SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
Product form : Substance
Trade name : 5-Fluorouracil
IUPAC name :
EC-No. : 200-085-6
CAS-No. : 51-21-8
REACH registration No : 01-2119937865-23
Product code : F0123
Formula : C4H3FN2O2

1.2. Relevant identified uses of the substance or mixture and uses advised against
1.2.1. Relevant identified uses
Main use category : Professional use
Industrial/Professional use spec : For professional use only. Duchefa Biochemie B.V. products are intended only for "in vitro laboratory" research purposes.

1.2.2. Uses advised against
No additional information available

1.3. Details of the supplier of the safety data sheet
Duchefa Biochemie B.V.
A. Hofmanweg 71
2031 BH Haarlem - The Netherlands
T +31(0)23-5319093 - F +31(0)23-5318027
info@duchefa.nl

1.4. Emergency telephone number
Emergency number : Supplier contact information:
+31(0)23-5319093 (M-F 09:00-17:00)
+31(0)6-30109355 (outside office hours)

<table>
<thead>
<tr>
<th>Organisation/Company</th>
<th>Address</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Health Organization world directory of poison centres</td>
<td><a href="http://apps.who.int/poisoncentres/">http://apps.who.int/poisoncentres/</a></td>
<td>Consult website for a local poison centre</td>
</tr>
</tbody>
</table>

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
Classification according to Regulation (EC) No. 1272/2008 [CLP]
Acute toxicity (oral), Category 4 : H302
Acute toxicity (dermal), Category 4 : H312
Acute toxicity (inhal.), Category 4 : H332
Carcinogenicity, Category 1B : H350
Reproductive toxicity, Category 1A : H360

Full text of hazard classes and H-statements : see section 16
Adverse physicochemical, human health and environmental effects
No additional information available

2.2. Label elements
Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP):

| GHS07 | GHS08 |

Signal word (CLP): Danger
Hazard statements (CLP):
H302+H312+H332 - Harmful if swallowed, in contact with skin or if inhaled
H350 - May cause cancer.
H360 - May damage fertility or the unborn child (if swallowed).
Precautionary statements (CLP):
P201 - Obtain special instructions before use.
P281 - Use personal protective equipment as required.
P308+P313 - IF exposed or concerned: Get medical advice/attention.
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER/doctor

2.3. Other hazards
No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances
Name: 5-Fluorouracil
CAS-No.: 51-21-8
EC-No.: 200-085-6

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Fluorouracil</td>
<td>(CAS-No.) 51-21-8</td>
<td>&gt;= 98</td>
</tr>
<tr>
<td></td>
<td>(EC-No.) 200-085-6</td>
<td></td>
</tr>
</tbody>
</table>

Full text of H-statements: see section 16

3.2. Mixtures
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures
First-aid measures after inhalation: Assure fresh air breathing. Call a physician immediately.
First-aid measures after skin contact: Wash skin with mild soap and water. Call a physician immediately.
First-aid measures after eye contact: Get immediate medical advice/attention. Rinse with water.
First-aid measures after ingestion: Call a physician immediately.

4.2. Most important symptoms and effects, both acute and delayed
Symptoms/effects: This material or its emissions may induce blood disorders and/or aggravate pre-existing blood disorders.
Symptoms/effects after ingestion: Ingestion may cause nausea, vomiting and diarrhea.
4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media: Dry chemical, CO2, or water spray or regular foam.

5.2. Special hazards arising from the substance or mixture
Hazardous decomposition products in case of fire: Under fire conditions, hazardous fumes will be present. COx. NOx. HF.

5.3. Advice for firefighters
Firefighting instructions: Prevent fire fighting water from entering the environment.
Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
General measures: Spill should be handled by trained cleaning personnel properly equipped with respiratory and eye protection.

6.1.1. For non-emergency personnel
Protective equipment: Wear suitable protective clothing.
Emergency procedures: Evacuate area.
Measures in case of dust release: Avoid dust formation.

6.1.2. For emergency responders
No additional information available

6.2. Environmental precautions
Avoid release to the environment. Do not allow to enter drains or water courses.

6.3. Methods and material for containment and cleaning up
Methods for cleaning up: Sweep up dry powder and dispose properly.

