# SAFETY DATA SHEET

**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND THE COMPANY/UNDERTAKING**

**Product Identifier**

Material Name: Sildenafil Citrate for Oral Suspension

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Synonyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revatio</td>
<td>Sildenafil Citrate Powder for Oral Solution; REVATIO POS</td>
</tr>
<tr>
<td>Chemical Family:</td>
<td>Mixture</td>
</tr>
</tbody>
</table>

**Relevant Identified Uses of the Substance or Mixture and Uses Advised Against**

**Intended Use:** Pharmaceutical product used for Treatment of pulmonary arterial hypertension

**Details of the Supplier of the Safety Data Sheet**

- **Pfizer Inc**
  - Pfizer Pharmaceuticals Group
  - 235 East 42nd Street
  - New York, New York 10017
  - 1-800-879-3477

- **Pfizer Ltd**
  - Ramsgate Road
  - Sandwich, Kent
  - CT13 9NJ
  - United Kingdom
  - +00 44 (0)1304 616161

**Emergency telephone number:**
- 1-877-777-3180

**Contact E-Mail:** pfizer-MSDS@pfizer.com

**Revision date:** 08-Feb-2017

**Version:** 2.2

**Page:** 1 of 10

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**2. HAZARDS IDENTIFICATION**

**Classification of the Substance or Mixture**

- **GHS - Classification:** Not classified as hazardous
- **US OSHA Specific - Classification**
  - **Physical Hazard:** Combustible Dust

**Label Elements**

- **Hazard Statements:** May form combustible dust concentrations in air

**Other Hazards**

An Occupational Exposure Value has been established for one or more of the ingredients (see Section 8).

**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.

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**3. COMPOSITION / INFORMATION ON INGREDIENTS**

Hazardous

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PZ00976
3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>EU EINECS/ELINCS List</th>
<th>GHS Classification</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citric acid</td>
<td>77-92-9</td>
<td>201-069-1</td>
<td>Eye Irrit. 2A (H319)</td>
<td>&lt;3.0</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>
</tr>
<tr>
<td>Sildenafil citrate</td>
<td>171599-83-0</td>
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<td>Acute Tox.4 (H302)</td>
<td>3.5</td>
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<td></td>
<td></td>
<td></td>
<td>Eye Irrit.2B (H320)</td>
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</tr>
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<td></td>
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<td></td>
<td>Aquatic Acute 3 (H402)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aquatic Chronic 3 (H412)</td>
<td></td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>236-675-5</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.
In accordance with 29 CFR 1910.1200, the exact percentage composition of this mixture has been withheld as a trade secret.

For the full text of the CLP/GHS abbreviations mentioned in this Section, see Section 16

4. FIRST AID MEASURES

Description of 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.

Most Important Symptoms and Effects, Both Acute and Delayed

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.

Medical Conditions: None known

Aggravated by Exposure: None

Indication of the Immediate Medical Attention and Special Treatment Needed

Notes to Physician: None
5. FIRE FIGHTING MEASURES

Extinguishing Media: Extinguish fires with CO2, extinguishing powder, foam, or water.

Special Hazards Arising from the Substance or Mixture
Hazardous Combustion Products: Formation of toxic gases is possible during heating or fire.

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

Advice for Fire-Fighters
During all fire fighting activities, wear appropriate protective equipment, including self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
Personnel involved in clean-up should wear appropriate personal protective equipment (see Section 8). Minimize exposure.

Environmental Precautions
Place waste in an appropriately labeled, sealed container for disposal. Care should be taken to avoid environmental release.

Methods and Material for Containment and Cleaning Up
Measures for Controlling / 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.

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

Precautions for Safe Handling
Minimize dust generation and accumulation. Avoid breathing dust. Avoid contact with eyes, skin 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. 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. Refer to Section 12 - Ecological Information, for information on potential effects on the environment.

