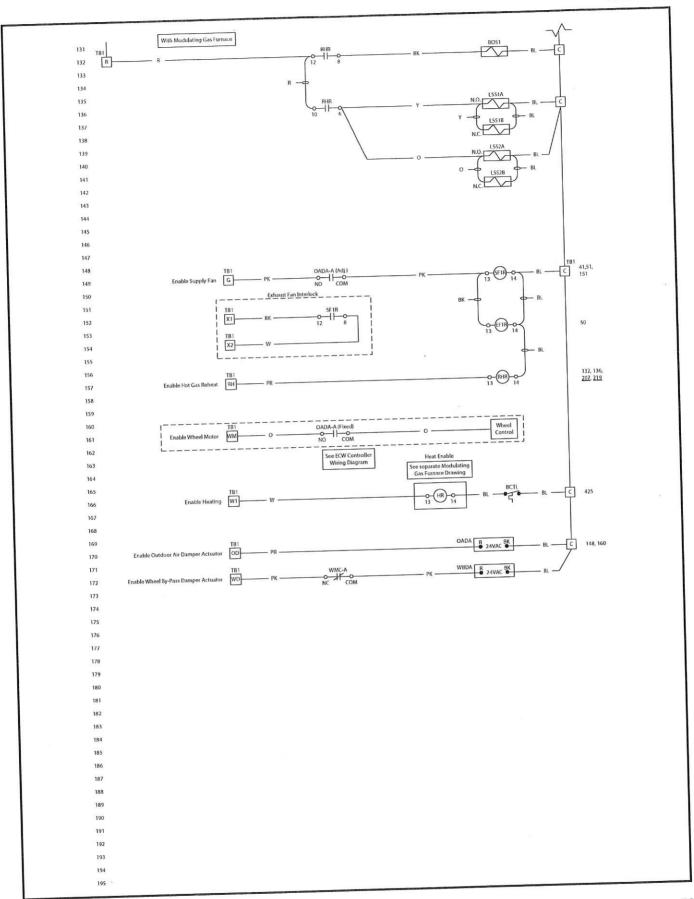




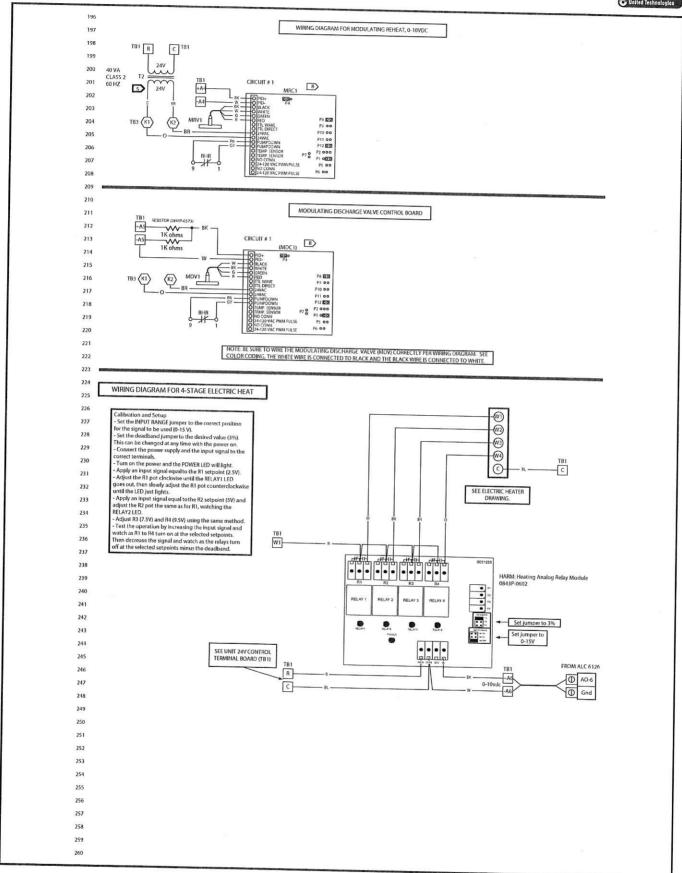




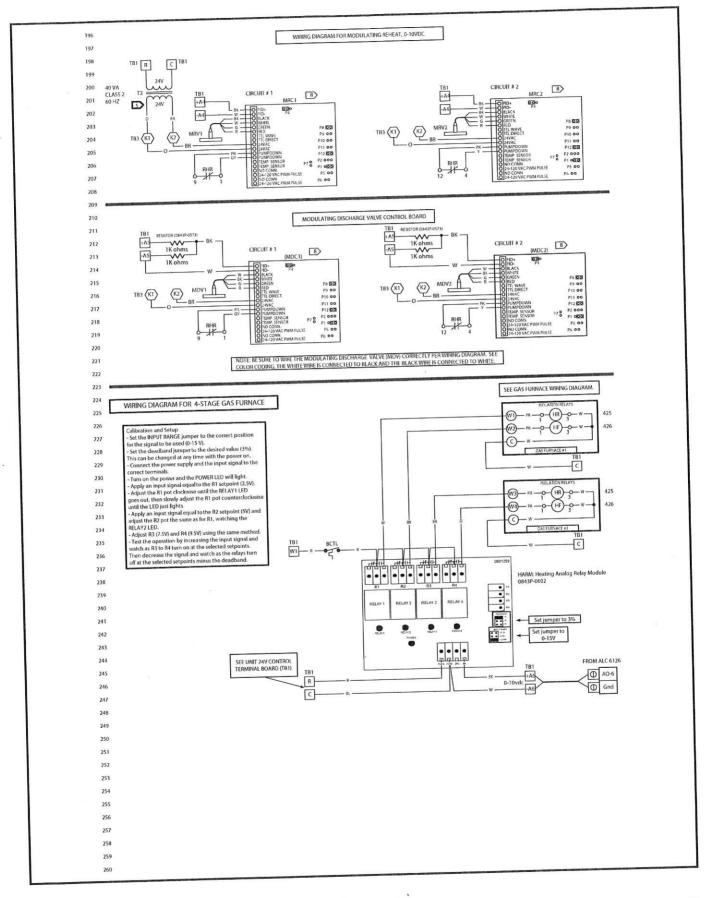




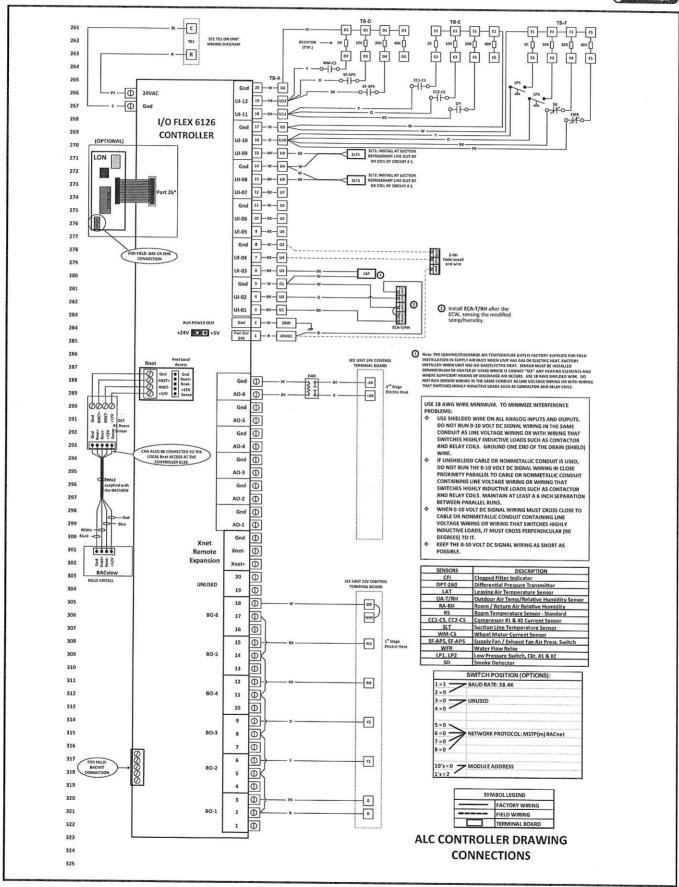




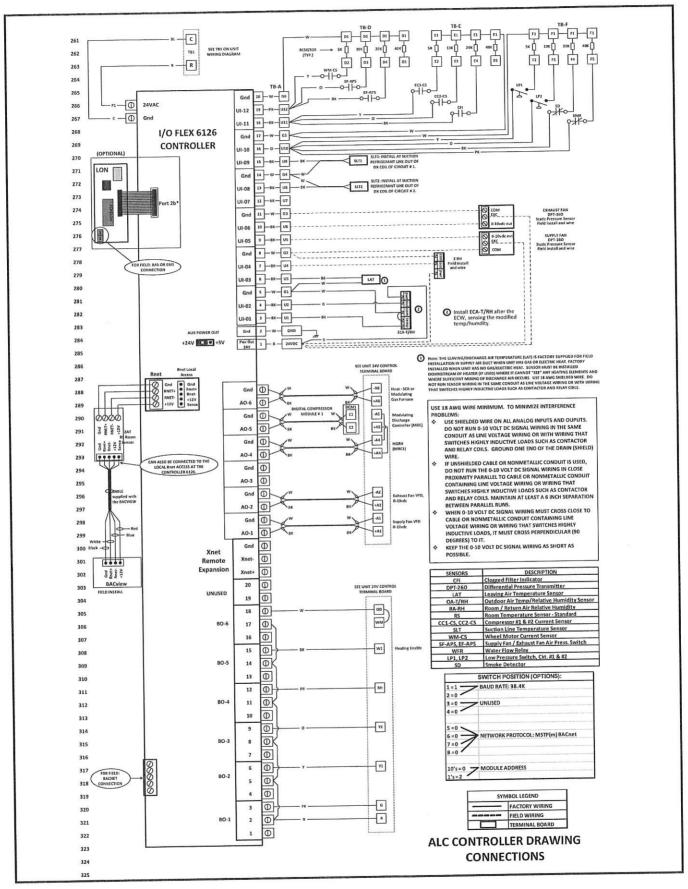




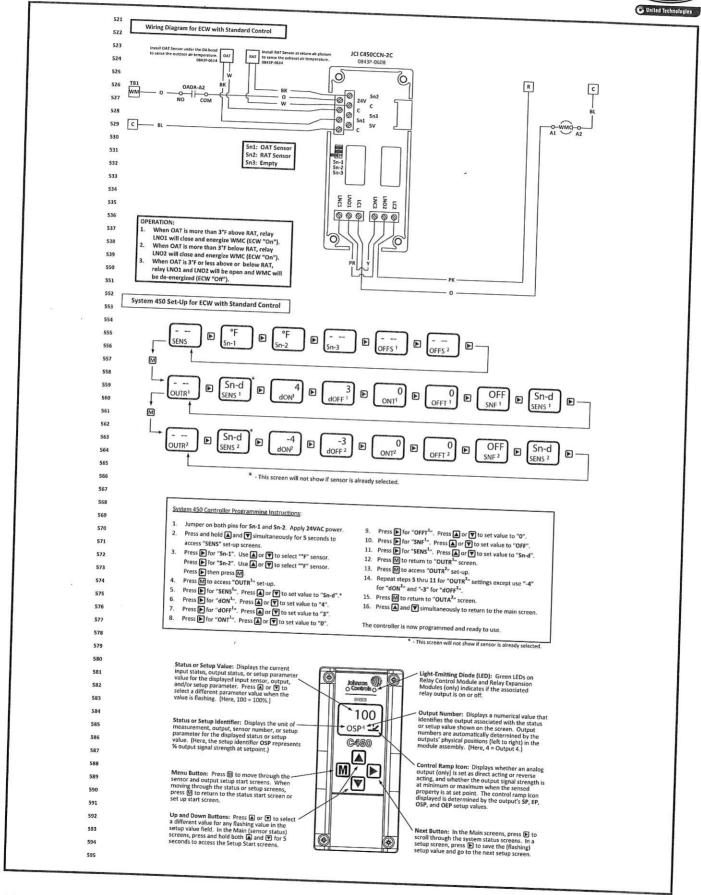




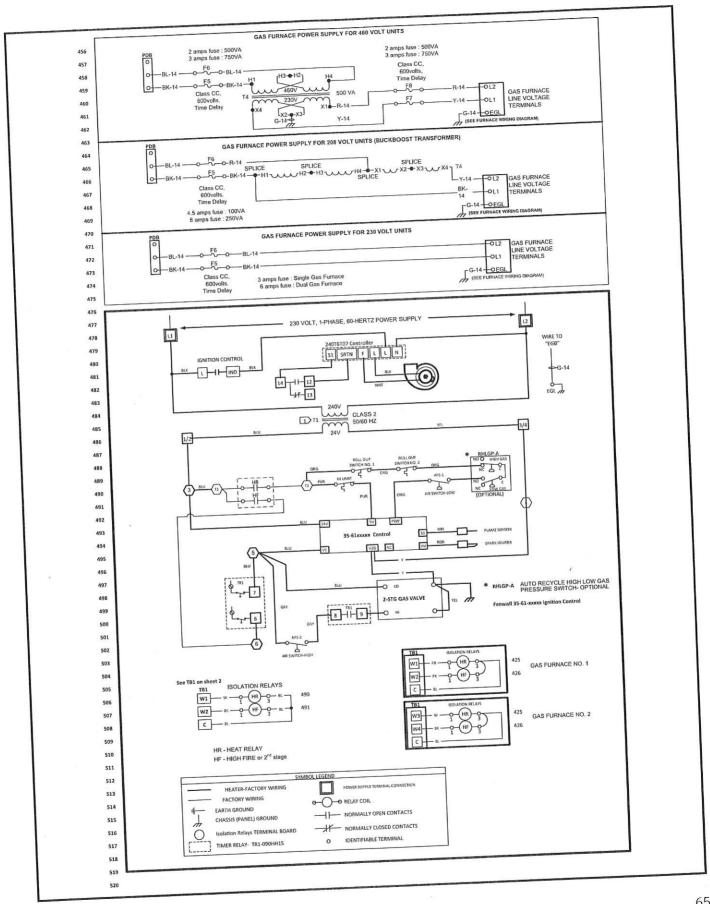




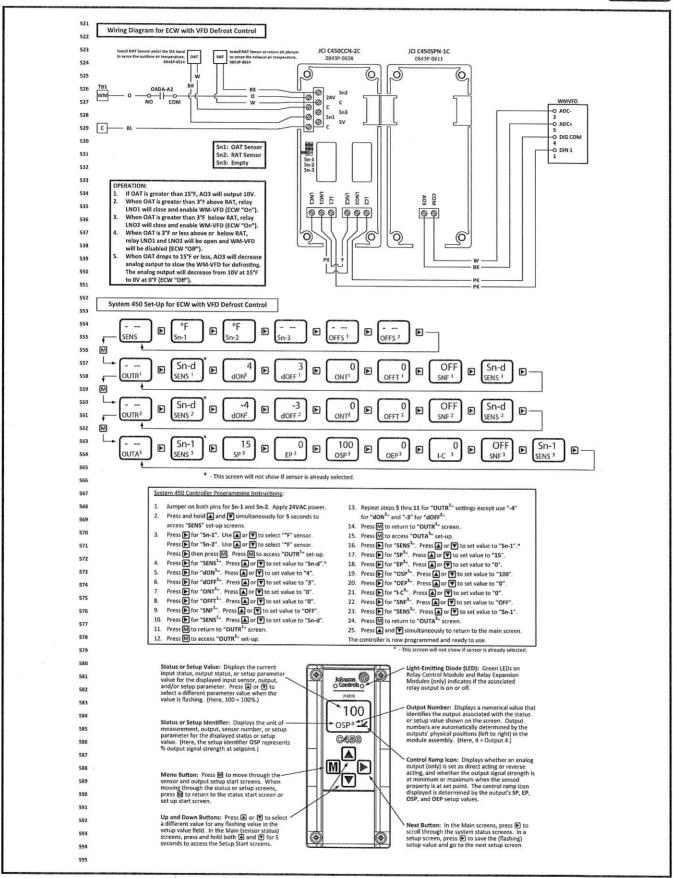














#### LEGEND FOR TYPICAL WIRING SCHEMATICS

Modulating Discharge - Line Controller
Modulating Discharge Valve
Modulating Reheat Temperature Control Board
Modulating Hot Gas Reheat Valve
Motor Starter Protection - Compressor Contactor
Exhaust Blower Motor Starter Protector
Motor Starter Protection - Outdoor Fan
Motor Starter Protection - Supply Fan
Motor Starter Protection - Wheel Motor
Two Position Outdoor Air Damper Actuator MDC Supply Air Differential Pressure Switch Blower Compartment High Temperature Limit Bleed off Solenoid #1 for HGRH Johnson Control C450 MDV MRC MRV MSP-CC APS BCTL BOS1 C450 C450 CB CC1 CC1-A CC2 CC2-A CCH CM1 CM2 MSP-EF MSP-OF MSP-SF Circuit Breaker