6.4. Reference to other sections
No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Precautions for safe handling: Ensure good ventilation of the work station. Handle in accordance with good industrial hygiene and safety procedures.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions: Store in a dry place. Store in a closed container.
Storage temperature: 2 - 8 °C

7.3. Specific end use(s)
For professional use only. Duchefa Biochemie B.V. products are intended only for “in vitro laboratory” research purposes.
SECTION 8: Exposure controls/personal protection

8.1. Control parameters
No additional information available

8.2. Exposure controls

Hand protection:

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Permeation</th>
<th>Thickness (mm)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>Nitrile rubber (NBR)</td>
<td>6 (&gt; 480 minutes)</td>
<td>0,11</td>
<td>EN 374</td>
</tr>
</tbody>
</table>

Eye protection:
Safety glasses

Skin and body protection:
Wear suitable protective clothing

Respiratory protection:
Filter type P3 (EN 143)

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Solid
Appearance: Crystalline powder.
Molecular mass: 130,1 g/mol
Colour: White.
Odour: No data available
Odour threshold: No data available
pH: No data available
pH solution: 4,5 - 5 10 g/l (20°C)
Relative evaporation rate (butylacetate=1): No data available
Melting point: 190 - 200 °C
Freezing point: No data available
Boiling point: No data available
Flash point: No data available
Auto-ignition temperature: No data available
Decomposition temperature: No data available
Flammability (solid, gas): No data available
Vapour pressure: No data available
Relative vapour density at 20 °C: No data available
Relative density: No data available
Solubility: No data available

Log Pow: -0,89 20°C
Viscosity, kinematic: No data available
Viscosity, dynamic: No data available
Explosive properties: No data available
Oxidising properties: No data available
5-Fluorouracil

Safety Data Sheet

according to Regulation (EU) 2015/830

Explosive limits : No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No additional information available

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
No additional information available

10.4. Conditions to avoid
No additional information available

10.5. Incompatible materials
Oxidising agents. Bases.

10.6. Hazardous decomposition products
When heated to decomposition, emits dangerous fumes. COx. NOx. HF.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Harmful if swallowed. Dermal: Harmful in contact with skin. Inhalation: Harmful if inhaled.

<table>
<thead>
<tr>
<th>5-Fluorouracil (51-21-8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : May cause cancer.

Reproductive toxicity : May damage fertility or the unborn child (if swallowed).
STOT-single exposure : Not classified
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity
No additional information available

12.2. Persistence and degradability

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<thead>
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<th>5-Fluorouracil (51-21-8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and degradability</td>
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</tbody>
</table>
12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>5-Fluorouracil (51-21-8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Pow</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil
No additional information available

12.5. Results of PBT and vPvB assessment
No additional information available

12.6. Other adverse effects
Additional information: Avoid release to the environment. Prevent entry to sewers and public waters

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste treatment methods: Dispose in a safe manner in accordance with local/national regulations.

SECTION 14: Transport information

In accordance with ADR / IATA / IMDG

<table>
<thead>
<tr>
<th>ADR</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1. UN number</td>
<td>2811</td>
<td>2811</td>
</tr>
<tr>
<td>14.2. UN proper shipping name</td>
<td>TOXIC SOLID, ORGANIC, N.O.S.</td>
<td>TOXIC SOLID, ORGANIC, N.O.S.</td>
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<tr>
<td>Transport document description</td>
<td>UN 2811 TOXIC SOLID, ORGANIC, N.O.S., 6.1, II, (D/E)</td>
<td>UN 2811 TOXIC SOLID, ORGANIC, N.O.S., 6.1, II</td>
</tr>
<tr>
<td>14.3. Transport hazard class(es)</td>
<td>6.1</td>
<td>6.1</td>
</tr>
<tr>
<td>14.4. Packing group</td>
<td>II</td>
<td>II</td>
</tr>
<tr>
<td>14.5. Environmental hazards</td>
<td>Dangerous for the environment: No</td>
<td>Dangerous for the environment: No</td>
</tr>
<tr>
<td>Marine pollutant: No</td>
<td>Marine pollutant: No</td>
<td></td>
</tr>
<tr>
<td>No supplementary information available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14.6. Special precautions for user

- Overland transport
  - Classification code (ADR): T2
  - Special provisions (ADR): 274, 614
  - Limited quantities (ADR): 500g
  - Excepted quantities (ADR): E4
  - Packing instructions (ADR): P002, IBC08
  - Special packing provisions (ADR): B4
Mixed packing provisions (ADR) : MP10
Portable tank and bulk container instructions (ADR) : T3
Portable tank and bulk container special provisions (ADR) : TP33
Tank code (ADR) : SGAH, L4BH
Tank special provisions (ADR) : TU15, TE19
Vehicle for tank carriage : AT
Transport category (ADR) : 2
Special provisions for carriage - Packages (ADR) : V11
Special provisions for carriage - Loading, unloading and handling (ADR) : CV13, CV28
Special provisions for carriage - Operation (ADR) : S9, S19
Hazard identification number (Kemler No.) : 60
Orange plates

Tunnel restriction code (ADR) : D/E
EAC code : 2X

- Transport by sea
Special provisions (IMDG) : 274
Limited quantities (IMDG) : 500 g
Excepted quantities (IMDG) : E4
Packing instructions (IMDG) : P002
IBC packing instructions (IMDG) : IBC08
IBC special provisions (IMDG) : B2, B4
Tank instructions (IMDG) : T3
Tank special provisions (IMDG) : TP33
EmS-No. (Fire) : F-A
EmS-No. (Spillage) : S-A
Stowage category (IMDG) : B
Properties and observations (IMDG) : Toxic if swallowed, by skin contact or by inhalation.
MFAG-No : 154

