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SAFETY DATA SHEET

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Trade Name: QPAC® Poly(butylene carbonate)
Product/Chemical Name: Poly(butylene carbonate)
Chemical Family: Aliphatic Polycarbonate

Manufacturer:
Empower Materials
91 Lukens Drive, Suite E
New Castle, DE 19720 - USA
302-225-0100

Emergency Telephone Numbers:
Chemtrec 1-800-424-9300 U.S.
1-703-527-3887 International

Use(s) of the substance/the mixture:
Laboratory chemicals, Manufacture of substances.

Restriction(s) on the use of the substance/the mixture:
None known.

SECTION 2 - HAZARDS IDENTIFICATION

Classification of the Substance or Mixture
QPAC® PBC is composed of no less than 94% Poly(butylene carbonate) polymer and contains less than 1% (between 0.2%-0.8%) methylene chloride and less than 5% butylene carbonate.

Methylene chloride is GHSA classified as H351: "Suspected of causing cancer" in accordance with 29 CFR 1910.1200 Appendix A (OSHA HCS) Carcinogenicity (methylene chloride: Category 2)

Butylene carbonate is GHS classified as H319: "Causes serious eye irritation" in accordance with 29 CFR 1910.1200 Appendix A (OSHA HCS) Eye Irritation (Butylene carbonate: Category 2A)

Exposure limits of pure Methylene Chloride:
Refer to the OSHA Methylene Chloride Standard [OSHA3144-06R (2003)]: sets a permissible exposure limit (PEL) of 25 parts methylene chloride per million parts of air (ppm) as an eight-hour time-weighted average (TWA). This refers to the average exposure during an eight-hour period. Employers must use engineering and work practice controls to limit employee exposures. Respiratory protection must be used in addition if these controls are insufficient to reduce exposures to below the limits.

The action level for airborne methylene chloride is set at a concentration of 12.5 ppm, calculated as an eight-hour TWA. Reaching or exceeding the action level signals that employers must begin compliance activities such as exposure monitoring and medical surveillance. There is also a short-term exposure limit (STEL) of 125 ppm, as measured over a 15-minute period.

GHS Label Elements, Including Precautionary Statements:

Hazard Pictograms

Signal Word: Warning!

Hazard Statements
Eye Irritation: H319 Causes serious eye irritation.

Hazards not Otherwise Classified (HNOC) or Not Covered by GHS
Avoid contact with strong oxidizing agents.

Avoid temperatures above 150 °C.

At process temperatures irritating fumes may be produced.

Hazardous Decomposition Products: Butylene carbonate when burned may form toxic levels of carbon monoxide, carbon dioxide, butylene oxide, formaldehyde, other irritating aldehydes, acids and ketones. Other hazardous products may occur under conditions of decomposition or combustion, and/or result from interaction with other materials and/or environment of decomposition or combustion.

Molten polymer may cause thermal burns.

Slipping hazard if spilled on hard smooth walking surface.

The material may accumulate static charges, which could be a source of ignition.

Emergency Overview
Avoid contact with eyes, skin or clothing. Avoid breathing dust or vapor from granulates or powder. Do not swallow. Wear safety glasses and latex gloves.

Wash thoroughly after handling. Use with adequate ventilation. May produce hazardous gases under fire conditions.

During emergencies, wear equipment to protect eyes, skin, and respiratory tract. Prevent material and run-off from entering sewer or waterways. Consult the Safety Data Sheet.

Conditions aggravated by exposure
No human or animal health effects data are known to exist. However, available toxicity information on polymers of molecular weight 1000 or greater suggests they have low toxicity.

May contain 0.2 – 0.8% methylene chloride. Pure methylene chloride is a suspected human carcinogen.

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient (s)	CAS Number	%
Poly(butylene carbonate) $(C_6H_8O_3)_n$	96361-30-7	94+ %
Mix of isomers of:		0 – 5 %
1,2-butylene carbonate	4437-85-8	
Trans-2,3-butylene carbonate (R,R)	51260-48-1	
Trans-2,3-butylene carbonate (S,S)	51261-82-6	
Cis-2,3-butylene carbonate	36368-39-5	
Methylene Chloride	75-09-2	0.2 – 0.8 %

SECTION 4 - FIRST AID MEASURES

Description of First Aid Measures:
Eye Contact:
Immediately flush with plenty of water for 15 minutes while holding back eyelids occasionally. Call a physician.

Skin Contact:
In case of skin contact, wash with soap and water.

Ingestion/Swallowed:
In case of ingestion have victim drink plenty of water. Call a physician.