Compressor Contactor No. 1 Compressor Contactor No. 1 Auxiliary Contact Compressor Contactor No. 2 Compressor Contactor No. 2 Compressor Contactor No. 2 Auxiliary Contact Compressor Crankcase Heater Compressor No. 1 MSP-WM Two Position Outdoor Air Damper Actuator
Outdoor Air Temperature Sensor
Outdoor Fan Contactor
Outdoor Fan Motor OADA OAT OFC OFM Compressor No. 1
Compressor No. 2
Compressor Overcurrent Protection Module
Compressor Current Sensor Board
Differential Pressure Transmitter 260 COPM PDB Power Distribution Block Power Monitor Return Air Temperature Sensor CS DPT-260 PM RAT RHR Energy Conservation Wheel
Exhaust Fan Contactor
Exhaust Fan Motor
Exhaust Fan Motor Relay
Exhaust Fan Variable Frequency Drive ECW Reheat Relay Reheat Relay
Hot Gas Reheat Solenoid Valve
Supply Fan Motor Contactor
Supply Fan Motor
Supply Fan Motor Relay
Control Transformer
Terminal Board
Variable Frequency Drive
Wheel Bypass Damper Actuator
Wheel Motor Contactor
FC Wheel Motor EFC EFM EFR RHS SFC SFM SFR EFVFD EGB Equipment Grounding Bar Heating Analog Relay
