

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

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

1.1 Product identifier

Trade name : Imipenem / Cilastatin / Relebactam Formulation

1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : Pharmaceutical

Recommended restrictions on use : Not applicable

1.3 Details of the supplier of the safety data sheet

Company : MSD
117 16th Road
1685 Halfway house, Midrand, South Africa

Telephone : +27 11 655 3000

E-mail address of person responsible for the SDS : EHSDATASTEWARD@msd.com

1.4 Emergency telephone number

+1-908-423-6000

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)


Eye irritation, Category 2	H319: Causes serious eye irritation.
Respiratory sensitisation, Category 1	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Reproductive toxicity, Category 2	H361d: Suspected of damaging the unborn child.
Specific target organ toxicity - repeated exposure, Category 2	H373: May cause damage to organs through prolonged or repeated exposure.
Short-term (acute) aquatic hazard, Category 1	H400: Very toxic to aquatic life.
Long-term (chronic) aquatic hazard, Category 1	H410: Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

- Hazard pictograms : 
- Signal word : Danger
- Hazard statements : H319 Causes serious eye irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H361d Suspected of damaging the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.
- Precautionary statements : **Prevention:**
P260 Do not breathe dust.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
- Response:**
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER/ doctor.
P391 Collect spillage.

Hazardous components which must be listed on the label:

Imipenem
Relebactam

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Contact with dust can cause mechanical irritation or drying of the skin.

May form explosive dust-air mixture during processing, handling or other means.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
Cilastatin	81129-83-1 279-694-4	Eye Irrit. 2; H319	>= 30 - < 50
Imipenem	74431-23-5	Resp. Sens. 1A; H334	>= 30 - < 50

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

		Repr. 2; H361d Aquatic Acute 1; H400 Aquatic Chronic 1; H410	
		M-Factor (Acute aquatic toxicity): 100 M-Factor (Chronic aquatic toxicity): 10	
Relebactam	1174020-13-3	STOT RE 2; H373 (Kidney)	>= 10 - < 20

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.
- Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).
- If inhaled : If inhaled, remove to fresh air.
If not breathing, give artificial respiration.
If breathing is difficult, give oxygen.
Get medical attention.
- In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water.
Remove contaminated clothing and shoes.
Get medical attention.
Wash clothing before reuse.
Thoroughly clean shoes before reuse.
- In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.
If easy to do, remove contact lens, if worn.
Get medical attention.
- If swallowed : If swallowed, DO NOT induce vomiting.
Get medical attention.
Rinse mouth thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed

Imipenem / Cilastatin / Relebactam Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 09.08.2023
5.2	30.09.2023	67750-00030	Date of first issue: 27.02.2015

Risks : Causes serious eye irritation.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Suspected of damaging the unborn child.
May cause damage to organs through prolonged or repeated exposure.

Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).
Contact with dust can cause mechanical irritation or drying of the skin.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically and supportively.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Water spray
Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry chemical

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Exposure to combustion products may be a hazard to health.

Hazardous combustion products : Carbon oxides
Metal oxides

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Use water spray to cool unopened containers.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Use personal protective equipment.
Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

6.2 Environmental precautions

Environmental precautions : Avoid release to the environment.
Prevent further leakage or spillage if safe to do so.
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Surround spill with absorbents and place a damp covering over the area to minimise entry of the material into the air.
Add excess liquid to allow the material to enter into solution.
Soak up with inert absorbent material.
Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air).
Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.
Clean up remaining materials from spill with suitable absorbent.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Technical measures : Static electricity may accumulate and ignite suspended dust causing an explosion.
Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

Local/Total ventilation : Use only with adequate ventilation.

Advice on safe handling : Do not breathe dust.
Do not swallow.
Do not get in eyes.
Avoid prolonged or repeated contact with skin.
Wash skin thoroughly after handling.

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment
Keep container tightly closed.
Already sensitised individuals, and those susceptible to asthma, allergies, chronic or recurrent respiratory disease, should consult their physician regarding working with respiratory irritants or sensitisers.
Minimize dust generation and accumulation.
Keep container closed when not in use.
Keep away from heat and sources of ignition.
Take precautionary measures against static discharges.
Take care to prevent spills, waste and minimize release to the environment.

Hygiene measures : If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.
The effective operation of a facility should include review of engineering controls, proper personal protective equipment, appropriate degowning and decontamination procedures, industrial hygiene monitoring, medical surveillance and the use of administrative controls.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep in properly labelled containers. Store locked up. Keep tightly closed. Store in accordance with the particular national regulations.