Inhalation:
Immediately remove victim to fresh air. If breathing becomes difficult, call a physician.

Most important symptoms and effects, both acute and delayed:
The most important known symptoms and effects are described in section 2.

Identification of any immediate medical attention and special treatment needed:
No data available.

SECTION 5 - FIRE FIGHTING MEASURES

Extinguishing Media
Suitable extinguishing media:
Use water spray, alcohol resistant foam, dry chemical or carbon dioxide.

Special Hazards Arising From the Substance or Mixture Combustion Products:
Butylene carbonate when burned may form toxic levels of carbon monoxide, carbon dioxide, butylene oxide, formaldehyde, other irritating aldehydes, acids and ketones. Other hazardous products may occur under conditions of decomposition or combustion, and/or result from interaction with other materials and/or environment of decomposition or combustion.

Explosion Hazard:
Avoid generating dust; Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Sensitive to Static Discharge:
Static discharge could be an ignition source for a combustible concentration of dust.

Advice for Firefighters:
Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:
Wear protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas.

Environmental Precautions:
Do not allow to enter sewers/surface or ground water.

Methods and Materials for Containment and Cleaning Up:
Sweep up and shovel. Keep in suitable closed containers for appropriate disposal.

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 / STORAGE

General Procedures:
Comply with legal requirements. Keep away from heat, sparks and flame. Avoid dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air).

Precautions for Safe Handling:
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust information should be taken into consideration before additional processing occurs. Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.

Conditions for Safe Storage, Including Any Incompatibilities:
Keep container tightly closed in a dry and well-ventilated place.
Recommended storage temperature: 2-8° C.

Specific end use(s)
Apart from the uses mentioned in section 1, no other specific uses are stipulated.

Incompatibility:
Incompatible with strong oxidizing agents
Temperature above 150 °C

SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION

Control Parameters:
Components with workplace control parameters:
Contains less than 1% (between 0.2%-0.8%) methylene chloride and less than 5% butylene carbonate (mix of isomers)

Exposure Controls:
Engineering Controls:
Provide adequate room ventilation. Provide adequate ventilation in areas where vapors can be generated (e.g. methylene chloride). Eliminate ignition sources in areas where dust could be generated (e.g. dust collectors). Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). It is recommended that all dust control equipment such as local exhaust ventilation contain explosion relief vents or an explosion suppression system.

Ventilation:
Local, mechanical exhaust ventilation recommended especially when used in thermal processing or spray applications. Work areas must be well ventilated to maintain low methylene chloride vapor concentration.

Exposure limits:
Refer to the OSHA standard for methylene chloride for additional information. The OSHA standard sets a permissible exposure limit (PEL) of 25 parts methylene chloride per million parts of air (ppm) as an eight-hour time-weighted average (TWA). This refers to the average exposure during an eight-hour period. Employers must use engineering and work practice controls to limit employee exposures. Respiratory protection must be used in addition if these controls are insufficient to reduce exposures to below the limits.

The action level for airborne methylene chloride is set at a concentration of 12.5 ppm, calculated as an eight-hour TWA. Reaching or exceeding the action level signals that employers must begin compliance activities such as exposure monitoring and medical surveillance. There is also a short-term exposure limit (STEL) of 125 ppm, as measured over a 15-minute period.

Personal Protective Equipment:
Safety glasses and gloves.

Respiratory Protection
If excessive dusting occurs or methylene chloride levels are above the limits, wear NIOSH/MSHA approved dust/mist respirator.

Skin Protection
Chemical resistant gloves and apron. Wear gloves to prevent contact with molten resins.

Eye Protection
Wear safety glasses during normal use.
Eye wash fountain and emergency shower should be provided in work.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear to slight tan pellets or white to off-white granulates
Upper/Lower Flammability or explosive limits	No data available
Odor	No odor
Vapor Pressure	No data available
Odor Threshold	No data available
Vapor Density	No data available
pH	No data available
Relative Density	No data available
Melting Point/Freezing Point	No data available
Solubility in Water	Insoluble
Initial Boiling Point and Boiling Range	No data available
Flash Point	No data available
Evaporation Rate	No data available
Flammability (solid, gas)	No data available
Auto-Ignition Temperature	No data available
Decomposition Temperature	Decomposes above 180ºC (356 °F)
Viscosity	No data available
Explosive properties	No data available
Oxidizing properties	No data available
Other information	No data available

SECTION 10 - STABILITY AND REACTIVITY

Reactivity:
No data available.

Chemical Stability:
Stable under recommended storage conditions.