Heating Analog Relay
Heating Analog Relay Mode
High Pressure Cutout
Low Ambient Fan Cycling Control
Low Pressure Cutout TB VFD HAR WBDA HARM HP WMC EC Wheel Motor Wheel Motor Contactor LA WM WMC LSS Liquid Sub-Cooling Solenoid

## **Guide specifications**

# Packaged Rooftop Cooling Unit and Packaged Rooftop Cooling Unit with Heat

# HVAC Guide Specifications — Section 62DA,DB,DC,DD

Size Range: 6 to 35 Tons Nominal (Cooling)
Carrier Model Number: 62DA,DB,DC,DD

#### Part 1 — General

#### 1.01 SYSTEM DESCRIPTION:

Outdoor roof curb or slab mounted, electronically controlled, cooling or cooling/heating unit utilizing hermetic scroll compressors with crankcase heaters for cooling duty and gas combustion or electric heaters for heating duty. Units shall discharge supply air vertically or horizontally as shown on contract drawings.

#### 1.02 QUALITY ASSURANCE

- A. Unit shall be designed to conform to ANSI/ ASHRAE (American National Standards Institute/ American Society of Heating, Refrigerating, and Air-Conditioning Engineers) 15 (latest edition), ASHRAE 62, and UL (Underwriters Laboratories) Standard 1995.
- B. Unit shall be listed by ETL and ETL, Canada as a total package.
- C. Gas heat equipped units shall be designed to conform with ANSI Standard Z21.47 (U.S.A.) / CSA (Canadian Standards Association) Standard 2.3 (Canada), Gas-Fired Central Furnaces.
- D. Roof curb shall be designed to NRCA (National Roofing Contractors Association) criteria per Bulletin B-1986.
- E. Insulation and adhesive shall meet NFPA (National Fire Protection Association) 90A requirements for flame spread and smoke generation.

#### 1.03 DELIVERY, STORAGE AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

#### Part 2 — Products

#### 2.01 EQUIPMENT

#### A. General:

Factory-assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, refrigerant charge (R-410A), operating oil charge, single refrigerant circuit (sizes 07–09) or dual refrigerant circuits (sizes 12–38), microprocessor based control system and associated hardware, and all special features required prior to field start-up.

