1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Pfizer Inc
Pfizer Pharmaceuticals Group
235 East 42nd Street
New York, New York 10017
1-212-573-2222
Emergency telephone number: 1-877-777-3180
Contact E-Mail: pfizer-MSDS@pfizer.com

Pfizer Global Manufacturing
Pfizer Inc
235 East 42nd Street
New York, NY 10017
Emergency telephone number: ChemSafe (24 hours): +44 (0)208 762 8322

Material Name: Sildenafil Citrate Powder for Oral Solution

<table>
<thead>
<tr>
<th>Trade Name:</th>
<th>Revatio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms:</td>
<td>Sildenafil Citrate Powder for Oral Solution; REVATIO POS</td>
</tr>
<tr>
<td>Chemical Family:</td>
<td>Mixture</td>
</tr>
<tr>
<td>Intended Use:</td>
<td>Pharmaceutical product used for Treatment of pulmonary arterial hypertension</td>
</tr>
</tbody>
</table>

2. HAZARDS IDENTIFICATION

Appearance: Powder

Statement of Hazard: Non-hazardous in accordance with international standards for workplace safety.

Additional Hazard Information:

- **Short Term:** May be harmful if swallowed. May cause eye irritation (based on components)
- **Long Term:** Animal studies indicate that this material may cause adverse effects on the cardiovascular system.

Known Clinical Effects: Adverse effects most commonly reported in clinical use include difficult digestion (dyspepsia), nose bleed, headache, flushing, insomnia, abnormal redness of skin (erythema), difficulty breathing, muscle pain, fever, gastrointestinal irritation, tingling/itching (paresthesia), transient changes in light perception and color vision, effects on hearing, and effects on vision.

EU Indication of danger: Not classified


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.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>EU EINECS/ELINCS List</th>
<th>Classification</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sildenafil citrate</td>
<td>171599-83-0</td>
<td>Not listed</td>
<td>Xn;R22</td>
<td>3.5</td>
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<tr>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>236-675-5</td>
<td>Not Listed</td>
<td>*</td>
</tr>
</tbody>
</table>
3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>EU EINECS/ELINCS List</th>
<th>Classification</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citric acid</td>
<td>77-92-9</td>
<td>201-069-1</td>
<td>Xi; R36</td>
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<tr>
<td>Colloidal silicon dioxide</td>
<td>7631-86-9</td>
<td>231-545-4</td>
<td>Not Listed</td>
<td>*</td>
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<tr>
<td>Sucralose</td>
<td>56038-13-2</td>
<td>259-952-2</td>
<td>Not Listed</td>
<td>*</td>
</tr>
<tr>
<td>Sorbitol</td>
<td>6706-59-8</td>
<td>Not listed</td>
<td>Not Listed</td>
<td>*</td>
</tr>
<tr>
<td>Sodium benzoate</td>
<td>532-32-1</td>
<td>208-534-8</td>
<td>Not Listed</td>
<td>*</td>
</tr>
<tr>
<td>Sodium citrate</td>
<td>68-04-2</td>
<td>200-675-3</td>
<td>Not Listed</td>
<td>*</td>
</tr>
<tr>
<td>Flavor</td>
<td>NOT ASSIGNED</td>
<td>Not listed</td>
<td>Not Listed</td>
<td>*</td>
</tr>
<tr>
<td>Xanthan gum</td>
<td>11138-66-2</td>
<td>234-394-2</td>
<td>Not Listed</td>
<td>*</td>
</tr>
</tbody>
</table>

Additional Information: * Proprietary
Ingredient(s) indicated as hazardous have been assessed under standards for workplace safety.

For the full text of the R phrases mentioned in this Section, see Section 16

4. FIRST AID MEASURES

Eye Contact: Flush with water while holding eyelids open for at least 15 minutes. Seek medical attention immediately.

Skin Contact: Remove contaminated clothing. Flush area with large amounts of water. Use soap. Seek medical 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.

