

# SAFETY DATA SHEET

Republic of Korea

In accordance with the Standard for Classification and Labeling of Chemical Substance and Safety Data Sheet, Article 10 Paragraph 1

## Section 1. Chemical product and company identification

**A. Product name** PF-MAB, Protein-free Nutrient Supplement for Monoclonal Antibody Production, 100X Concentrate, 1000mL

**Catalogue Number** SH30138.02

**Article Number** 29184182

## B. Recommended use of the chemical

### Restrictions on use

#### Uses advised against

Not applicable.

**C. Manufacturer Supplier**

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(9.00 am - 6.00 pm)

## Section 2. Hazards identification

**A. Hazard classification** CARCINOGENICITY - Category 1B

This product is classified in accordance with the Industrial Safety and Health Act and the Chemical Control Act.

Percentage of the mixture consisting of ingredient(s) of unknown acute oral toxicity: 1.7%

Percentage of the mixture consisting of ingredient(s) of unknown acute dermal toxicity: 17.5%

Percentage of the mixture consisting of ingredient(s) of unknown acute inhalation toxicity: 17.5%

Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 16.4%

## B. GHS label elements, including precautionary statements

### Symbol



### Signal word

Danger

### Hazard statements

May cause cancer.

**Precautionary statements**

<b>Prevention</b>	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing.
<b>Response</b>	IF exposed or concerned: Get medical attention.
<b>Storage</b>	Store locked up.
<b>Disposal</b>	Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>C. Other hazards which do not result in classification</b>	None known.

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

<b>Substance/mixture</b>	Mixture
<b>Other means of identification</b>	Not available.
<b>CAS number/other identifiers</b>	
<b>CAS number</b>	Not applicable.
<b>EC number</b>	Mixture.
<b>Product code</b>	SH30138.02

<b>Ingredient name</b>	<b>Common name</b>	<b>Identifiers</b>	<b>%</b>
Nitric acid, iron(3+) salt, nonahydrate	Ferric nitrate, nonahydrate; Iron trinitrate, nonahydrate; Iron (III) nitrate, nonahydrate; Iron (III) nitrate nonahydrate; Iron(III) nitrate, nonahydrate (1:3:9); Ferric nitrate nonahydrate	7782-61-8	≥1 - <10
citric acid	1,2,3-Propanetricarboxylic acid, 2-hydroxy-; 2-Hydroxy-1,2,3-propanetricarboxylic acid; 2-Hydroxypropane-1,2,3-tricarboxylic acid; E 330; β-hydroxytricarballic acid; ACIDE CITRIQUE; beta-Hydroxytricarballic acid; CITRIC ACID, ANHYDROUS; 2-hydroxy-1,2,3-propa-netricarboxylic acid; Anhydrous citric acid; Citronensäure; Citiric acid	77-92-9	≥1 - <10
Cadmium chloride, hydrate (2:5)	Cadmium chloride (CdCl <sub>2</sub> ), hydrate (2:5); dichlorocadmium pentahydrate; cadmium chloride hydrate (2:5); cadmium chloride hemipentahydrate; CADMIUM CHLORIDE, HEMIPENTAHYDRATE	7790-78-5	<0.1

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**

<b>A. Eye contact</b>	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.
<b>B. Skin contact</b>	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
<b>C. Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
<b>D. Ingestion</b>	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.

<b>E. Notes to physician</b>	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
<b>Specific treatments</b>	No specific treatment.
<b>Protection of first-aiders</b>	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

### A. Extinguishing media

<b>Suitable</b>	Use an extinguishing agent suitable for the surrounding fire.
<b>Not suitable</b>	None known.
<b>B. Specific hazards arising from the chemical</b>	In a fire or if heated, a pressure increase will occur and the container may burst.
<b>Hazardous thermal decomposition products</b>	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides halogenated compounds metal oxide/oxides
<b>C. Special protective equipment for fire-fighters</b>	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
<b>Special precautions for fire-fighters</b>	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.

## Section 6. Accidental release measures

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

## Section 7. Handling and storage

### A. Precautions for safe handling

<b>Protective measures</b>	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.
<b>Advice on general occupational hygiene</b>	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.
<b>B. Conditions for safe storage, including any incompatibilities</b>	Store between the following temperatures: 15 to 30°C (59 to 86°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

## Section 8. Exposure controls/personal protection

### A. Control parameters

#### Occupational exposure limits

##### **Ingredient name**

Cadmium compounds

##### **Exposure limits**

**Ministry of Employment and Labor (Republic of Korea, 7/2018).**

TWA: 0.01 mg/m<sup>3</sup>, (as Cd) 8 hours.

TWA: 0.002 mg/m<sup>3</sup>, (as Cd) 8 hours. Form:  
Respirable fraction

### B. **Appropriate engineering controls**

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.