#### B. Unit Cabinet:

- Double wall design, constructed of G-90 galvanized steel, bonderized and pre-coated with a baked enamel finish.
  - a. Top cover shall be 18-gage sheet metal with 1.0-in. thick, 4.0-lb density, closed cell insulation with a 24-gage sheet metal interior liner.



- b. Access panels and doors shall be 20-gage sheet metal with 1.0-in. thick, 4.0-lb density, closed cell insulation with a 24-gage sheet metal interior liner. Access doors shall be equipped with stainless steel hinges and quarter turn, adjustable, cam-action latches.
- c. Insulation shall have a minimum thermal resistance rating of R7.
- d. Corner and center posts shall be 16-gage galvanized steel.
- e. Basepans shall be 16-gage galvanized steel.
   All openings through the basepan shall have upturned flanges at least 0.5 inches in height.
- Basepans shall be insulated with 0.375-in. thick closed cell foam insulation.
- g. Compressor rail shall be 12-gage galvanized steel.
- h. Condensate pan shall be 16-gage stainless steel insulated with closed cell neoprene insulation.
- i. Base rail shall be 14-gage galvanized steel.
- j. Fan deck (indoor and outdoor section) shall be 16-gage galvanized steel.
- k. Roof sections shall be sloped for proper drainage.
- Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM (American Society for Testing and Material) B117 (scribed specimen).
- 3. Unit shall have insulated hinged access doors for easy access to the control box and other areas requiring servicing. Each door shall seal against a rubber gasket to help prevent air and water leakage and be equipped to permit ease and safety during servicing.
- 4. Interior cabinet surfaces shall be lined with 24 gage galvanized steel.
- Unit shall have a factory-installed sloped condensate drain connection fabricated of galvanized steel.
- 6. Unit shall be equipped with rigging openings in frame rails to facilitate overhead rigging.
- 7. Filters shall be accessible through a hinged access panel.
- 8. Unit shall have vinyl-coated security grille to protect the condenser and compressor section.
- 9. The outdoor air opening shall have a factory-installed hood with bird screen.

#### C. Fans:

- 1. Indoor Supply Fans:
  - a. Fans shall be belt driven with single outlet discharge.
  - Fan shaft bearings shall be of the pillow block type with positive locking collar and be permanently lubricated.



- Fans shall be statically and dynamically balanced.
- d. The fan assembly shall be mounted in rubber vibration isolators.
- e. Fan assembly shall be on a slide-out deck that is removable for maintenance and service.

#### 2. Condenser Fans:

- Fans shall be direct-driven propeller type only, with corrosion-resistant blades riveted to corrosion-resistant steel supports.
- Fans shall discharge air vertically upward and be protected by PVC coated steel wire safety guards.
- c. Fans shall be statically and dynamically balanced.

#### D. Compressors:

- Fully hermetic, scroll type compressors with overload protection and short cycle protection with minimum on and off timers. Digital compressors are available.
- 2. Factory rubber-in-shear mounted for vibration isolation.
- 3. Reverse rotation protection capability.
- 4. Crankcase heaters shall only be activated during compressor off mode.

#### E. Coils:

- 1. Standard evaporator coil shall have enhanced surface aluminum plate fins mechanically bonded to six rows of seamless internally grooved copper tubes with all joints brazed.
- Standard condenser coil shall have enhanced surface aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
- 3. Coils shall be pressure tested at 650 psig prior to unit assembly; leak tested at 150 psig and undergo final testing at 475 psig.
- 4. Optional coil coatings for corrosion protection shall be available.

#### F. Refrigeration System Components:

- 1. Unit shall be equipped with single refrigerant circuit (sizes 07–09) or dual refrigerant circuits (sizes 12–38), with each circuit containing:
  - a. Solid core liquid line filter drier.
  - b. Adjustable thermostatic expansion valve accumulators.
  - Hot gas bypass shall be standard on all nondigital compressors.
  - d. Gage connection ports.
- 2. 100% outdoor air units shall be equipped with low ambient head pressure control to allow operation down to 35 F.

#### 3. Hot Gas Reheat:

A factory-installed hot gas reheat (HGRH) coil shall be available. The HGRH coil shall be

available on the lead circuit only or on both refrigerant circuits. Units with HGRH will have variable speed low ambient head pressure control. Cycling or modulating HGRH shall be available.

#### 4. Liquid Subcooling Reheat:

A factory-installed liquid subcooling reheat (LSRH) shall be available on all unit circuits and shall have cycling control. LSRH shall be used in conjunction with lead circuit HGRH.

#### G. Filter Section:

Standard filter section shall be supplied with 2-in. thick MERV-8 fiberglass filters.

#### H. Controls and Safeties:

- 1. Microprocessor Controls:
  - Unit shall have a factory installed and programmed microprocessor controller with LED indicators and archive capability.
  - b. Shall include a field-installed space temperature sensor with communication port.
  - c. Shall be capable of communicating via BACnet, Modbus, N2 or LonWorks protocols.
  - d. Shall provide a 5° F temperature difference between cooling and heating set points to meet ASHRAE 90.1, energy standard.
  - e. Shall provide an alarm indicator and an audible alarm signal via accessory interface device.
  - f. Unit shall display current alarms and log 100 most recent alarms.
  - g. Compressor minimum off time (5 minutes) shall be provided.
  - h. Shall have a service diagnostic mode.
  - i. Unit shall be complete with self-contained low voltage control circuit.
  - j. Control interface shall be via accessory device with display and key pad. Accessory controller connection shall be at unit controller and space temperature sensor.
  - Unit scheduling shall be accomplished by built in scheduling program, occupancy switch, or external BAS.

