

DRY ICE SAFE HANDLING GUIDELINES

Gene Therapy products are shipped in insulated shipping containers and kept cold with dry ice to protect product quality. **Dry ice exposure is a safety hazard.**

FACTS ABOUT DRY ICE

Dry ice is the frozen form of carbon dioxide. When heated, most frozen solids melt to a liquid form, but dry ice transforms directly into a gas (sublimation). Dry ice sublimates at temperatures at or above -109°F (-78°C). **The main hazards of dry ice include burns and asphyxiation.** Use of dry ice in confined spaces (e.g., small rooms or walk-in coolers) and/or poorly ventilated areas can result in depletion of oxygen resulting in asphyxiation. Exposed skin should be protected from contact with dry ice. **To ensure appropriate controls are in place, review the enclosed Safety Data Sheet (SDS) and consult with your EHS/Occupational Health department.**

VENTILATION

Take precautions when preparing to handle dry ice. Before opening the thermal shipping container, make sure the area in which you are working has proper ventilation. **Use of dry ice in confined spaces (e.g. small rooms or walk-in coolers) and/or poorly ventilated areas can result in depletion of oxygen resulting in asphyxiation.**

BURN TREATMENT

Dry ice **may cause cold burns to the skin.** Use **waterproof insulated gloves** when handling dry ice. Seek medical care as directed by the Dry Ice Safety Data Sheet (SDS).

DISPOSAL

Once dry ice is no longer needed, open the container and **leave it at room temperature in a well-ventilated area.** It will readily sublime from a solid to a gas. **DO NOT** leave dry ice in an unsecured area. **DO NOT** place in drain or flush in toilet. **DO NOT** dispose in trash. **DO NOT** place in a closed area such as an airtight container or walk-in cooler.

GENERAL SAFETY GUIDANCE FOR DRY ICE CAUTION



DO NOT TOUCH AVOID EYE CONTACT

Wear personal protective equipment (PPE). Use waterproof insulated gloves when removing or adding dry ice to prevent cold burns and frostbite. Avoid contact with face and eyes. Wear eye protection (e.g., safety goggles or safety glasses with side shields).



DO NOT EAT

Dry ice is harmful if eaten or swallowed. If ingested, seek immediate medical care.



DO NOT STORE IN CONFINED SPACES

Dry ice changes to a gas very rapidly at room temperature displacing oxygen. Only use dry ice in open or well-ventilated areas.



DO NOT PLACE IN AIRTIGHT CONTAINERS

Airtight containers may explode as dry ice rapidly expands to a gas when exposed to temperatures above -109°F (-78°C).



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Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Name Carbon Dioxide, Dry Ice
Product Code(s) PF00096
Synonyms Dry ice (nuggets, pellets, or blocks)
Trade Name: Not established
Chemical Family: Not determined
carbon dioxide (compressed)
CAS No 124-38-9

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

Recommended Use Refrigerant Packaging

1.3. Details of the supplier of the safety data sheet

Pfizer Inc
66 Hudson Boulevard East
New York, New York 10001
1-800-879-3477

Pfizer Ireland Pharmaceuticals
OSG Building
Ringaskiddy, Co. Cork.
Ireland
+353 21 4378701

E-mail address pfizer-MSDS@pfizer.com

1.4. Emergency telephone number

Emergency Telephone Chemtrec 1-800-424-9300 International Chemtrec (24 hours):+1-703-527-3887

Section 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

GHS - Classification: Not classified as hazardous

OSHA Classification

Health Hazard: Simple Asphyxiant

2.2. Label elements

Signal word Warning

Hazard statements May displace oxygen and cause rapid suffocation

Precautionary Statements P282 - Wear cold insulating gloves/face shield/eye protection
P336 + P315 - Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention
P403 - Store in a well-ventilated place

Supplemental Hazard Contact with dry ice may cause cold burns or frostbite.

2.3. Other hazards

Other hazards An Occupational Exposure Value has been established for this substance (see Section 8).