Advice on common storage : Do not store with the following product types:
Strong oxidizing agents

7.3 Specific end use(s)

Specific use(s) : No data available

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Cilastatin	81129-83-1	TWA	5 mg/m ³ (OEB 1)	Internal
Imipenem	74431-23-5	TWA	3000 µg/m ³ (OEB 1)	Internal
Further information: RSEN, DSEN				
		Wipe limit	100 µg/100 cm ²	Internal
Relebactam	1174020-13-3	TWA	0.3 mg/m ³ (OEB 2)	Internal

Imipenem / Cilastatin / Relebactam Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 09.08.2023
5.2	30.09.2023	67750-00030	Date of first issue: 27.02.2015

8.2 Exposure controls

Engineering measures

Use feasible engineering controls to minimize exposure to compound.
All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment.

Personal protective equipment

Eye/face protection	:	Wear safety glasses with side shields or goggles. If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles. Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.
Hand protection	:	
Material	:	Chemical-resistant gloves
Skin and body protection	:	Work uniform or laboratory coat.
Respiratory protection	:	If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection.
Filter type	:	Particulates type (P)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	powder
Colour	:	White to light yellow
Odour	:	No data available
Odour Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	Not applicable
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	May form explosive dust-air mixture during processing, handling or other means.
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapour pressure	:	Not applicable
Relative vapour density	:	Not applicable

**Imipenem / Cilastatin / Relebactam Formula-
tion**

Version	Revision Date:	SDS Number:	Date of last issue: 09.08.2023
5.2	30.09.2023	67750-00030	Date of first issue: 27.02.2015

Relative density	:	No data available
Density	:	No data available
Solubility(ies)	:	
Water solubility	:	soluble
Partition coefficient: n-octanol/water	:	Not applicable
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity	:	
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	Not applicable
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

9.2 Other information

Flammability (liquids)	:	Not applicable
Molecular weight	:	No data available
Particle size	:	No data available

SECTION 10: Stability and reactivity**10.1 Reactivity**

Not classified as a reactivity hazard.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions	:	May form explosive dust-air mixture during processing, handling or other means. Can react with strong oxidizing agents.
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10.4 Conditions to avoid

Conditions to avoid	:	Heat, flames and sparks. Avoid dust formation.
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10.5 Incompatible materials

Materials to avoid	:	Oxidizing agents
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Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

10.6 Hazardous decomposition products

No hazardous decomposition products are known.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Information on likely routes of exposure : Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity

Not classified based on available information.

Components:

Cilastatin:

Acute oral toxicity : LD50 (Rat): 8.000 mg/kg
LD50 (Mouse): 8.000 mg/kg

Imipenem:

Acute oral toxicity : LD50 (Mouse): 10.000 mg/kg
Acute toxicity (other routes of administration) : LD50 (Rat): > 2.000 mg/kg
Application Route: Intravenous
LD50 (Mouse): 1.500 mg/kg
Application Route: Intravenous

Skin corrosion/irritation

Not classified based on available information.

Components:

Cilastatin:

Species : Rabbit
Result : No skin irritation

Relebactam:

Method : EpiDerm
Result : No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Components:

Cilastatin:

Species : Rabbit
Result : Moderate eye irritation

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

Relebactam:

Method : Bovine cornea (BCOP)
Result : No eye irritation

Respiratory or skin sensitisation**Skin sensitisation**

Not classified based on available information.

Respiratory sensitisation

May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Components:**Cilastatin:**

Exposure routes : Skin contact
Remarks : No data available

Exposure routes : Inhalation
Remarks : No data available

Imipenem:

Remarks : May cause sensitisation of susceptible persons by inhalation of aerosol or dust.

Exposure routes : Skin contact
Remarks : Not classified due to lack of data.

Relebactam:

Test Type : Local lymph node assay (LLNA)
Exposure routes : Dermal
Result : Not a skin sensitizer.

Germ cell mutagenicity

Not classified based on available information.

Components:**Cilastatin:**

Genotoxicity in vitro : Test Type: Microbial mutagenesis assay (Ames test)
Result: negative

Imipenem:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster lung cells
Result: negative

Test Type: reverse mutation assay
Result: negative

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2	Revision Date: 30.09.2023	SDS Number: 67750-00030	Date of last issue: 09.08.2023 Date of first issue: 27.02.2015
----------------	------------------------------	----------------------------	---

Test Type: unscheduled DNA synthesis assay
Result: negative

Test Type: Chromosomal aberration
Result: negative

Test Type: sister chromatid exchange assay
Result: negative

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse
Application Route: Intravenous
Result: negative

Relebactam:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

Genotoxicity in vivo : Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Species: Rat
Application Route: Intraperitoneal injection
Result: negative

Germ cell mutagenicity- Assessment : Weight of evidence does not support classification as a germ cell mutagen.