#### 2. Safeties:

- a. Unit shall incorporate a solid-state compressor lockout which provides optional reset capability at the space thermostat should any of the following safety devices trip and shut off compressor:
  - Compressor lockout protection provided for either internal or external overload.
  - 2) Low-pressure protection.
  - 3) Freeze protection (evaporator coil).
  - 4) High-pressure protection.
  - 5) Loss of charge protection.
- b. Supply-air sensor shall be located in the unit and shall be used for compressor stage control.

## Guide specifications (cont)

- Unit shall be equipped with a supply fan status switch to protect the system in the event of a fan drive failure.
- d. Induced-draft heating section shall be provided with the following minimum protections:
  - 1) High-temperature limit switch.
  - Differential pressure switch to prove induced draft.
  - 3) Flame rollout switch.
  - 4) Flame proving controls.
  - 5) Redundant style gas valve.

#### I. Operating Characteristics:

- Unit shall be capable of starting and running at 115 F ambient outdoor temperature per maximum load criteria of AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Standard 340/360.
- Unit with standard controls will operate in cooling down to an outdoor ambient temperature of 35 F.
- Unit shall be equipped with a motorized twoposition outdoor air (OA) damper for 100% OA operation.
- 4. Unit shall be provided with fan time delay to prevent cold air delivery (gas heat only).

#### J. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.

#### K. Motors:

- Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have either internal line break thermal and current overload protection or external current overload modules with compressor temperature sensors.
- All condenser-fan motors shall be open drip proof with permanently lubricated ball bearings, class F insulation and manual reset overload protection.
- All indoor-fan motors 1 hp and larger shall meet the minimum efficiency requirements as established by the Energy Independence and Security Act of 2007 (EISA), effective December 20, 2010.
- 4. All indoor-fan motors shall be open drip proof design.

#### L. Special Features:

Not all feature combinations are available. Contact your local Carrier Sales Office.

#### 1. Energy Recovery:

- The factory-installed enthalpy wheel shall be certified to meet the requirements of AHRI Standard 1060 and shall be AHRI listed.
- b. The enthalpy wheel shall be constructed of corrugated synthetic fibrous media with a



- desiccant intimately bound and uniformly and permanently dispersed throughout the matrix structure of the media.
- c. The desiccant material shall be molecular sieve, 4 angstrom or smaller.
- d. The rotor shall be constructed of alternating layers of flat and corrugated media.
- e. Wheel construction shall be fluted or formed honeycomb geometry so as to eliminate internal wheel bypass.
- f. The wheel frames shall be evenly spaced steel spokes with a galvanized steel outer band and rigid center hub.
- g. The wheel seals shall be full contact nylon brush type.
- h. The wheel shall slide out of the cabinet side for service.
- Wheel cassettes shall be constructed of galvanized steel. Cassettes shall have integral purge section.
- The wheel bearings shall be inboard mounted, permanently sealed roller bearings or externally flanged bearings.
- k. The wheel shall be driven by a fractional horsepower AC motor via multilink drive belts.
- Energy wheel defrost control and air bypass shall be available.

#### 2. Gas Heating:

- Gas heat shall be induced-draft combustion type with energy saving direct spark ignition systems and redundant main gas valves.
- The heat exchanger shall be of the tubular section type constructed of a minimum of 20-gage stainless steel.
- c. Burners shall be of the in-shot type constructed of aluminum coated steel.
- d. All gas piping shall enter the unit cabinet at a single location.

#### e. Induced-Draft Fans:

- Shall be direct-driven, single inlet, forward-curved centrifugal type.
- Shall be statically and dynamically balanced.
- Shall be made from steel with a corrosion-resistant finish.
- High-corrosion areas such as flue gas collection and exhaust areas shall be lined with corrosion resistant material.
- g. Optional 5:1 or 10:1 turndown modulating furnace shall be available.

#### 3. Electric Heat:

 Electric resistance heaters shall be factoryinstalled, nichrome element type, open wire coils with 0.375 in. inside diameter, insulated with ceramic bushings, and include operating



and safety controls. Coil ends shall be staked and welded to terminal screw slots.

b. Factory-installed electric heat shall have staged heat control (1, 2, 3, or 4 stages) or SCR (silicon controlled rectifier) control providing infinite capacity adjustment.

#### 4. Hot Water Heat:

Unit shall have a 2-row hot water coil, aluminum construction, with air vents installed downstream of the evaporator coil. Coil connection stubs will be located inside the unit cabinet. Hydronic control valves shall be field furnished.

#### 5. Steam Heat:

Unit shall have 1-row, steam distributing type, aluminum fin coil installed downstream of the evaporator coil. Coil connection stubs will be located inside the unit cabinet. Control valves to be field furnished.