Conditions for Safe Storage, Including any Incompatibilities
Storage Conditions: Store as directed by product packaging.
Specific end use(s): Pharmaceutical drug product

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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

Colloidal silicon dioxide
Australia TWA 2 mg/m³
Austria OEL - MAKs 4 mg/m³
Czech Republic OEL - TWA 0.1 mg/m³
Estonia OEL - TWA 2 mg/m³
Finland OEL - TWA 5 mg/m³
Germany - TRGS 900 - TWAs 4 mg/m³
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Controls

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.

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

Hands: Impervious gloves (e.g. Nitrile, etc.) are recommended if skin contact with drug product is possible and for bulk processing operations. (Protective gloves must meet the standards in accordance with EN374, ASTM F1001 or international equivalent.)

Eyes: Wear safety glasses or goggles if eye contact is possible. (Eye protection must meet the standards in accordance with EN166, ANSI Z87.1 or international equivalent.)
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Skin:** Impervious protective clothing is recommended if skin contact with drug product is possible and for bulk processing operations. (Protective clothing must meet the standards in accordance with EN13982, ANSI 103 or international equivalent.)

**Respiratory protection:** Under normal conditions of use, 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 (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.)

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical State:</th>
<th>Powder</th>
<th>Color:</th>
<th>No data available.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor:</td>
<td>No data available.</td>
<td>Odor Threshold:</td>
<td>No data available.</td>
</tr>
<tr>
<td>Molecular Formula:</td>
<td>Mixture</td>
<td>Molecular Weight:</td>
<td>Mixture</td>
</tr>
</tbody>
</table>

| Solvent Solubility: | No data available |
| Water Solubility:  | No data available |
| pH:                 | No data available. |
| Melting/Freezing Point (°C): | No data available |
| Boiling Point (°C): | No data available. |
| Partition Coefficient: (Method, pH, Endpoint, Value) |
| Sucralose           | No data available |
| Sorbitol            | No data available |
| Titanium dioxide    | No data available |
| Sodium benzoate     | No data available |
| Xanthan gum         | No data available |
| Colloidal silicon dioxide | No data available |
| Flavor              | No data available |
| Sodium citrate      | No data available |
| Sildenafil citrate   | Predicted 7.4 Log D 2.26 |
| Citric acid         | No data available |
| Decomposition Temperature (°C): | No data available. |
| Evaporation Rate (Gram/s): | No data available. |
| Vapor Pressure (kPa): | No data available. |
| Vapor Density (g/ml): | No data available. |
| Relative Density:    | No data available |
| Viscosity:           | No data available |

| Flammability:        |                   |
| Autoignition Temperature (Solid) (°C): | No data available. |
| Flammability (Solids): | No data available. |
| Flash Point (Liquid) (°C): | No data available. |
| Upper Explosive Limits (Liquid) (% by Vol.): | No data available. |
10. STABILITY AND REACTIVITY

Reactivity: No data available
Chemical Stability: Stable under normal conditions of use.
Possibility of Hazardous Reactions
  Oxidizing Properties: No data available
  Conditions to Avoid: None known
  Incompatible Materials: As a precautionary measure, keep away from strong oxidizers
  Hazardous Decomposition Products: No data available

11. TOXICOLOGICAL INFORMATION

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

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

Titanium dioxide
  Rat Oral LD50 > 7500 mg/kg
  Rat Subcutaneous LD50 50 mg/kg

Sodium benzoate
  Rat Oral LD50 4,070 mg/kg
  Mouse Oral LD50 1600mg/kg

Xanthan gum
  Rat Oral LD50 > 5000 mg/kg

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

Citric acid
  Rat Oral LD50 3000 mg/kg

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)
11. TOXICOLOGICAL INFORMATION

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)

**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

**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

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

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

**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

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))

**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 2B (Possibly Carcinogenic to Humans)

**Colloidal silicon dioxide**
- IARC:  Group 3 (Not Classifiable)
- NTP:  Reasonably Anticipated To Be A Human Carcinogen
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.