Possibility of Hazardous Reactions:
No data available.

Incompatible Materials:
Strong oxidizing agents.

Hazardous Decomposition Products:
Butylene carbonate when burned may form toxic levels of carbon monoxide, carbon dioxide, butylene oxide, formaldehyde, other irritating aldehydes, acids and ketones. Other hazardous products may occur under conditions of decomposition or combustion, and/or result from interaction with other materials and/or environment of decomposition or combustion.

In the event of fire: see section 5.

Materials and Conditions to Avoid:
Keep away from excess heat and temperatures above 150°C. During the initial mild decomposition, the polymer decomposes primarily to butylene carbonate. Further decomposition of the polymer and the butylene carbonate can produce butylene oxide, carbon dioxide, and other unknown materials both gaseous and solid.

SECTION 11 - TOXICOLOGICAL INFORMATION

General
No human or animal health effects data are known to exist for polybutylene carbonate. However, available toxicity information on polymers of molecular weight 1000 or greater suggests they have low toxicity. May contain 0.2 – 0.8% methylene chloride. Pure methylene chloride is a suspected human carcinogen. May contain up to 5% butylene carbonate. Butylene carbonate may cause serious eye damage.

Information on toxicological effects:
Acute Toxicity:
No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation:
No data available

Serious eye damage/eye irritation:
Butylene carbonate is GHS classified as H319: "Causes serious eye irritation" in accordance with 29 CFR 1910.1200 Appendix A (OSHA HCS) Eye Irritation (Butylene carbonate: Category 2A).

Respiratory or skin sensitization:
No data available

Germ cell mutagenicity:
No data available

Carcinogenicity:
Methylene chloride is GHSA classified as H351: "Suspected of causing cancer" in accordance with 29 CFR 1910.1200 Appendix A (OSHA HCS) Carcinogenicity (methylene chloride: Category 2)

Reproductive toxicity:
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

Acute Overexposure:
No data is available on the health effects of chronic exposure to this product.

Chronic Overexposure:
No other effects besides those associated with acute exposure.

SECTION 12 - ECOLOGICAL INFORMATION

Toxicity:
No data available

Persistence and degradability:
No data available

Bio accumulative potential:
No data available

Mobility in soil:
No data available

Results of PBT and vPvB assessment:
No data available

Other adverse effects:
No data available

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Treatment Methods:
Product: Offer surplus and non-recyclable solutions to a licensed disposal company.

Containment packaging: Dispose of as unused product

Hazardous Waste Characteristic:
None

Recommendation:
Dispose of contaminated product, empty containers and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures. Discharge of processing effluent to the sewer may require a permit. DO NOT discharge effluent solutions to septic systems.

SECTION 14 - TRANSPORTATION INFORMATION

Ground Shipping Information (DOT)
Proper Shipping Name:
None

Non-Hazardous for Transport:
This substance is considered to be non-hazardous for transport.

Air Shipping Information (ICAO/IATA)
Proper Shipping Name:
None

Non-Hazardous for Air Transport:
This substance is considered to be non-hazardous for air transport.

International Maritime Organization (IMO) Additional Shipping Class (IMDG code)
IMDG Code:
Not Applicable

HTS Code:
Not Applicable

SECTION 15 - REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS
SARA LISTED: No
TSCA Inventory Item: U.S. Toxic Substances Control Act (TSCA): All component(s) comprising these products are compliant with TSCA. These products have no special requirements under TSCA (e.g. consent orders, test rules, 12(b) requirements, etc.).

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

SARA 313 Components
SARA Section 313 Toxic Chemical List: Methylene chloride is listed.

SECTION 16 - OTHER INFORMATION

Classification System:
NFPA Ratings
Health Hazard = 0
Fire Hazard = 0
Reactivity Hazard = 0

HMIS Ratings
Health Hazard = 0
Chronic Health Hazard =
Flammability = 0
Physical Hazard = 0

Refer to NFPA 652, Standard for Combustible Dusts, and NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling.

It is believed that the herein contained information is accurate. It is provided for the purpose of hazard communication independent of any sale of the product, as part of our product safety program. There is no claim made regarding an implied warranty, express warranty, and fitness for a particular purpose or merchantability by the information herein contained or regarding the product. We make available data sheets for our products, which we urge you to obtain for the products you buy, process, distribute, or use. You should advice those who may come in contact with our products of the herein contained information.

User should consult his legal advisor or the appropriate government agency to establish applicability or effect of any regulation or law regarding the product. We do not undertake to provide advice on these matters.