SECTION 1. IDENTIFICATION

Product name : HEMLIBRA(TM) (60 mg/0.4 ml)
Product code : RO553-4262/F04
Common name(s), synonym(s) of the substance : Emicizumab with excipients in aqueous solution

Manufacturer or supplier’s details
Company name of supplier : Genentech, Inc.
Address : DNA Way 1
94080 South San Francisco
CA
USA
Telephone : 001-(650) 225-1000
E-mail address : info.sds@roche.com
Emergency telephone : US Chemtrec phone (800)-424-9300

Recommended use of the chemical and restrictions on use
Recommended use : Formulated pharmaceutical active substance
Restrictions on use : For professional users only.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Not a hazardous substance or mixture.

GHS label elements
Not a hazardous substance or mixture.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emicizumab</td>
<td>1610943-06-0</td>
<td>15.0</td>
</tr>
<tr>
<td>L-Arginine</td>
<td>74-79-3</td>
<td>2.61</td>
</tr>
<tr>
<td>L-Histidine</td>
<td>71-00-1</td>
<td>0.31</td>
</tr>
<tr>
<td>L-Aspartic acid</td>
<td>56-84-8</td>
<td>0.0</td>
</tr>
<tr>
<td>Poloxamer 188</td>
<td>691397-13-4</td>
<td>0.05</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>&gt; 82.0</td>
</tr>
</tbody>
</table>
SECTION 4. FIRST AID MEASURES

General advice : Do not leave the victim unattended.

If inhaled : Move to fresh air.
If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : If on skin, rinse well with water.

In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.
If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Rinse mouth with water.

Most important symptoms and effects, both acute and delayed : None known.

Notes to physician : The first aid procedure should be established in consultation with the doctor responsible for industrial medicine.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific hazards during fire fighting : No information available.

Hazardous combustion products : In case of fire hazardous decomposition products may be produced such as:
Carbon monoxide
Nitrogen oxides (NOx)

Further information : Standard procedure for chemical fires.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special protective equipment for fire-fighters : Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Refer to protective measures listed in sections 7 and 8.
Environmental precautions: Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up: Wipe up with absorbent material (e.g. cloth, fleece). Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion: Normal measures for preventive fire protection.

Advice on safe handling: For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area.

Conditions for safe storage: Electrical installations / working materials must comply with the technological safety standards.

Further information on storage conditions: See label, package insert or internal guidelines.

Materials to avoid: No materials to be especially mentioned.

Storage temperature: Protected from heat and light.

Further information on storage stability: No decomposition if stored and applied as directed.

Packaging material: Suitable material: Stainless steel, glass, Vials.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emicizumab</td>
<td>1610943-06-0</td>
<td>IOEL</td>
<td>0.02 mg/m3</td>
<td>Roche Industrial Hygiene Committee (RIIHC)</td>
</tr>
</tbody>
</table>

Engineering measures: No data available

Personal protective equipment

Respiratory protection: No personal respiratory protective equipment normally required.

Hand protection

Material: Protective gloves.
Remarks: Wear appropriate protective gloves to prevent skin contact. Replace torn or punctured gloves promptly.
Eye protection: Safety glasses
Skin and body protection: Protective suit
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Aqueous solution, sterile
Color: colorless, light yellow
Odor: No data available
Odor Threshold: No data available
pH: 6.0
Melting point/range: No data available
Boiling point/boiling range: No data available
Flash point: does not flash
Evaporation rate: No data available
Flammability (solid, gas): Does not sustain combustion.
Flammability (liquids): Does not sustain combustion.
Self-ignition: Not applicable
Upper explosion limit / Upper flammability limit: No data available
Lower explosion limit / Lower flammability limit: No data available
Vapor pressure: No data available
Relative vapor density: No data available
Relative density: No data available
Solubility(ies)
  Water solubility: completely miscible
  Solubility in other solvents: No data available
Partition coefficient: n-
octanol/water

Autoignition temperature : No data available

Decomposition temperature : No data available

Viscosity
  Viscosity, dynamic : No data available
  Viscosity, kinematic : No data available

Explosive properties : No data available

Oxidizing properties : The substance or mixture is not classified as oxidizing.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No dangerous reaction known under conditions of normal use.

Chemical stability : Stable under normal conditions.

Proteins are temperature-sensitive; the thermal denaturation has an impact on quality but does not affect Plant and Process Safety; during decomposition no flammable gas, no organic peroxide and no oxidising substances are created.

Does not contain any antimicrobial preservative; therefore, care must be taken to ensure the sterility of the prepared solution.

Possibility of hazardous reactions : Stable under recommended storage conditions.

No hazards to be specially mentioned.

Conditions to avoid : No data available

Incompatible materials : No data available

Hazardous decomposition products : No data available

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity
Not classified based on available information.

Components:

Emicizumab:
Acute oral toxicity : Remarks: Not bioavailable by oral administration

L-Arginine:
Acute oral toxicity : LD50 Oral (Rat): > 5,110 mg/kg
Skin corrosion/irritation
Not classified based on available information.

Components:

L-Arginine:
Remarks: May cause skin irritation in susceptible persons.

Serious eye damage/eye irritation
Not classified based on available information.

Components:

L-Arginine:
Result: Irritating to eyes.
Remarks: May cause irreversible eye damage.

Respiratory or skin sensitization

Skin sensitization
Not classified based on available information.

Respiratory sensitization
Not classified based on available information.

Germ cell mutagenicity
Not classified based on available information.

Carcinogenicity
Not classified based on available information.

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
Not classified based on available information.

STOT-single exposure
Not classified based on available information.

Components:

L-Arginine:
Assessment: The substance or mixture is not classified as specific target organ toxicant, single exposure.