Toxicity:

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

Sildenafil citrate
*Daphnia magna* (Water Flea)  TAD  EC50  48 Hours  14 mg/L
*Oncorhynchus 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: (Inoculum, Method, End Point, Result)

Sildenafil citrate
Activated sludge  OECD  EC50  > 1000 mg/L

Persistence and Degradability: No data available

Bio-accumulative Potential: No data available

Mobility in Soil: No data available

13. DISPOSAL CONSIDERATIONS

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 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

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

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

Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

Citric acid
- CERCLA/SARA 313 Emission reporting: Not Listed
- California Proposition 65: Not Listed
- Inventory - United States TSCA - Sect. 8(b): Present
- Australia (AICS): Present
- EU EINECS/ELINCS List: 201-069-1

Colloidal silicon dioxide
- CERCLA/SARA 313 Emission reporting: Not Listed
- California Proposition 65: Not Listed
- Inventory - United States TSCA - Sect. 8(b): Present
- Australia (AICS): Present
- EU EINECS/ELINCS List: 231-545-4

Flavor
- CERCLA/SARA 313 Emission reporting: Not Listed
- California Proposition 65: Not Listed
- EU EINECS/ELINCS List: Not Listed

Sildenafil citrate
- CERCLA/SARA 313 Emission reporting: Not Listed
- California Proposition 65: Not Listed
- EU EINECS/ELINCS List: Not Listed

Sodium benzoate
- CERCLA/SARA 313 Emission reporting: Not Listed
- California Proposition 65: Not Listed
- Inventory - United States TSCA - Sect. 8(b): Present
- Australia (AICS): Present
- EU EINECS/ELINCS List: 208-534-8

Sodium citrate
- CERCLA/SARA 313 Emission reporting: Not Listed
- California Proposition 65: Not Listed
- Inventory - United States TSCA - Sect. 8(b): Present
- Australia (AICS): Present
- EU EINECS/ELINCS List: 200-675-3

Sorbitol
- CERCLA/SARA 313 Emission reporting: Not Listed
- California Proposition 65: Not Listed
- EU EINECS/ELINCS List: Not Listed

Sucralose
- CERCLA/SARA 313 Emission reporting: Not Listed
15. REGULATORY INFORMATION

<table>
<thead>
<tr>
<th>Material</th>
<th>California Proposition 65</th>
<th>Australia (AICS)</th>
<th>EU EINECS/ELINCS List</th>
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</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>Not Listed</td>
<td>Present</td>
<td>259-952-2</td>
</tr>
<tr>
<td></td>
<td>CERCLA/SARA 313 Emission reporting</td>
<td>Not Listed</td>
<td></td>
</tr>
</tbody>
</table>
|                   | California Proposition 65  | car
cinogen 9/2/2011 
airborne, unbound particles 
of respirable size |
|                   | Inventory - United States TSCA - Sect. 8(b) | Present |
|                   | Australia (AICS)           | Present          | 236-675-5             |
|                   | EU EINECS/ELINCS List      |                  |                       |
| Xanthan gum       | Not Listed                 | Present          | 234-394-2             |
|                   | CERCLA/SARA 313 Emission reporting | Not Listed       |                       |
|                   | California Proposition 65  | Not Listed       |                       |
|                   | Inventory - United States TSCA - Sect. 8(b) | Present |
|                   | Australia (AICS)           | Present          |                       |

16. OTHER INFORMATION

Text of CLP/GHS Classification abbreviations mentioned in Section 3

Acute toxicity, oral-Cat.4; H302 - Harmful if swallowed
Serious eye damage/eye irritation-Cat. 2B; H320 - Causes eye irritation
Hazardous to the aquatic environment, acute toxicity-Cat.3; H402 - Harmful to aquatic life
Hazardous to the aquatic environment, chronic toxicity-Cat.3; H412 - Harmful to aquatic life with long lasting effects
Serious eye damage/eye irritation-Cat.2A; H319 - Causes serious eye irritation

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

Reasons for Revision: Updated Section 2 - Hazard Identification. Updated Section 3 - Composition / Information on Ingredients. Updated Section 1 - Identification of the Substance/Preparation and the Company/Undertaking. Updated Section 8 - Exposure Controls / Personal Protection.

Revision date: 08-Feb-2017

Prepared by: Product Stewardship Hazard Communication

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