

Safety Data Sheet

according to Regulation (EC) No 1907/2006

Standard 45% 5-HMF Aqueous Solution

Revision date: 14.01.2020

Reg.nr. ECHA/Annex VII: 01-2120824735-51-0000

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SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Standard 45% 5-HMF Aqueous Solution

1.2. Relevant identified uses of the substance or mixture and uses advised against**Use of the substance/mixture**

Industrial manufacturing.

Uses advised against

Any non-intended use.

1.3. Details of the supplier of the safety data sheet

Company name:	AVA-Biochem BSL AG	
Street:	Rothausstr. 61	
Place:	4132 Muttenz (Schweiz)	
Telephone:	+41 41 727 09 70	
e-mail:	contact@ava-biochem.com	
Responsible Department:	Dr. Stefan Krawielitzki AVA-Biochem BSL AG Rothausstr. 61, 4132 Muttenz	e-mail: s.krawielitzki@ava-biochem.com Tel. +41 41 727 09 75

1.4. Emergency telephone number:

0049 172 8944754

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****Regulation (EC) No. 1272/2008**

Hazard categories:

Skin corrosion/irritation: Skin Irrit. 2

Serious eye damage/eye irritation: Eye Irrit. 2

Specific target organ toxicity - single exposure: STOT SE 3

Hazard Statements:

May cause allergic reaction.

Causes serious eye irritation.

May cause respiratory irritation.

2.2. Label elements**Regulation (EC) No. 1272/2008****Hazard components for labelling**

5-(Hydroxymethyl)-2-furaldehyde

Signal word: Warning**Pictograms:****Hazard statements**

H317	May cause allergic reaction.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

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Precautionary statements

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352	IF ON SKIN: Wash with plenty of water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER/doctor if you feel unwell.
P501	Dispose of contents/container to in accordance with official regulations.

2.3. Other hazards

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

SECTION 3: Composition/information on ingredients**3.2. Mixtures****Hazardous components**

CAS No	Chemical name			Quantity
	EC No	Index No	REACH No	
	Classification according to Regulation (EC) No. 1272/2008 [CLP]			
67-47-0	5-(Hydroxymethyl)-2-furaldehyde Reg.nr. ECHA/Annex VII: 01-2120824735-51-0000			44 - 46 %
	200-654-9			
	Skin Irrit. 2, Eye Irrit. 2, STOT SE 3; H317 H319 H335			
98-01-1	2-furaldehyde			< 0,9 %
	202-627-7	605-010-00-4		
	Carc. 2, Acute Tox. 4, Eye Irrit. 2, STOT SE 3, Skin Irrit. 2; H351 H331 H301 H312 H319 H335 H315			
50-00-0	formaldehyde ... %			< 0,1 %
	200-001-8	605-001-00-5		
	Carc. 1B, Muta. 2, Acute Tox. 3, Skin Corr. 1B, Skin Sens. 1; H350 H341 H301 H311 H331 H314 H317			

Full text of H and EUH statements: see section 16.

Further Information

Product does not contain listed SVHC substances > 0,1 % according to Regulation (EC) No. 1907/2006 Article 59 (REACH)

SECTION 4: First aid measures**4.1. Description of first aid measures****General information**

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

After inhalation

In case of accident by inhalation: remove casualty to fresh air and keep at rest. In the case of lung irritation: Primary treatment using corticoide spray, eg. Auxiloson spray, Pulmicort-dosage-spray. (Auxiloson and Pulmicort are registered trademarks). In case of allergic symptoms, especially in the breathing area, seek medical advice immediately.

After contact with skin

After contact with skin, wash immediately with: Water and soap. Remove contaminated, saturated clothing immediately. In case of skin irritation, consult a physician.

After contact with eyes

Rinse cautiously with water for several minutes. In case of troubles or persistent symptoms, consult an ophthalmologist.

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After ingestion

Rinse mouth thoroughly with water. Call a physician immediately. Let water be drunken in little sips (dilution effect).

4.2. Most important symptoms and effects, both acute and delayed

No information available.

4.3. Indication of any immediate medical attention and special treatment needed

First Aid, decontamination, treatment of symptoms.

SECTION 5: Firefighting measures**5.1. Extinguishing media****Suitable extinguishing media**

Water spray.
Alcohol resistant foam.
Dry extinguishing powder.
The product itself does not burn. Co-ordinate fire-fighting measures to the fire surroundings.

Unsuitable extinguishing media

High power water jet.

5.2. Special hazards arising from the substance or mixture

Can be released in case of fire: Carbon monoxide, Carbon dioxide (CO₂).

5.3. Advice for firefighters

In case of fire: Wear self-contained breathing apparatus.

Additional information

Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Safe handling: see section 7
Personal protection equipment: see section 8

6.2. Environmental precautions

Do not allow to enter into surface water or drains. Prevent spread over a wide area (e.g. by containment or oil barriers).