Inhalation: Remove to fresh air and keep patient at rest. Seek medical attention immediately.

Symptoms and Effects of Exposure: For information on potential signs and symptoms of exposure, See Section 2 - Hazards Identification and/or Section 11 - Toxicological Information.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Use carbon dioxide, dry chemical, or water spray.

Hazardous Combustion Products: Formation of toxic gases is possible during heating or fire.

Fire Fighting Procedures: During all fire fighting activities, wear appropriate protective equipment, including self-contained breathing apparatus.

Fire / Explosion Hazards: Fine particles (such as dust and mists) may fuel fires/explosions.

6. ACCIDENTAL RELEASE MEASURES

Health and Safety Precautions: Personnel involved in clean-up should wear appropriate personal protective equipment (see Section 8). Minimize exposure.

Measures for Cleaning / Collecting: Contain the source of spill if it is safe to do so. Collect spilled material by a method that controls dust generation. A damp cloth or a filtered vacuum should be used to clean spills of dry solids. Clean spill area thoroughly.
Measures for Environmental Protections: Place waste in an appropriately labeled, sealed container for disposal. Care should be taken to avoid environmental release.

Additional Consideration for Large Spills: Non-essential personnel should be evacuated from affected area. Report emergency situations immediately. Clean up operations should only be undertaken by trained personnel.

### 7. HANDLING AND STORAGE

General Handling: Minimize dust generation and accumulation. Avoid breathing dust. Avoid contact with eyes, skin and clothing. Refer to Section 12 - Ecological Information, for information on potential effects on the environment. Wash hands and any exposed skin after removal of PPE. Releases to the environment should be avoided. Review and implement appropriate technical and procedural waste water and waste disposal measures to prevent occupational exposure or environmental releases. Potential points of process emissions of this material to the atmosphere should be controlled with dust collectors, HEPA filtration systems or other equivalent controls.

Storage Conditions: Store as directed by product packaging.

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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

**Sildenafil citrate**

- **Pfizer OEL TWA-8 Hr:** 350µg/m³

**Titanium dioxide**

- **ACGIH Threshold Limit Value (TWA)** 10 mg/m³ TWA
- **Australia TWA** 10 mg/m³
- **Austria OEL - MAKs** Listed
- **Belgium OEL - TWA** Listed
- **Bulgaria OEL - TWA** Listed
- **Denmark OEL - TWA** Listed
- **Estonia OEL - TWA** Listed
- **France OEL - TWA** Listed
- **Greece OEL - TWA** Listed
- **Ireland OEL - TWAs** Listed
- **Latvia OEL - TWA** Listed
- **Lithuania OEL - TWA** Listed
- **OSHA - Final PELS - TWAs:** 15 mg/m³ total
- **Poland OEL - TWA** Listed
- **Portugal OEL - TWA** Listed
- **Romania OEL - TWA** Listed
- **Spain OEL - TWA** Listed
- **Sweden OEL - TWAs** Listed

**Colloidal silicon dioxide**

- **Australia TWA** 2 mg/m³
- **Austria OEL - MAKs** Listed
- **Czech Republic OEL - TWA** Listed
- **Estonia OEL - TWA** Listed
- **Germany - TRGS 900 - TWAs** 4 mg/m³
- **Germany (DFG) - MAK** 4 mg/m³ MAK
- **Ireland OEL - TWAs** Listed
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Analytical Method:
Analytical method available for Sildenafil. Contact Pfizer Inc for further information.

Engineering Controls:
Engineering controls should be used as the primary means to control exposures. General room ventilation is adequate unless the process generates dust, mist or fumes. Keep airborne contamination levels below the exposure limits listed above in this section.

Environmental Exposure Controls:
Refer to specific Member State legislation for requirements under Community environmental legislation.

Personal Protective Equipment:
Refer to applicable national standards and regulations in the selection and use of personal protective equipment (PPE).

