Section 1 - Product and Company Information

Product Name: B-ESTRADIOL 3-BENZOATE  
Product Number: E8515  
Brand: SIGMA  
Company: Sigma-Aldrich Canada, Ltd  
Address: 2149 Winston Park Drive  
Oakville ON L6H 6J8 CA  
Technical Phone: 9058299500  
Fax: 9058299292  
Emergency Phone: 800-424-9300

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
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<tbody>
<tr>
<td>17B-ESTRADIOL 3-BENZOATE</td>
<td>50-50-0</td>
<td>No</td>
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<tr>
<td>Formula</td>
<td>C25H2803</td>
<td></td>
</tr>
<tr>
<td>Synonyms</td>
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</table>
| Benovocylin * Benz hormovarine * Benzoate d’oestradiol (French) * Benzoestrofol *  
| Benzofoline * Benzo-gynoestryl * Benzoic acid estradiol * De graafina * Diffollisterol *  
| Difolliculine * Dihydroestrin benzoate *  
| Dihydrofolliculion benzoate * Dimenformone benzoate  
| * Dimenformone * Dloyn B * Eston-B * Estradiol benzoate * Estradiol-17-beta-benzoate *  
| Estradiol-17-beta-3-benzoate * beta-Estradiol benzoate * beta-Estradiol 3-benzoate *  
| 17-beta-Estradiol benzoate * 17-beta-Estradiol 3-benzoate *  
| 3-benzoate * Estradiol monobenzoate *  
| 17-beta-Estradiol monobenzoate *  
| Estra-1,3,5(10)-triene-3,17-diol  
| (17-beta)-3-benzoate *  
| Estra-1,3,5(10)-triene-3,17-beta-diol, 3-benzoate *  
| 1,3,5(10)-Estratriene-3,17-beta-diol 3-benzoate *  
| Femestrone * Follicormone * Follidrin * Folone * Graafina * Gynecormone * Gynformone * Hidroestron *  
| Hormogynon * Hydroxyestrin benzoate *  
| Oestradiol benzoate * Oestradiol 3-benzoate *  
| beta-Oestradiol benzoate * beta-Oestradiol 3-benzoate *  
| 17-beta-Oestradiol 3-benzoate *  
| Oestradiol monobenzoate *  

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic.  
May impair fertility. May cause harm to the unborn child. Limited evidence of a carcinogenic effect.  
Target organ(s): Female reproductive system.

HMIS RATING
HEALTH: 0*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING
HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Noncombustible. Use extinguishing media appropriate to surrounding fire conditions.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.
METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>376.5 AMU</td>
<td></td>
</tr>
<tr>
<td>pH</td>
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<td></td>
</tr>
<tr>
<td>BP/BP Range</td>
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<tr>
<td>MP/MP Range</td>
<td>191 °C</td>
<td></td>
</tr>
<tr>
<td>Freezing Point</td>
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</tr>
<tr>
<td>Vapor Pressure</td>
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<tr>
<td>Vapor Density</td>
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<tr>
<td>Saturated Vapor Conc.</td>
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</tr>
<tr>
<td>SG/Density</td>
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<td></td>
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<tr>
<td>Bulk Density</td>
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<tr>
<td>Odor Threshold</td>
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</tr>
<tr>
<td>Volatile%</td>
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<td>VOC Content</td>
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<td></td>
</tr>
<tr>
<td>Water Content</td>
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<tr>
<td>Solvent Content</td>
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<tr>
<td>Evaporation Rate</td>
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<td>Viscosity</td>
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<td>Partition Coefficient</td>
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<td>Decomposition Temp.</td>
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</tr>
<tr>
<td>Flash Point</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Female reproductive system.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

CHRONIC EXPOSURE - CARCINOGEN
Result: Studies in humans strongly suggest that the administration of estrogens is causally related to an increased incidence of endometrial carcinoma; there is no evidence that b-estradiol is different from other estrogens in this respect. IARC Monograph, volume 21, page 312, 1979.

Species: Rat
Route of Application: Implant
Dose: 25 MG/KG
Result: Skin and Appendages: Other: Tumors. Endocrine:Tumors. Tumorogenic:Neoplastic by RTECS criteria.

Species: Mouse
Route of Application: Subcutaneous
Dose: 24 MG/KG
Exposure Time: 36W
Frequency: I

Species: Mouse
Route of Application: Parenteral
Dose: 38 MG/KG
Exposure Time: 57W
Frequency: I
Result: Tumorigenic:Tumor types after systemic administration not seen spontaneously. Skin and Appendages: Other: Tumors. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

Species: Mouse
Route of Application: Implant
Dose: 60 MG/KG
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors. Tumorigenic:Tumor types after systemic administration not seen spontaneously.