#### 6. Supply Fan:

Supply fan of the backward curve, forward curve, airfoil, or backward inclined type shall be factory-installed, mounted on rubber isolation, and installed on a slide-out deck that is removable for maintenance and service.

#### 7. Modulating Supply Fan:

Package shall include a VFD-controlled supply fan mounted on rubber vibration isolation and installed on a slide-out deck that is removable for maintenance and service. VFD control shall be based on duct pressure.

#### 8. Liquid Subcooling Coil:

The unit shall be equipped with a factoryinstalled full face liquid subcooling coil on all circuits.

#### 9. Exhaust Fan:

Package shall include an exhaust fan of the backward curve, forward curve, or airfoil type mounted on rubber vibration isolation with gravity relief damper. The shaft-mounted fan shall be mounted in sealed ball bearings and driven via an adjustable sheave belt drive.

#### 10. Modulating Exhaust Fan:

Package shall include a VFD controlled exhaust fan mounted on rubber vibration isolation with gravity relief damper. The shaft-mounted fan is mounted in sealed ball bearings and driven via an adjustable sheave belt drive. Control shall be based on building pressure.

#### 11. Oversize Fan Motors:

Oversize fan motors shall be available for both optional supply and exhaust fan motors.

#### 12. Liquefied Propane Conversion Kit:

Kit shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane gas.

#### 13. Convenience Outlet:

Shall be factory-installed and internally mounted with an externally accessible 115-v, 15 amp GFI, female receptacle with hinged cover. The outlet shall require field-supplied 115-v power supply wiring.

#### 14. Fused Disconnect Switch:

Shall be factory-installed, internally mounted, and UL approved. Fused switch shall provide unit power shutoff. Shall be accessible from outside the unit and shall provide power off lockout capability.

#### 15. Firestat:

A factory-installed, manual-reset firestat shall be mounted in the return-air opening of the unit. The firestat shall be set to open at 135 F.

#### 16. Exhaust Air Smoke Detector:

A factory-installed smoke detector shall be mounted in the unit exhaust air intake (62DC,DD).

#### 17. Dirty Filter Status Switch:

The manual reset filter status switch shall be a pressure differential switch and will indicate a dirty filter. The switch shall be factory installed.

#### 18. Fan Status Switch:

The unit shall be equipped with a field-adjustable differential air pressure switch installed across the filters or supply fan to provide proof of airflow.

#### 19. Phase/Voltage Monitor:

A factory-installed under-voltage and phase loss sensor shall stop the unit whenever voltage is too low, phases are out of sequence, or a phase is dropped. The unit will restart automatically within five minutes after the correct power is supplied.

#### 20. Spring Fan Isolation:

Supply fan and power exhaust fan (if equipped) shall be mounted in spring type isolation with seismic restraints.

#### 21. 4-Inch Filters:

Optional filter section shall be supplied with 4-in. thick MERV-8 or 11 pleated fiberglass filters

#### 22. Filter Kits:

Accessory filter kits shall be available with MERV-8 or 11 type filters.

#### 23. Digital Compressor:

A digital compressor shall be available. The control system shall be capable of unloading the compressor in an unlimited number of steps from 100% capacity down to 10% capacity.

#### 24. Commissioning User Interface:

The commissioning keypad/display unit shall have a numeric keypad, direction keys, and

# Guide specifications (cont)

programmable function keys. The display shall be a 4-line by 40-character backlit LCD display.

25. Head Pressure Control:

Condenser fan cycling or variable speed condenser fans shall be available for head pressure control.

LonWorks Communicator:
 LonWorks communication shall be available factory installed.

27. Roof Curb:

Curb shall be formed of 14-gage galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.

28. Minimum Load Valve:

Unit shall be equipped with factory-installed minimum load valve (hot gas bypass).

29. Harsh Environment Coating:

Unit shall be equipped with a factory-applied "Harsh Environment Protection" designed to combat the corrosive effects of industrial and commercial atmospheric conditions including: salt air, salt water, acid rain, chlorine and chlorides, hydrochloric, nitric, hydrofluoric, sulfuric and uric acid fumes, hydrogen sulfide gas, lye, sulfur dioxide, methane gas, hydrocarbons, chlorinated solvents and aromatic solvents. The Harsh Environment Protection shall include the following features, where applicable, to provide extra protection against corrosive atmospheric conditions:

- a. Vinyl-coated condenser fan guards.
- b. Non-corroding condenser fan motor mounts.



- c. Totally enclosed single-speed three-phase condenser fan motors.
- d. Coated refrigerant to air condenser with corrosion-resistant coil coating composed of aluminum-impregnated polyurethane, rated for 10,000 hr salt spray.
- e. Coated refrigerant to air evaporator with corrosion-resistant coil coating composed of aluminum-impregnated polyurethane, rated for 10,000 hr salt spray.
- f. Coated refrigerant to air hot gas reheat coil with corrosion-resistant coil coating composed of aluminum-impregnated polyure-thane, rated for 10,000 hr salt spray.
- g. Coated refrigerant to air subcooling coil with corrosion-resistant coil coating composed of aluminum-impregnated polyurethane, rated for 10,000 hr salt spray.
- h. All interior (un-insulated) cabinet panels coated with corrosion-resistant cabinet coating composed of polyurethane, rated for 10,000 hr salt spray.
- All exterior surfaces of the cabinet coated with corrosion-resistant cabinet coating composed of polyurethane, rated for 10,000 hr salt spray.
- j. All compressors, accumulators, factoryinstalled receivers, control device covers and refrigerant piping coated with corrosion-resistant cabinet coating composed of polyurethane, rated for 10,000 hr salt spray.