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Note: This document has been prepared in accordance with standards for workplace safety, which require the inclusion of all known hazards of the product or its ingredients regardless of the potential risk. The precautionary statements and warnings included may not apply in all cases. Your needs may vary depending upon the potential for exposure in your workplace.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Hazardous

Chemical name	Weight-%	REACH Registration Number	EC No	Classification according to Regulation (EC) No. 1272/2008 [CLP]	Specific concentration limit (SCL)	M-Factor	M-Factor (long-term)
carbon dioxide (compressed) (CAS #: 124-38-9)	100		204-696-9	Not classified as hazardous	Not Listed	No data available	No data available

Full text of H- and EUH-phrases: see section 16

Acute Toxicity Estimate
No information available

Additional information Ingredient(s) indicated as hazardous have been assessed under standards for workplace safety.

Section 4: FIRST AID MEASURES

4.1. Description of first aid measures

Inhalation	Remove to fresh air. Seek immediate medical attention/advice.
Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
Skin contact	Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.
Ingestion	Never give anything by mouth to an unconscious person. Wash out mouth with water. Do not induce vomiting unless directed by medical personnel. Seek medical attention immediately.

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

Most important symptoms and effects For information on potential signs and symptoms of exposure, See Section 2 - Hazards Identification and/or Section 11 - Toxicological Information.

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

Note to physicians None.

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Section 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media Dry chemical, CO₂, alcohol-resistant foam or water spray.

5.2. Special hazards arising from the substance or mixture

Specific hazards arising from the chemical Dry ice sublimates to carbon dioxide vapor. Vapor may displace oxygen and cause rapid suffocation.

Hazardous combustion products Formation of toxic gases is possible during heating or fire. Toxic gases including carbon monoxide can be expected in fires of this material. May include oxides of carbon.

5.3. Advice for firefighters

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Personnel involved in clean-up should wear appropriate personal protective equipment (see Section 8). Minimize exposure.

For emergency responders Use personal protection recommended in Section 8.

6.2. Environmental precautions

Environmental precautions Refer to protective measures listed in Sections 7 and 8.

6.3. Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Avoid use of a filtered vacuum to clean spills of dry solids. Contain the source of the spill or leak. Clean spill area thoroughly. Collect spilled material by a method that controls dust generation.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

6.4. Reference to other sections

Reference to other sections See section 8 for more information. See section 13 for more information.

Section 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Advice on safe handling

Restrict access to work area. Avoid open handling. Minimize generating airborne mists and vapors. Use process containment, local exhaust ventilation or perform work under fume hood/fume cupboard. Avoid inhalation and contact with skin, eye, and clothing. When handling, use appropriate personal protective equipment (see Section 8). Wash hands and any exposed skin after removal of PPE. Releases to the environment should be avoided. NEVER HANDLE SOLID CARBON DIOXIDE WITH YOUR BARE HANDS. USE GLOVES OR DRY ICE TONGS OR A DRY SHOVEL OR SCOOP.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions Store and use with adequate ventilation. Do not store in tight containers or confined spaces. Storage areas should be clean and dry. Store at -78.5 °C in properly labeled containers.

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7.3. Specific end use(s)

Specific use(s) Refrigerant Packaging.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure Limits

Refer to available public information for specific member state Occupational Exposure Limits.

carbon dioxide (compressed)