Species: Guinea pig
Route of Application: Subcutaneous
Dose: 240 UG/KG
Exposure Time: 8W
Frequency: I

Species: Guinea pig
Route of Application: Implant
Dose: 3000 UG/KG
Result: Tumorigenic:Tumors at site or application. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

Species: Hamster
Route of Application: Implant
Dose: 80 MG/KG

Species: Mouse
Route of Application: Subcutaneous
Dose: 23 MG/KG
Exposure Time: 36W
Frequency: I

Species: Guinea pig
Route of Application: Subcutaneous
Dose: 4 MG/KG
Exposure Time: 9W
Frequency: I

Species: Rat
Route of Application: Implant
Dose: 30 MG/KG
Result: Brain and Coverings:Tumors. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

Species: Guinea pig
Route of Application: Implant
Dose: 50 MG/KG
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.
criteria. Tumorigenic:Tumor types after systemic administration not seen spontaneously.

Species: Guinea pig  
Route of Application: Implant  
Dose: 100 MG/KG  

Species: Mouse  
Route of Application: Implant  
Dose: 80 MG/KG  
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors. Tumorigenic:Tumor types after systemic administration not seen spontaneously.

Species: Mouse  
Route of Application: Subcutaneous  
Dose: 4790 UG/KG  
Exposure Time: 36W  
Frequency: I  

Species: Mouse  
Route of Application: Subcutaneous  
Dose: 38 MG/KG  
Exposure Time: 39W  
Frequency: I  
Result: Skin and Appendages: Other: Tumors. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

Species: Mouse  
Route of Application: Subcutaneous  
Dose: 15 MG/KG  
Exposure Time: 22W  
Frequency: I  

Species: Rat  
Route of Application: Implant  
Dose: 100 MG/KG  
Result: Endocrine:Tumors. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

IARC CARCINOGEN LIST  
Rating: Group 1 Group 1

CHRONIC EXPOSURE - TERATOGEN  
Result: May cause congenital malformation in the fetus.

Species: Rat  
Dose: 2500 UG/KG  
Route of Application: Intramuscular  
Exposure Time: (13D PREG)  
Result: Effects on Embryo or Fetus: Cytological changes (including somatic cell genetic material).
Species: Rat  
Dose: 5 MG/KG  
Route of Application: Intramuscular  
Exposure Time: (19D PREG)  
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Mouse  
Dose: 28 MG/KG  
Route of Application: Subcutaneous  
Exposure Time: (12-16D PREG)  
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Species: Mouse  
Dose: 300 MG/KG  
Route of Application: Intramuscular  
Exposure Time: (14D PREG)  
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Pig  
Dose: 366 UG/KG  
Route of Application: Intramuscular  
Exposure Time: (15-25D PREG)  
Result: Specific Developmental Abnormalities: Urogenital system.

CHRONIC EXPOSURE - MUTAGEN

Species: Rat  
Route: Subcutaneous  
Dose: 10 UG/KG  
Mutation test: DNA inhibition

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Result: May cause reproductive disorders.

Species: Woman  
Dose: 1 MG/KG  
Route of Application: Intramuscular  
Exposure Time: (5D PRE)  
Result: Maternal Effects: Menstrual cycle changes or disorders.

Species: Rat  
Dose: 1063 UG/KG  
Route of Application: Oral  
Exposure Time: (42D PRE-21D POST)  
Result: Effects on Fertility: Mating performance (e.g., # sperm positive females per # females mated; # copulations per # estrus cycles). Maternal Effects: Ovaries, fallopian tubes. Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rat  
Dose: 1063 UG/KG  
Route of Application: Oral  
Exposure Time: (42D PRE-21D POST)  
Result: Effects on Newborn: Physical.

Species: Rat  
Dose: 1500 NG/KG  
Route of Application: Oral  
Exposure Time: (3D PRE)  
Species: Rat  
Dose: 350 UG/KG  
Route of Application: Oral  
Exposure Time: (7D MALE)  

Species: Rat  
Dose: 32 UG/KG  
Route of Application: Subcutaneous  
Exposure Time: (3-4D PREG)  
Result: Effects on Fertility: Abortion.

Species: Rat  
Dose: 100 UG/KG  
Route of Application: Subcutaneous  
Exposure Time: (1D PRE)  

Species: Rat  
Dose: 70 NG/KG  
Route of Application: Subcutaneous  
Exposure Time: (7D MALE)  
Result: Paternal Effects: Prostate, seminal vesicle, Cowper's gland, accessory glands.