### C. Personal protective equipment

#### **Respiratory protection**

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

#### **Eye 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: safety glasses with side-shields.

#### **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.

#### **Skin 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.

#### **Hygiene measures**

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

## Section 9. Physical and chemical properties

### A. Appearance

#### **Physical state**

Liquid.

#### **Color**

Clear. Dark Brownish

### B. **Odor**

Not available.

### C. **Odor threshold**

Not available.

### D. **pH**

2.8 to 4.8

### E. **Melting/freezing point**

Not available.

### F. **Boiling point/boiling range**

Not available.

### G. **Flash point**

Not available.

#### **Fire point**

Not available.

#### **Burning time**

Not applicable.

#### **Burning rate**

Not applicable.

### H. **Evaporation rate**

Not available.

### I. **Flammability (solid, gas)**

Not available.

### J. **Lower and upper explosive (flammable) limits**

Not available.

### K. **Vapor pressure**

Not available.

### L. **Solubility**

Not available.

#### **Solubility in water**

Not available.

### M. **Vapor density**

Not available.

### N. **Relative density**

Not available.

### O. **Partition coefficient: n-octanol/water**

Not available.

### P. **Auto-ignition temperature**

Not available.

<b>Q. Decomposition temperature</b>	Not available.
<b>SADT</b>	Not available.
<b>R. Viscosity</b>	Not available.
<b>Flow time (ISO 2431)</b>	Not available.
<b>S. Molecular weight</b>	Not applicable.

## Section 10. Stability and reactivity

<b>A. Chemical stability</b>	The product is stable.
<b>Possibility of hazardous reactions</b>	Under normal conditions of storage and use, hazardous reactions will not occur.
<b>B. Conditions to avoid</b>	No specific data.
<b>C. Incompatible materials</b>	No specific data.
<b>D. Hazardous decomposition products</b>	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### A. Information on the likely routes of exposure

Routes of entry anticipated: Oral, Dermal.

#### Potential acute health effects

<b>Respiratory</b>	No known significant effects or critical hazards.
<b>Oral</b>	No known significant effects or critical hazards.
<b>Skin</b>	No known significant effects or critical hazards.
<b>Eyes</b>	No known significant effects or critical hazards.

#### Over-exposure signs/symptoms

<b>Inhalation</b>	No specific data.
<b>Ingestion</b>	No specific data.
<b>Skin contact</b>	No specific data.
<b>Eye contact</b>	No specific data.

### B. Health hazards

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Nitric acid, iron(3+) salt, nonahydrate	LD50 Oral	Rat	3250 mg/kg	-
citric acid	LD50 Oral	Rat	3 g/kg	-
Cadmium chloride, hydrate (2:5)	LD50 Oral	Rat	665 mg/kg	-

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
citric acid	Eyes - Severe irritant	Rabbit	-	24 hours 750 Micrograms	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	0.5 Milliliters	-

#### Sensitization

Not available.

### CMR - ISHA Article 42 Public Notice No 2016-41 Occupational Exposure Limits

Product/ingredient name	Identifiers	Classification
Cadmium and compounds	7790-78-5	GERM CELL MUTAGENICITY - Category 2 CARCINOGENICITY - Category 1A TOXIC TO REPRODUCTION (Fertility) - Category 2 TOXIC TO REPRODUCTION (Unborn child) - Category 2

#### Mutagenicity

Not available.

#### Carcinogenicity

Not available.

#### Classification

Product/ingredient name	OSHA	IARC	NTP	ACGIH
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Nitric acid, iron(3+) salt, nonahydrate	-	2A	-	-
Cadmium compounds	-	1	-	A2

**Reproductive toxicity**

Not available.

**Teratogenicity**

Not available.

**Specific target organ toxicity (single exposure)**

Not available.

**Specific target organ toxicity (repeated exposure)**

Not available.

**Aspiration hazard**

Not available.

**Potential chronic health effects****Chronic toxicity**

Not available.

<b>General</b>	No known significant effects or critical hazards.
<b>Carcinogenicity</b>	May cause cancer. Risk of cancer depends on duration and level of exposure.
<b>Mutagenicity</b>	No known significant effects or critical hazards.
<b>Teratogenicity</b>	No known significant effects or critical hazards.
<b>Developmental effects</b>	No known significant effects or critical hazards.
<b>Fertility effects</b>	No known significant effects or critical hazards.

**ATE value**

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
PF-MAb, Protein-free Nutrient Supplement for Monoclonal Antibody Production, 100X Concentrate	158359.8	N/A	N/A	N/A	N/A
Nitric acid, iron(3+) salt, nonahydrate	3250	N/A	N/A	N/A	N/A
citric acid	3000	N/A	N/A	N/A	N/A
Cadmium compounds	665	1100	N/A	11	N/A

**Section 12. Ecological information****A. Ecotoxicity**

Product/ingredient name	Result	Species	Exposure
citric acid	Acute LC50 160000 µg/l Marine water	Crustaceans - Carcinus maenas - Adult	48 hours

**B. Persistence/degradability**

Not available.