Replaces: 62D-7PD

# Appendix H BACT Analysis

# Appendix H Cerasmooth Process BACT Analysis

#### **Description:**

Various volatile organic compound (VOC) and hazardous air pollutant (HAP) containing chemicals are mixed with a silicon carbide grit to form a durable and chemical/heat resistant epoxy ester resin coating that will be applied to internal pump parts used in the mining and power generation industries.

#### **Emissions Summary:**

The major emission from this source category are VOCs and HAPs (mostly styrene) from the mixing, curing, and application of the resin coatings to the internal pump surfaces. The maximum PTE for this source has been calculated at 0.13 tpy of VOC which includes approximately 0.05 tons tpy of HAPs, mainly styrene. Approximately 50% of these emissions are vented passively to the outdoors as fugitive emissions from the climate controlled Pappas Building where the P400 mixing and application will take place. The remaining emissions will be released in a paint booth that will be modified to capture VOC emissions.

Emissions from this source category were determined using a mass balance method dependent on the percentage of VOC in each material.

### **Control Options:**

The following sources were reviewed to identify available control technologies:

EPA's RBLC

EPA's Air Pollution Technology Fact Sheets

EPA's Control Techniques Guidelines and Alternative Control Techniques Documents Utah DAQ Document DAQ-2018-007161

#### **Control Options for VOC:**

- · Carbon Adsorbers (United States Environmental Protection Agency, 1993)
- · Thermal Vapor Incinerators (US EPA, 1993)
- · Catalytic Vapor Incinerators (US EPA, 1993)
- · Flares (US EPA, 1993)
- · Condensers (US EPA, 1993)

### **Technological Feasibility:**

### **Control Options for VOC:**

#### Carbon Adsorbers

There are two types of carbon adsorbers – fixed bed carbon adsorbers and carbon canister adsorbers. Fixed bed carbon adsorbers are used for controlling continuous, large gas streams with flow rates ranging from 30 to 3,000 m³/minute (US EPA, 1993). Based on the maximum PTE of 0.13 tpy of fugitive VOC emissions being passively exhausted from all of the Cerasmooth processes, the gas stream flow rate for this source category is far below the gas stream flow rate a fixed bed carbon adsorber can be sized for. Therefore, this control option is not technologically feasible for this source category. Carbon canister adsorption can be used to control low flow gas streams. Therefore, carbon canister/filter adsorption is technologically feasible for this source category.

### Thermal Vapor Incinerators

Thermal vapor incinerators are typically sized to handle gas stream flow rates ranging from 8 to 1,400 m³/minute (US EPA, 1993). Based on the maximum PTE of 12.04 tpy of VOC emissions being passively exhausted through 35 individual ducts, the gas stream flow rate for this source category is far below the gas stream flow rate a thermal vapor incinerator can be sized for. Therefore, this control option is not technologically feasible for this source category.

### Catalytic Vapor Incinerators

Catalytic vapor incinerators are typically operated at temperatures in the range of 600 - 1,200 °F. Temperatures below this range result in low destruction efficiencies (US EPA, 1993). The passive gas streams from the mold machines/extruders and glue machines are not at this high operating temperature; therefore, this is not a technologically feasible control option.

#### *Flares*

Flares can be used for almost any VOC stream, and can handle fluctuations in VOC concentration, flow rate, and content (US EPA, 1993). Therefore, the use of a flare is a technologically feasible control option for this source category.

#### Condensers

Condensers can be used for any organic compound, dependent on the organic compound chemical properties (US EPA, 1993). However, condensers are not effective for gas streams containing low organic concentrations (US EPA, 1993). Therefore, this is not a technologically feasible control option.

## Ranking of Individual and Combined Controls:

- 1. Flares: Up to 98% control efficiency (US EPA, 1993)
- 2. Carbon Adsorbers: Up to 95% control efficiency for carbon canister/filter adsorption system (US EPA, 1993).

### **Economic Feasibility:**

### **Control Options for VOC:**

- 1. Flares: According to Table 5-6 in "Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations Processes in the Synthetic Organic Chemical Manufacturing Industry" on Page 5-16 indicates that flares are not an economically feasible control option for this source category.
- 2. Carbon Adsorbers: The capital and operating costs for a carbon adsorber were estimated using EPA data and other sources (US EPA 2002) (Ken Corey & Leo Zappa, n.d.). Based on these data, this control option is not economically feasible. However, since there is an existing paint booth present at Weir (Handlay Paint Booth), that could be modified at a relatively lower cost by adding Polysorb Charcoal filters to the exhaust stream, this control technology will be implemented for portions of the Cerasmooth process. The mixing, application and curing of the P460 and P470 coatings will take place in the modified Handlay Paint Booth. The P400 chemical mixing and application will take place in the Pappas Building with no emission controls. However, the curing of the P400 coating will take place in the Handlay Paint Booth.

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