STOT-repeated exposure
Not classified based on available information.
Components:

L-Arginine:
Assessment: The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity

Components:

Emicizumab:
Species: cynomolgus monkey
NOAEL: mg/kg/w, 100
Application Route: i.v.
Exposure time: 4 Weeks

Species: cynomolgus monkey
NOAEL: mg/kg/w, 30
Application Route: s.c.
Exposure time: 13 Weeks

Species: cynomolgus monkey
NOAEL: mg/kg/w, 30
Application Route: s.c.
Exposure time: 26 Weeks

Aspiration toxicity
Not classified based on available information.

Components:

L-Arginine:
No data available

Further information

Components:

Emicizumab:
Remarks: anaphylactic reactions may occur following the intravenous application of proteins; rare cases of hypersensitivity have been described with other monoclonal antibodies

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Emicizumab:
Toxicity to fish: LC50 (Brachydanio rerio (zebrafish)): > 100 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
GLP: yes
Safety Data Sheet

HEMLIBRA(TM) (60 mg/0.4 ml)

Version: 1.1
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Date of last issue: 04-18-2019
Date of first issue: 04-18-2019

Remarks: nominal concentration

NOEC (Brachydanio rerio (zebrafish)): 100 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: nominal concentration

Toxicity to daphnia and other aquatic invertebrates:

EC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
GLP: yes
Remarks: nominal concentration

NOEC (Daphnia magna (Water flea)): 100 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
GLP: yes
Remarks: nominal concentration

Toxicity to algae/aquatic plants:

ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
GLP: yes
Remarks: nominal concentration

NOErC (Desmodesmus subspicatus (green algae)): 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
GLP: yes
Remarks: nominal concentration

EyC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
GLP: yes
Remarks: nominal concentration

NOEyC (Desmodesmus subspicatus (green algae)): 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
GLP: yes
Remarks: nominal concentration

Toxicity to microorganisms:

(activated sludge): Exposure time: 14 d
Method: OECD Test Guideline 301F
GLP: yes
Remarks: no adverse influence on substrate biodegradation

L-Arginine:

Toxicity to fish:

LC50 (Brachydanio rerio (zebrafish)): 2,800 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
GLP: yes
SAFETY DATA SHEET

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NOEC (Brachydanio rerio (zebrafish)): 1,000 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
GLP: yes

Toxicity to daphnia and other aquatic invertebrates
NOEC (Daphnia magna (Water flea)): 1,000 mg/l
Exposure time: 24 h
Method: OECD Test Guideline 202
GLP: yes

Toxicity to microorganisms
EC10 (Pseudomonas putida): < 10,000 mg/l
Exposure time: 16 h
Method: DIN 38 412 Part 8
GLP: yes

Ecotoxicology Assessment
Acute aquatic toxicity
This product has no known ecotoxicological effects.

Chronic aquatic toxicity
This product has no known ecotoxicological effects.

Toxicity Data on Soil
Not expected to adsorb on soil.

Other organisms relevant to the environment
No data available

Persistence and degradability

Components:

Emicizumab:
Biodegradability
Result: Readily biodegradable.
Biodegradation: 99 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
GLP: yes

Physico-chemical removability
Method: OECD Test Guideline 301F
Remarks: Not abiotically degradable

Bioaccumulative potential

Components:

Emicizumab:
Partition coefficient: n-octanol/water
Remarks: No data available

L-Arginine:
Partition coefficient: n-octanol/water
log Pow: -4.2

Mobility in soil
No data available
SAFETY DATA SHEET

HEMLIBRA(TM) (60 mg/0.4 ml)

Other adverse effects

**Product:**

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

**Components:**

L-Arginine:

Adsorbed organic bound halogens (AOX) : Remarks: Not applicable

Additional ecological information : No data available

SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal methods**

Waste from residues : Can be disposed as waste water, when in compliance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

**International Regulations**

**UNRTDG**: Not regulated as a dangerous good

**IATA-DGR**: Not regulated as a dangerous good

**IMDG-Code**: Not regulated as a dangerous good

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**: Not applicable

**Domestic regulation**

**49 CFR**: Not regulated as a dangerous good
SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Component TPQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SARA 311/312 Hazards</td>
<td>No SARA Hazards</td>
<td></td>
</tr>
</tbody>
</table>

Clean Air Act
This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act
This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations

Massachusetts Right To Know

Pennsylvania Right To Know

Water 7732-18-5
Emicizumab 1610943-06-0

Maine Chemicals of High Concern

Vermont Chemicals of High Concern

Washington Chemicals of High Concern

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

DSL  Emicizumab
     This product contains the following components that are not on the Canadian DSL nor NDSL.

AICS  Not in compliance with the inventory

NZIoC  On the inventory, or in compliance with the inventory
SAFETY DATA SHEET

HEMLIBRA(TM) (60 mg/0.4 ml)

ENCS : Not in compliance with the inventory
ISHL : Not in compliance with the inventory
KECI : Not in compliance with the inventory
PICCS : Not in compliance with the inventory
IECSC : Not in compliance with the inventory
TCSI : Not in compliance with the inventory
TSCA : Substance(s) not listed on TSCA inventory

TSCA list
No substances are subject to a Significant New Use Rule.
No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

NFPA:

HMIS® IV:

HEALTH / 0
FLAMMABILITY 0
PHYSICAL HAZARD 0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; 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; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; 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 Organiza-
HEMLIBRA(TM) (60 mg/0.4 ml)

Revision Date: 03-19-2020

Date of last issue: 04-18-2019

Date of first issue: 04-18-2019

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

US / Z8 / 1810