**C. Bioaccumulative potential**

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
citric acid	-1.8	-	low

**D. Mobility in soil**

<b>Soil/water partition coefficient (K<sub>oc</sub>)</b>	Not available.
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**E. Other adverse effects**

No known significant effects or critical hazards.

**Section 13. Disposal considerations****A. 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.

**B. Disposal precautions**

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

### UN

A. UN number	Not available.
B. Proper shipping name	Not available.
C. Classes	Not available.
D. Packing group	Not available.
E. Marine pollutant	No.
F. Additional information	-
Label	

### IMDG

A. UN number	Not available.
B. Proper shipping name	Not available.
C. Classes	Not available.
D. Packing group	Not available.
E. Marine pollutant	No.
F. Additional information	-
Label	

### IATA

A. UN number	Not available.
B. Proper shipping name	Not available.
C. Classes	Not available.
D. Packing group	Not available.
E. Marine pollutant	No.
F. Additional information	-
Label	

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

**Transport in bulk according to Annex II of MARPOL and the IBC Code**      Not available.

## Section 15. Regulatory information

### A. Regulation according to ISHA

**ISHA article 37 (Harmful substances prohibited from manufacture)**      None of the components are listed.

**ISHA article 38 (Harmful substances requiring permission)**      None of the components are listed.

### Exposure Limits of Chemical Substances and Physical Factors

The following components have an OEL:  
Cadmium compounds

**ISHA Enforcement Regs Annex 11-3 (Exposure standards established for harmful factors)**      The following components are listed: Cadmium and its compounds

**ISHA Enforcement Regs Annex 11-5 (Harmful factors subject to Work Environment Measurement)**      None of the components are listed.

**ISHA Enforcement Regs Annex 12-2 (Harmful Factors Subject to Special Health Check-up)**      None of the components are listed.


<b>Standard of Industrial Safety and Health Annex 12 (Hazardous substances subject to control)</b>	None of the components are listed.
<b>B. <u>Regulation according to Chemicals Control Act</u></b>	
<b>CCA Article 11 (TRI)</b>	None of the components are listed.
<b>CCA Article 18 Prohibited (K-Reach Article 27)</b>	None of the components are listed.
<b>CCA Article 19 Subject to authorization (K-Reach Article 25)</b>	None of the components are listed.
<b>CCA Article 20 Toxic Chemicals (K-Reach Article 20)</b>	Not applicable
<b>CCA Article 20 Restricted (K-Reach Article 27)</b>	None of the components are listed.
<b>CCA Article 39 (Accident Precaution Chemicals)</b>	None of the components are listed.
<b>Existing Chemical Substances Subject to Registration</b>	The following components are listed: Tin chloride (SnCl <sub>2</sub> ), dihydrate, Hydrogen chloride; Hydrochloric acid, Sulfuric acid, zinc salt (1:1), heptahydrate
<b>C. <u>Dangerous Materials Safety Management Act</u></b>	Not available.
<b>D. <u>Wastes regulation</u></b>	Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>E. <u>Regulation according to other foreign laws</u></b>	
<b>Article 2 of Youth Protection Act on Substances Hazardous to Youth</b>	Not applicable.
<b><u>International regulations</u></b>	
<b><u>Chemical Weapon Convention List Schedules I, II &amp; III Chemicals</u></b>	
Not listed.	
<b><u>Montreal Protocol</u></b>	
Not listed.	
<b><u>Stockholm Convention on Persistent Organic Pollutants</u></b>	
Not listed.	
<b><u>Rotterdam Convention on Prior Informed Consent (PIC)</u></b>	
Not listed.	
<b><u>UNECE Aarhus Protocol on POPs and Heavy Metals</u></b>	
Not listed.	
<b><u>Inventory list</u></b>	
<b>Republic of Korea</b>	Not determined.
<b>Europe</b>	All components are listed or exempted.
<b>United States</b>	All components are listed or exempted.
<b>China</b>	Not determined.
<b>Japan</b>	<b>Japan inventory (ENCS):</b> Not determined. <b>Japan inventory (ISHL):</b> Not determined.

## Section 16. Other information

<b>A. <u>References</u></b>	Not available.
<b>B. <u>Date of issue/Date of revision</u></b>	12 October 2019
<b>C. <u>Version</u></b>	0.02
<b><u>Date of printing</u></b>	<b>12 April 2020</b>
	sds_author@cytiva.com
<b>D. <u>Other</u></b>	



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 Indicates information that has changed from previously issued version.

**Key to abbreviations**

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

**Notice to reader**

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

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