ACGIH TLV	STEL: 30000 ppm 5000 ppm
Austria	5000 ppm 9000 mg/m ³ STEL 10000 ppm STEL 18000 mg/m ³
Bulgaria	5000 ppm 9000 mg/m ³
Czech Republic	9000 mg/m ³ Ceiling: 45000 mg/m ³
Denmark	5000 ppm 9000 mg/m ³
Estonia	5000 ppm 9000 mg/m ³
European Union	TWA: 5000 ppm TWA: 9000 mg/m ³
Finland	5000 ppm 9100 mg/m ³
France	9000 mg/m ³
Germany	5000 ppm 9100 mg/m ³ Ceiling / Peak: 10000 ppm Ceiling / Peak: 18200 mg/m ³
Germany	5000 ppm 9100 mg/m ³
Hungary	9000 mg/m ³
Ireland	5000 ppm 9000 mg/m ³ STEL: 15000 ppm STEL: 27000 mg/m ³
Italy	5000 ppm 9000 mg/m ³
Latvia	5000 ppm 9000 mg/m ³
Netherlands	9000 mg/m ³
Poland	STEL: 27000 mg/m ³ 9000 mg/m ³
Romania	5000 ppm 9000 mg/m ³
Russia	TWA: 9000 mg/m ³ MAC: 27000 mg/m ³
Slovakia	5000 ppm 9000 mg/m ³
Spain	5000 ppm 9150 mg/m ³
Switzerland	5000 ppm 9000 mg/m ³
OSHA PEL	5000 ppm

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United Kingdom

9000 mg/m³
(vacated) TWA: 10000 ppm
(vacated) TWA: 18000 mg/m³
(vacated) STEL: 30000 ppm
(vacated) STEL: 54000 mg/m³
TWA: 5000 ppm
TWA: 9150 mg/m³
STEL: 15000 ppm
STEL: 27400 mg/m³

8.2. Exposure controls

Engineering controls	Engineering controls should be used as the primary means to control exposures.
Environmental exposure controls	No information available.
Personal protective equipment	Contact your safety and health professional or safety equipment supplier for assistance in selecting the correct protective clothing/equipment based on an assessment of the workplace conditions, other chemicals used or present in the workplace and specific operational processes. Refer to applicable national standards and regulations in the selection and use of personal protective equipment (PPE).
Eye/face protection	Wear safety glasses as minimum protection. (Safety glasses must meet the standards in accordance with EN166, ANSI Z87.1 or international equivalent.).
Hand protection	Wear insulated gloves to prevent skin contact. (Protective gloves must meet the standards in accordance with EN511 or international equivalent.).
Skin and body protection	Use protective clothing (uniforms, lab coats, disposable coveralls, etc.) in both production and laboratory areas. (Protective clothing must meet the standards in accordance with EN13982, ANSI 103 or international equivalent.).
Respiratory protection	Whenever any air contamination (dust, mist, vapor) is generated, respiratory protection, with appropriate protection factors, should be used to minimize exposure. (e.g. particulate respirator with a half mask, P3 filter). (Respirators must meet the standards in accordance with EN140, EN143, ASTM F2704-10 or international equivalent.).
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state	Solid
Color	White
Odor	No information available.
Odor threshold	No information available
Molecular formula	CO ₂
Molecular weight	44
Property	Values
pH	No data available
Melting point / freezing point	-56.6
Boiling point / boiling range	-78.46
Flash point	No information available
Evaporation rate	No data available
Flammability (solid, gas)	No data available
Flammability Limit in Air	
Upper flammability limit:	No data available

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Lower flammability limit:	No data available
Vapor pressure	5.73
Vapor density	No data available
Relative density	No data available
Water solubility	No data available
Solubility(ies)	No data available
Partition coefficient	No data available
Autoignition temperature	No data available
Decomposition temperature	No data available
Kinematic viscosity	No data available
Dynamic viscosity	No data available
Particle characteristics	
Particle Size	No information available
Particle Size Distribution	No information available
Explosive properties	No information available

9.2. Other information

No information available

9.2.1. Information with regard to physical hazard classes

No information available

9.2.2. Other safety characteristics

No information available

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity

Reactivity No data available.

10.2. Chemical stability

Stability Stable under normal conditions.

Explosion data

Sensitivity to Mechanical Impact No data available.

Sensitivity to Static Discharge No data available.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions No information available.

10.4. Conditions to avoid

Conditions to avoid Dry ice sublimates to carbon dioxide vapor. Vapor may displace oxygen and cause rapid suffocation.

10.5. Incompatible materials

Incompatible materials As a precautionary measure, keep away from strong oxidizers.

10.6. Hazardous decomposition products

Hazardous decomposition products No data available.