- Air transport
PCA Excepted quantities (IATA) : E4
PCA Limited quantities (IATA) : Y644
PCA limited quantity max net quantity (IATA) : 1kg
PCA packing instructions (IATA) : 669
PCA max net quantity (IATA) : 25kg
CAO packing instructions (IATA) : 676
CAO max net quantity (IATA) : 100kg
Special provisions (IATA) : A3, A5
ERG code (IATA) : 6L
14.7. Transport in bulk according to Annex II of Marpol and the IBC Code
Not applicable

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations
No REACH Annex XVII restrictions
5-Fluorouracil is not on the REACH Candidate List
5-Fluorouracil is not on the REACH Annex XIV List

15.1.2. National regulations

Germany
12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV: Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands
SZW-lijst van kankerverwekkende stoffen: The substance is not listed
SZW-lijst van mutagene stoffen: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling: The substance is not listed

Denmark
Recommendations Danish Regulation: Young people below the age of 18 years are not allowed to use the product
Pregnant/breastfeeding women working with the product must not be in direct contact with the product
The requirements from the Danish Working Environment Authorities regarding work with carcinogens must be followed during use and disposal

15.2. Chemical safety assessment
No additional information available

SECTION 16: Other information

Indication of changes:

<table>
<thead>
<tr>
<th>Indication of changes:</th>
<th>Emergency number</th>
<th>Modified</th>
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</thead>
<tbody>
<tr>
<td>1.4</td>
<td>Emergency number</td>
<td>Modified</td>
</tr>
<tr>
<td>2.2</td>
<td>Hazard statements (CLP)</td>
<td>Added</td>
</tr>
<tr>
<td>8.2</td>
<td>Respiratory protection</td>
<td>Modified</td>
</tr>
<tr>
<td>8.2</td>
<td>Hand protection</td>
<td>Modified</td>
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</tbody>
</table>

Abbreviations and acronyms:
### Acute Toxicity Estimate

<table>
<thead>
<tr>
<th>ATE</th>
<th>Acute Toxicity Estimate</th>
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</table>

<table>
<thead>
<tr>
<th>ADR</th>
<th>European Agreement concerning the International Carriage of Dangerous Goods by Road</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>BCF</th>
<th>Bioconcentration factor</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CLP</th>
<th>Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>DPD</th>
<th>Dangerous Preparations Directive 1999/45/EC</th>
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</table>

<table>
<thead>
<tr>
<th>DSD</th>
<th>Dangerous Substances Directive 67/548/EEC</th>
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<table>
<thead>
<tr>
<th>IATA</th>
<th>International Air Transport Association</th>
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<table>
<thead>
<tr>
<th>IMDG</th>
<th>International Maritime Dangerous Goods</th>
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<table>
<thead>
<tr>
<th>LC50</th>
<th>Median lethal concentration</th>
</tr>
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<table>
<thead>
<tr>
<th>LD50</th>
<th>Median lethal dose</th>
</tr>
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<table>
<thead>
<tr>
<th>LOAEL</th>
<th>Lowest Observed Adverse Effect Level</th>
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<table>
<thead>
<tr>
<th>NOAEC</th>
<th>No-Observed Adverse Effect Concentration</th>
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<table>
<thead>
<tr>
<th>PBT</th>
<th>Persistent Bioaccumulative Toxic</th>
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|------|------------------------------------------------------------------------------------------------|

<table>
<thead>
<tr>
<th>SDS</th>
<th>Safety Data Sheet</th>
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Full text of H- and EUH-statements:

<table>
<thead>
<tr>
<th>Acute Tox. 4 (Dermal)</th>
<th>Acute toxicity (dermal), Category 4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Acute Tox. 4 (Inhalation)</th>
<th>Acute toxicity (inhal.), Category 4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Acute Tox. 4 (Oral)</th>
<th>Acute toxicity (oral), Category 4</th>
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<table>
<thead>
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<th>Carc. 1A</th>
<th>Carcinogenicity, Category 1A</th>
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<th>Carc. 1B</th>
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<table>
<thead>
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<th>Reproductive toxicity, Category 1A</th>
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<table>
<thead>
<tr>
<th>Repr. 1A</th>
<th>Reproductive toxicity, Category 1A</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>H302</th>
<th>Harmful if swallowed.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>H312</th>
<th>Harmful in contact with skin.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>H332</th>
<th>Harmful if inhaled.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>H350</th>
<th>May cause cancer.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>H360</th>
<th>May damage fertility or the unborn child.</th>
</tr>
</thead>
</table>

| H360FD | May damage fertility. May damage the unborn child. |

SDS Biochemicals version 2017

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.