   Hands: Impervious gloves are recommended if skin contact with drug product is possible and for bulk processing operations.
   Eyes: Wear safety glasses or goggles if eye contact is possible.
   Skin: Impervious protective clothing is recommended if skin contact with drug product is possible and for bulk processing operations.
   Respiratory protection: If the applicable Occupational Exposure Limit (OEL) is exceeded, wear an appropriate respirator with a protection factor sufficient to control exposures to below the OEL.

9. PHYSICAL AND CHEMICAL PROPERTIES:

   Physical State: Powder
   Molecular Formula: Mixture
   Color: No data available.
   Molecular Weight: Mixture

10. STABILITY AND REACTIVITY

   Stability: Stable under normal conditions of use.
   Conditions to Avoid: None known
   Incompatible Materials: As a precautionary measure, keep away from strong oxidizers

11. TOXICOLOGICAL INFORMATION

   General Information: The information included in this section describes the potential hazards of the individual ingredients.

   Acute Toxicity: (Species, Route, End Point, Dose)

   Sildenafil citrate
   Rat Oral LDmin. 300-500 mg/kg
   Mouse Oral LDmin. 500-1000 mg/kg
   Rat Dermal LD50 > 2000 mg/kg

   Titanium dioxide
   Rat Oral LD50 > 7500 mg/kg

PZ00976
### 11. TOXICOLOGICAL INFORMATION

#### Acute Toxicity Comments:
A greater than symbol (>) indicates that the toxicity endpoint being tested was not achievable at the highest dose used in the test.

#### Irritation / Sensitization: (Study Type, Species, Severity)

**Sildenafil citrate**
- Eye Irritation: Rabbit, Moderate
- Skin Irritation: Rabbit, Non-irritating
- Skin Sensitization: Guinea Pig, Negative

**Citric acid**
- Eye Irritation: Rabbit, Severe
- Skin Irritation: Rabbit, Mild

#### Repeated Dose Toxicity: (Duration, Species, Route, Dose, End Point, Target Organ)

**Sildenafil citrate**
- 6 Month(s): Rat, Oral, 3 mg/kg/day, NOAEL, Adrenal gland, Liver, Thyroid
- 6 Month(s): Dog, Oral, 15 mg/kg/day, NOAEL, Cardiovascular system

**Sodium benzoate**
- 10 Day(s): Rat, Oral, 27370 mg/kg, LOAEL, Liver, Blood
- 10 Day(s): Mouse, Oral, 45 g/kg, LOAEL, Liver, Kidney, Blood, Ureter, Bladder

#### Reproduction & Developmental Toxicity: (Study Type, Species, Route, Dose, End Point, Effect(s))

**Sildenafil citrate**
- Reproductive & Fertility: Rat, Oral, 60 mg/kg/day, NOEL, No effects at maximum dose
- Embryo / Fetal Development: Rat, Oral, 50 mg/kg/day, NOEL, Maternal Toxicity, Not Teratogenic
- Embryo / Fetal Development: Rabbit, Oral, 50 mg/kg/day, NOEL, Maternal Toxicity, Not Teratogenic

**Sodium benzoate**
- Embryo / Fetal Development: Rat, Oral, 44 g/kg, LOEL, Developmental toxicity

#### Genetic Toxicity: (Study Type, Cell Type/Organism, Result)

**Sildenafil citrate**
- *In Vitro* Bacterial Mutagenicity (Ames): *Salmonella* Negative
- *In Vitro* Cytogenetics: Human Lymphocytes Negative
- *In Vivo* Micronucleus Chromosome Aberration: Mouse Bone Marrow Negative

#### Carcinogenicity: (Duration, Species, Route, Dose, End Point, Effect(s))
11. TOXICOLOGICAL INFORMATION

Sildenafil citrate
24 Month(s) Mouse Oral 5 mg/kg/day NOAEL Not carcinogenic
24 Month(s) Rat Oral 60 mg/kg/day NOAEL Not carcinogenic

Carcinogen Status: None of the components of this formulation are listed as a carcinogen by IARC, NTP or OSHA.