Carcinogenicity

Not classified based on available information.

Reproductive toxicity

Suspected of damaging the unborn child.

Components:

Cilastatin:

Effects on fertility : Test Type: Fertility/early embryonic development
Application Route: Intravenous
Fertility: LOAEL: 1.000
Symptoms: No adverse effects
Result: No effects on fertility and early embryonic development were detected.

Imipenem:

Effects on fertility : Test Type: Fertility/early embryonic development
Species: Rat, male and female
Application Route: Intravenous
Fertility: LOAEL: 80 mg/kg body weight

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2	Revision Date: 30.09.2023	SDS Number: 67750-00030	Date of last issue: 09.08.2023 Date of first issue: 27.02.2015
----------------	------------------------------	----------------------------	---

Symptoms: No adverse effects, Reduced foetal weight
Result: No effects on fertility and early embryonic development were detected.

Test Type: Fertility/early embryonic development
Species: Rat, male and female
Application Route: Subcutaneous
Fertility: LOAEL: 320 mg/kg body weight
Symptoms: No adverse effects, Reduced foetal weight
Result: No effects on fertility and early embryonic development were detected.

Effects on foetal development : Test Type: Development
Species: Monkey
Application Route: Intravenous
Developmental Toxicity: LOAEL: 100 mg/kg body weight
Result: Embryotoxic effects and adverse effects on the offspring were detected., No teratogenic effects

Test Type: Development
Species: Rabbit
Application Route: Intravenous
Developmental Toxicity: NOAEL: 60 mg/kg body weight
Result: No teratogenic effects

Test Type: Development
Species: Rat
Application Route: Intravenous
Developmental Toxicity: NOAEL: 60 mg/kg body weight
Result: No teratogenic effects

Reproductive toxicity - Assessment : Some evidence of adverse effects on development, based on animal experiments.

Relebactam:

Effects on fertility : Test Type: Pre-/postnatal development
Species: Rat
Application Route: Subcutaneous
Fertility: NOAEL: 450 mg/kg body weight

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rat
Application Route: Intraperitoneal injection
Embryo-foetal toxicity: NOAEL: 450 mg/kg body weight
Result: No effects on foetal development

Test Type: Embryo-foetal development
Species: Mouse
Application Route: Intraperitoneal injection
Embryo-foetal toxicity: NOAEL: 450 mg/kg body weight
Result: No effects on foetal development

Test Type: Development

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2	Revision Date: 30.09.2023	SDS Number: 67750-00030	Date of last issue: 09.08.2023 Date of first issue: 27.02.2015
----------------	------------------------------	----------------------------	---

Species: Rat
 Application Route: Intravenous
 Developmental Toxicity: NOAEL: >= 450 mg/kg body weight
 Result: No effects on fertility and early embryonic development were detected.

Test Type: Development
 Species: Rabbit
 Application Route: Intravenous
 Developmental Toxicity: NOAEL: 450 mg/kg body weight
 Result: No effects on foetal development

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Components:

Relebactam:

Target Organs : Kidney
 Assessment : May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Cilastatin:

Species : Rat
 NOAEL : >= 500 mg/kg
 Application Route : Intravenous
 Exposure time : 90 Days
 Remarks : No significant adverse effects were reported

Species : Monkey
 NOAEL : >= 500 mg/kg
 Application Route : Intravenous
 Exposure time : 5 Weeks
 Remarks : No significant adverse effects were reported

Imipenem:

Species : Monkey
 NOAEL : 60 mg/kg
 LOAEL : 150 mg/kg
 Application Route : Intravenous
 Exposure time : 6 Months
 Target Organs : Kidney

Species : Monkey
 NOAEL : 120 mg/kg
 Application Route : Subcutaneous

Imipenem / Cilastatin / Relebactam Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 09.08.2023
5.2	30.09.2023	67750-00030	Date of first issue: 27.02.2015

Exposure time : 6 Months
Remarks : No significant adverse effects were reported

Species : Rat
NOAEL : 180 mg/kg
Application Route : Intravenous
Exposure time : 6 Months
Remarks : No significant adverse effects were reported

Species : Rabbit
LOAEL : 150 mg/kg
Application Route : Intravenous
Target Organs : Kidney

Relebactam:

Species : Rat, female
NOAEL : 150 mg/kg
Application Route : Intravenous
Exposure time : 30 d

Species : Rat, male
NOAEL : 450 mg/kg
Application Route : Intravenous
Exposure time : 30 d

Species : Monkey
NOAEL : 25 mg/kg
Application Route : Intravenous
Exposure time : 30 d
Target Organs : Kidney

Species : Monkey
NOAEL : 37,5 mg/kg
Application Route : Intravenous
Exposure time : 30 d

Species : Monkey
NOAEL : 50 mg/kg
LOAEL : 150 mg/kg
Application Route : Intravenous
Exposure time : 3 Months
Target Organs : Kidney

Aspiration toxicity

Not classified based on available information.