Species: Rat  
Dose: 7 UG/KG  
Route of Application: Subcutaneous  
Exposure Time: (7D PRE)  
Result: Maternal Effects: Menstrual cycle changes or disorders.

Species: Rat  
Dose: 250 UG/KG  
Route of Application: Subcutaneous  
Exposure Time: (5D MALE)  

Species: Rat  
Dose: 25 MG/KG  
Route of Application: Subcutaneous  
Exposure Time: (21D PREG)
Result: Effects on Newborn: Delayed effects.
Species: Rat
Dose: 3750 UG/KG
Route of Application: Intramuscular
Exposure Time: (15D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Rat
Dose: 3750 UG/KG
Route of Application: Intramuscular
Exposure Time: (15D MALE)
Result: Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females).

Species: Rat
Dose: 55 UG/KG
Route of Application: Intracerebral
Exposure Time: (1D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Rat
Dose: 10500 UG/KG
Route of Application: Parenteral
Exposure Time: (21D MALE)

Species: Rat
Dose: 200 UG/KG
Route of Application: Parenteral
Exposure Time: (1D MALE)
Result: Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females).

Species: Rat
Dose: 10 MG/KG
Route of Application: Implant
Exposure Time: (24D PRE)

Species: Mouse
Dose: 8 UG/KG
Route of Application: Oral
Exposure Time: (3-4D PREG)
Result: Effects on Fertility: Abortion.

Species: Mouse
Dose: 2 UG/KG
Route of Application: Subcutaneous
Exposure Time: (8D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).
Species: Mouse
Dose: 8 UG/KG
Route of Application: Subcutaneous
Exposure Time: (2-5D PREG)
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated).

Species: Mouse
Dose: 1300 NG/KG
Route of Application: Subcutaneous
Exposure Time: (3D PRE)

Species: Mouse
Dose: 12 MG/KG
Route of Application: Intramuscular
Exposure Time: (30D MALE)

Species: Mouse
Dose: 6 MG/KG
Route of Application: Intramuscular
Exposure Time: (15D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Species: Mouse
Dose: 12500 NG/KG
Route of Application: Parenteral
Exposure Time: (1D PRE)

Species: Mouse
Dose: 4800 NG/KG
Route of Application: Parenteral
Exposure Time: (15-20D PREG)
Result: Effects on Newborn: Physical.

Species: Dog
Dose: 60 UG/KG
Route of Application: Intramuscular
Exposure Time: (42-62D PREG)
Result: Effects on Newborn: Physical. Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Other postnatal measures or effects.

Species: Dog
Dose: 1120 UG/KG
Route of Application: Parenteral
Exposure Time: (16W MALE)

Species: Monkey
Dose: 84 UG/KG
Route of Application: Intramuscular
Exposure Time: (14D PRE)
Result: Maternal Effects: Other effects.
Species: Rabbit
Dose: 2500 NG/KG
Route of Application: Intramuscular
Exposure Time: (1-3D PREG)
Result: Effects on Fertility: Other measures of fertility

Species: Pig
Dose: 3333 UG/KG
Route of Application: Intramuscular
Exposure Time: (8-11W PREG)
Result: Effects on Newborn: Delayed effects.

Species: Hamster
Dose: 200 MG/KG
Route of Application: Implant
Exposure Time: (12D MALE)
Result: Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females).

Species: Hamster
Dose: 200 MG/KG
Route of Application: Implant
Exposure Time: (4D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Domestic Animals
Dose: 136 UG/KG
Route of Application: Intramuscular
Exposure Time: (20W PREG)
Result: Maternal Effects: Parturition.

Species: Domestic Animals
Dose: 182 UG/KG
Route of Application: Intramuscular
Exposure Time: (18W PREG)
Result: Effects on Fertility: Abortion.

Species: Domestic Animals
Dose: 364 UG/KG
Route of Application: Intramuscular
Exposure Time: (20W PREG)
Result: Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive).

Section 12 - Ecological Information
No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: T
Indication of Danger: Toxic.
R: 61-60-40
Risk Statements: May cause harm to the unborn child. May impair fertility. Limited evidence of a carcinogenic effect.
S: 22-36/37/39-45
Safety Statements: Do not breathe dust. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic.
Risk Statements: May impair fertility. May cause harm to the unborn child. Limited evidence of a carcinogenic effect.
Safety Statements: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Wear suitable protective clothing, gloves, and eye/face protection. Avoid exposure – obtain special instructions before use. Do not breathe dust.
US Statements: Target organ(s): Female reproductive system.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.
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