Titanium dioxide
IARC: Group 3 (Not Classifiable)

Colloidal silicon dioxide
IARC: Group 3

12. ECOLOGICAL INFORMATION

Environmental Overview: In the environment, the active ingredient in this formulation is expected to remain in water or migrate through the soil to groundwater. Harmful effects to aquatic organisms could occur.

Mobility, Persistence and Degradability: The active ingredient in this formulation is water soluble and is expected to remain primarily in water.

Bioaccumulation and Toxicity: The active ingredient in this formulation has low potential to bioaccumulate and long-term adverse effects to aquatic organisms are not expected. See aquatic toxicity data, below.

Aquatic Toxicity: (Species, Method, End Point, Duration, Result)

Sildenafil citrate
Daphnia Magna TAD EC50 48 Hours 14 mg/L
Onchorhynchus mykiss (Rainbow Trout) OECD LC50 96 Hours > 9.5 mg/L
Pseudokirchneriella subcapitata (Green Alga) OECD EC50 72 Hours 20 mg/L

Aquatic Toxicity Comments: A greater than (>) symbol indicates that acute ecotoxicity was not observed at the maximum solubility. Since the substance is insoluble in aqueous solutions above this concentration, an acute ecotoxicity value (i.e. LC/EC50) is not achievable.

Bacterial Inhibition: (Species, Method, End Point, Duration, Result)

Sildenafil citrate
Activated sludge OECD EC50 3 Hours > 1000 mg/L

13. DISPOSAL CONSIDERATIONS

Disposal Procedures: 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 waste water 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.

14. TRANSPORT INFORMATION

Not regulated for transport under USDOT, EUADR, IATA, or IMDG regulations.
15. REGULATORY INFORMATION

EU Indication of danger: Not classified

OSHA Label:
Non-hazardous in accordance with international standards for workplace safety.

Canada - WHMIS: Classifications

WHMIS hazard class:
None required
This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

Sucralose
Australia (AICS): Listed
EU EINECS/ELINCS List 259-952-2

Titanium dioxide
Inventory - United States TSCA - Sect. 8(b) Listed
Australia (AICS): Listed
EU EINECS/ELINCS List 236-675-5

Sodium benzoate
Inventory - United States TSCA - Sect. 8(b) Listed
Australia (AICS): Listed
EU EINECS/ELINCS List 208-534-8

Sodium citrate
Inventory - United States TSCA - Sect. 8(b) Listed
Australia (AICS): Listed
Standard for the Uniform Scheduling for Drugs and Poisons: Schedule 5
EU EINECS/ELINCS List 200-675-3

Citric acid
Inventory - United States TSCA - Sect. 8(b) Listed
Australia (AICS): Listed
EU EINECS/ELINCS List 201-069-1

Colloidal silicon dioxide
Inventory - United States TSCA - Sect. 8(b) Listed
Australia (AICS): Listed
EU EINECS/ELINCS List 231-545-4

Xanthan gum
Inventory - United States TSCA - Sect. 8(b) Listed
15. REGULATORY INFORMATION

<table>
<thead>
<tr>
<th>Australia (AICS):</th>
<th>Listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU EINECS/ELINCS List</td>
<td>234-394-2</td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

Text of R phrases mentioned in Section 3

R22 - Harmful if swallowed.
R36 - Irritating to eyes.

Data Sources: Pfizer proprietary drug development information. Safety data sheets for individual ingredients.

Prepared by: Toxicology and Hazard Communication
             Pfizer Global Environment, Health, and Safety Operations

Pfizer Inc believes that the information contained in this Material Safety Data Sheet is accurate, and while it is provided in good faith, it is without warranty of any kind, expressed or implied. If data for a hazard are not included in this document there is no known information at this time.

End of Safety Data Sheet