Section 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

General Information:

Toxicological properties have not been thoroughly investigated.

Short term

Dry ice sublimates to carbon dioxide vapor. Vapor may displace oxygen and cause rapid suffocation. Contact with dry ice may cause cold burns or frostbite.

Acute toxicity

Based on available data, the classification criteria are not met.

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Serious eye damage/eye irritation	Based on available data, the classification criteria are not met.
Skin corrosion/irritation	Based on available data, the classification criteria are not met.
Respiratory or skin sensitization	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.
Reproductive toxicity	Based on available data, the classification criteria are not met.
Germ cell mutagenicity	Based on available data, the classification criteria are not met.
Carcinogenicity	Based on available data, the classification criteria are not met.
Aspiration hazard	Based on available data, the classification criteria are not met.

Carcinogenicity Not listed as a carcinogen by IARC, NTP or US OSHA.

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Endocrine disrupting properties No information available.

11.2.2. Other information

Other adverse effects No information available.

Section 12: ECOLOGICAL INFORMATION

Environmental Overview: Releases to the environment should be avoided. Environmental properties have not been investigated.

12.1. Toxicity

No information available

12.2. Persistence and degradability

Persistence and degradability No information available.

12.3. Bioaccumulative potential

Bioaccumulation No information available.

12.4. Mobility in soil

Mobility in soil No information available.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment No information available.

12.6. Endocrine disrupting properties

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Endocrine disrupting properties No information available.

12.7. Other adverse effects

No information available.

Section 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Dispose of waste in accordance with all applicable laws and regulations. Member State specific and Community specific provisions must be considered. Considering the relevant known environmental and human health hazards of the material, review and implement appropriate technical and procedural wastewater and waste disposal measures to prevent occupational exposure and environmental release. It is recommended that waste minimization be practiced. The best available technology should be utilized to prevent environmental releases. This may include destructive techniques for waste and wastewater.

Section 14: TRANSPORT INFORMATION

The following refers to all modes of transportation unless specified below.

UN number:	Not applicable
UN proper shipping name:	Not regulated
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental Hazard(s):	Not applicable

Special precautions for user: Not applicable

IMDG

UN-No	UN1845
UN proper shipping name	Carbon Dioxide, Solid
Hazard Class	9

IATA

UN-No	UN1845
UN proper shipping name	Carbon Dioxide, Solid
Hazard Class	9

Section 15: REGULATORY INFORMATION

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

carbon dioxide (compressed)

CERCLA/SARA Section 313 de minimus %	Not Listed
California Proposition 65	Not Listed
TSCA	Present
EINECS	204-696-9
AICS	Present

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

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Authorizations and/or restrictions on use:

This product does not contain substances subject to authorization (Regulation (EC) No. 1907/2006 (REACH), Annex XIV) This product does not contain substances subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII)

Persistent Organic Pollutants

Not applicable

Ozone-depleting substances (ODS) regulation (EC) 1005/2009

Not applicable

Plant protection products directive (91/414/EEC)

Chemical name	Plant protection products directive (91/414/EEC)
carbon dioxide (compressed) - 124-38-9	Plant protection agent

EU - Biocides

Chemical name	EU - Biocides
carbon dioxide (compressed) - 124-38-9	Product-type 14: Rodenticides Product-type 18: Insecticides, acaricides and products to control other arthropods

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

AICS - Australian Inventory of Chemical Substances

15.2. Chemical safety assessment

Chemical Safety Report No information available

Section 16: OTHER INFORMATION

Key or legend to abbreviations and acronyms used in the safety data sheet

Data Sources: Publicly available toxicity information. Commercial vendor SDS.

Reason for revision Updated Section 1 - Identification of the Substance/Preparation and the Company/Undertaking. Updated Section 2 - Hazard Identification. Updated Section 3 - Composition / Information on Ingredients. Updated Section 12 - Ecological Information. Updated Section 15 - Regulatory Information.

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Prepared By Pfizer Global Environment, Health, and Safety

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