Experience with human exposure

Components:

Imipenem:

Inhalation : Symptoms: Nausea, Vomiting, Diarrhoea, Fever, hypotension, Dizziness, Drowsiness, Convulsions, pruritis, Rash

Imipenem / Cilastatin / Relebactam Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 09.08.2023
5.2	30.09.2023	67750-00030	Date of first issue: 27.02.2015

Remarks: May cause sensitisation of susceptible persons by inhalation of aerosol or dust.

Relebactam:

Skin contact : Symptoms: Pain, Discomfort, Diarrhoea, Abdominal pain, insomnia, Nausea, sore throat, Vertigo

SECTION 12: Ecological information

12.1 Toxicity

Components:

Cilastatin:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 111 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 99 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50 (Anabaena flos-aquae): > 99 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

EC50 (Pseudokirchneriella subcapitata (green algae)): > 99 mg/l

Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Anabaena flos-aquae): 99 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 99 mg/l

Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC50 : > 1.000 mg/l
Exposure time: 3 h
Test Type: Respiration inhibition
Method: OECD Test Guideline 209

Toxicity to fish (Chronic toxicity) : EC10: > 9,9 mg/l
Exposure time: 32 d
Species: Pimephales promelas (fathead minnow)
Method: OECD Test Guideline 210

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EC10: > 10 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 211

**Imipenem / Cilastatin / Relebactam Formula-
tion**

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

Imipenem:

- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 78 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
- Toxicity to algae/aquatic plants : EC50 (Anabaena flos-aquae (cyanobacterium)): 0,0046 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- NOEC (Anabaena flos-aquae (cyanobacterium)): 0,002 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- EC50 (Pseudokirchneriella subcapitata (green algae)): > 74 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- NOEC (Pseudokirchneriella subcapitata (green algae)): 74 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- M-Factor (Acute aquatic toxicity) : 100
- Toxicity to microorganisms : EC50 : > 1.000 mg/l
Exposure time: 3 h
Test Type: Respiration inhibition
Method: OECD Test Guideline 209
- Toxicity to fish (Chronic toxicity) : NOEC: 9,4 mg/l
Exposure time: 32 d
Species: Pimephales promelas (fathead minnow)
Method: OECD Test Guideline 210
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 11 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 211
- M-Factor (Chronic aquatic toxicity) : 10

Relebactam:

- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
- EC50 (Americamysis): > 100 mg/l
Exposure time: 96 h

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2	Revision Date: 30.09.2023	SDS Number: 67750-00030	Date of last issue: 09.08.2023 Date of first issue: 27.02.2015
----------------	------------------------------	----------------------------	---

Toxicity to algae/aquatic plants	:	<p>EC50 (Pseudokirchneriella subcapitata (green algae)): 86 mg/l Exposure time: 72 h Method: OECD Test Guideline 201</p> <p>NOEC (Pseudokirchneriella subcapitata (green algae)): 12 mg/l Exposure time: 72 h Method: OECD Test Guideline 201</p> <p>EC50 (Anabaena flos-aquae (cyanobacterium)): > 11 mg/l Exposure time: 72 h Method: OECD Test Guideline 201</p> <p>NOEC (Anabaena flos-aquae (cyanobacterium)): 11 mg/l Exposure time: 72 h Method: OECD Test Guideline 201</p>
Toxicity to microorganisms	:	<p>EC50 : > 1.000 mg/l Exposure time: 3 h Test Type: Respiration inhibition Method: OECD Test Guideline 209</p> <p>NOEC : 96,3 mg/l Exposure time: 3 h Test Type: Respiration inhibition Method: OECD Test Guideline 209</p>
Toxicity to fish (Chronic toxicity)	:	<p>NOEC: 9,2 mg/l Exposure time: 32 d Species: Pimephales promelas (fathead minnow) Method: OECD Test Guideline 210</p>
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	<p>NOEC: 2,7 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Method: OECD Test Guideline 211</p>

12.2 Persistence and degradability

Components:

Cilastatin:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 27 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Imipenem:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 29 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

Relebactam:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 11,3 %
Exposure time: 28 d
Method: OECD Test Guideline 314

12.3 Bioaccumulative potential

Components:**Cilastatin:**

Partition coefficient: n-octanol/water : log Pow: -3,53

Imipenem:

Partition coefficient: n-octanol/water : log Pow: < -1

Relebactam:

Partition coefficient: n-octanol/water : log Pow: < -2

12.4 Mobility in soil

Components:**Cilastatin:**

Distribution among environmental compartments : log Koc: 2,3

Relebactam:

Distribution among environmental compartments : log Koc: 2,3

12.5 Results of PBT and vPvB assessment

Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Product:

Endocrine disrupting potential : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2	Revision Date: 30.09.2023	SDS Number: 67750-00030	Date of last issue: 09.08.2023 Date of first issue: 27.02.2015
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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product	:	Dispose of in accordance with local regulations. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities. Do not dispose of waste into sewer.
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADN	:	UN 3077
ADR	:	UN 3077
RID	:	UN 3077
IMDG	:	UN 3077
IATA	:	UN 3077

14.2 UN proper shipping name

ADN	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Imipenem)
ADR	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Imipenem)
RID	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Imipenem)
IMDG	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Imipenem)
IATA	:	Environmentally hazardous substance, solid, n.o.s. (Imipenem)

14.3 Transport hazard class(es)

	Class	Subsidiary risks
ADN	:	9
ADR	:	9
RID	:	9
IMDG	:	9

Imipenem / Cilastatin / Relebactam Formulation

Version 5.2 Revision Date: 30.09.2023 SDS Number: 67750-00030 Date of last issue: 09.08.2023
Date of first issue: 27.02.2015

IATA : 9

14.4 Packing group

ADN

Packing group : III
Classification Code : M7
Hazard Identification Number : 90
Labels : 9

ADR

Packing group : III
Classification Code : M7
Hazard Identification Number : 90
Labels : 9
Tunnel restriction code : (-)

RID

Packing group : III
Classification Code : M7
Hazard Identification Number : 90
Labels : 9

IMDG

Packing group : III
Labels : 9
EmS Code : F-A, S-F

IATA (Cargo)

Packing instruction (cargo aircraft) : 956
Packing instruction (LQ) : Y956
Packing group : III
Labels : Miscellaneous

IATA (Passenger)

Packing instruction (passenger aircraft) : 956
Packing instruction (LQ) : Y956
Packing group : III
Labels : Miscellaneous

14.5 Environmental hazards

ADN

Environmentally hazardous : yes

ADR

Environmentally hazardous : yes

RID

Environmentally hazardous : yes

IMDG

Marine pollutant : yes

IATA (Passenger)

Environmentally hazardous : yes

Imipenem / Cilastatin / Relebactam Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 09.08.2023
5.2	30.09.2023	67750-00030	Date of first issue: 27.02.2015

IATA (Cargo)

Environmentally hazardous : yes

14.6 Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Remarks : Not applicable for product as supplied.

SECTION 15: Regulatory information

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

The components of this product are reported in the following inventories:

AICS : not determined

DSL : not determined

IECSC : not determined

15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

Other information : Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

Full text of H-Statements

H319 : Causes serious eye irritation.

H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H361d : Suspected of damaging the unborn child.

H373 : May cause damage to organs through prolonged or repeated exposure.

H400 : Very toxic to aquatic life.

H410 : Very toxic to aquatic life with long lasting effects.

Full text of other abbreviations

Aquatic Acute : Short-term (acute) aquatic hazard

Aquatic Chronic : Long-term (chronic) aquatic hazard

Eye Irrit. : Eye irritation

Repr. : Reproductive toxicity

Resp. Sens. : Respiratory sensitisation

STOT RE : Specific target organ toxicity - repeated exposure

Imipenem / Cilastatin / Relebactam Formula- tion

Version 5.2	Revision Date: 30.09.2023	SDS Number: 67750-00030	Date of last issue: 09.08.2023 Date of first issue: 27.02.2015
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ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of very high concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Further information

Sources of key data used to compile the Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

Classification of the mixture:

Eye Irrit. 2	H319
Resp. Sens. 1	H334
Repr. 2	H361d
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Classification procedure:

Calculation method
Calculation method
Calculation method
Calculation method
Calculation method
Calculation method

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be

Imipenem / Cilastatin / Relebactam Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 09.08.2023
5.2	30.09.2023	67750-00030	Date of first issue: 27.02.2015

considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

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