6.3. Methods and material for containment and cleaning up

Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents).
Treat the recovered material as prescribed in the section on waste disposal.
Clean contaminated objects and areas thoroughly observing environmental regulations.

6.4. Reference to other sections

Disposal: see section 13

SECTION 7: Handling and storage**7.1. Precautions for safe handling****Advice on safe handling**

Wear suitable protective clothing. (See section 8.)
Do not breathe gas/fumes/vapour/spray. Avoid contact with skin, eyes and clothes.

Advice on protection against fire and explosion

Usual measures for fire prevention.

Further information on handling

General protection and hygiene measures: refer to chapter 8

7.2. Conditions for safe storage, including any incompatibilities

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Requirements for storage rooms and vessels

Keep container tightly closed in a cool, well-ventilated place.

Hints on joint storage

Do not store together with: Explosives. Gas. Oxidizing liquids. Oxidizing solids. Self-reactive substances and mixtures. Organic peroxides. Ammonium nitrate. Combustible toxic substances. Non-combustible toxic substances.

Further information on storage conditions

Keep the packing dry and well sealed to prevent contamination and absorption of humidity.
 Recommended storage temperature: 8°C
 Protect against: Light. UV-radiation/sunlight. Heat. Moisture.

7.3. Specific end use(s)

See section 1.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limits (EH40)

CAS No	Substance	ppm	mg/m ³	fibres/ml	Category	Origin
98-01-1	2-Furaldehyde (furfural)	2	8		TWA (8 h)	WEL
		5	20		STEL (15 min)	WEL
50-00-0	Formaldehyde	2	2.5		TWA (8 h)	WEL
		2	2.5		STEL (15 min)	WEL

Additional advice on limit values

To date, no national critical limit values exist.

8.2. Exposure controls



Appropriate engineering controls

Provide adequate ventilation.

Protective and hygiene measures

Always close containers tightly after the removal of product. When using do not eat, drink, smoke, sniff. Wash hands before breaks and after work.

Eye/face protection

Wear safety glasses; chemical goggles (if splashing is possible). DIN EN 166

Hand protection

Wear suitable gloves.

Suitable material:

FKM (fluororubber). - Thickness of glove material: 0,4 mm

Breakthrough time >= 8 h

Butyl rubber. - Thickness of glove material: 0,5 mm

Breakthrough time >= 8 h

CR (polychloroprenes, Chloroprene rubber). - Thickness of glove material: 0,5 mm

Breakthrough time >= 8 h

NBR (Nitrile rubber). - Thickness of glove material: 0,35 mm

Breakthrough time >= 8 h

PVC (Polyvinyl chloride). - Thickness of glove material: 0,5 mm

Breakthrough time >= 8 h

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The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Check leak tightness/impermeability prior to use. In the case of wanting to use the gloves again, clean them before taking off and air them well.

Skin protection

Suitable protective clothing: Lab apron.

Minimum standard for preventive measures while handling with working materials are specified in the TRGS 500 (D).

Respiratory protection

With correct and proper use, and under normal conditions, breathing protection is not required.

Respiratory protection necessary at:

Insufficient ventilation.

Release of: product exceeding exposure limit values

Suitable respiratory protective equipment:

Combination filtering device (EN 14387); Type : A-P3

The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, self-contained breathing apparatus must be used

Environmental exposure controls

Do not allow uncontrolled discharge of product into the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state:	liquid
Colour:	dark orange - light brown
Odour:	characteristic

pH-Value:	not determined
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Changes in the physical state

Melting point:	not determined
Initial boiling point and boiling range:	not determined
Sublimation point:	not determined
Softening point:	not determined
Pour point:	not determined
Flash point:	not determined
Sustaining combustion:	Not sustaining combustion

Explosive properties

Product itself is not explosive.

Lower explosion limits:	not determined
Upper explosion limits:	not determined
Ignition temperature:	not determined

Auto-ignition temperature

Gas:	not determined
Decomposition temperature:	not determined

Oxidizing properties

none

Vapour pressure:	not determined
Density:	not determined

Test method

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Water solubility: not determined

Solubility in other solvents

not determined

Partition coefficient: not determined

Viscosity / dynamic: not determined

Viscosity / kinematic: not determined

Flow time: not determined

Vapour density: not determined

Evaporation rate: not determined

Solvent separation test: not determined

Solvent content: not determined

9.2. Other information

Solid content: not determined

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

No information available.

10.2. Chemical stability

The product is chemically stable under recommended conditions of storage, use and temperature.

10.3. Possibility of hazardous reactions

No information available.

10.4. Conditions to avoid

Protect against: UV-radiation/sunlight. heat.

10.5. Incompatible materials

Materials to avoid: Oxidizing agents, strong. Reducing agents, strong.

10.6. Hazardous decomposition productsCan be released in case of fire: Carbon dioxide (CO₂). Carbon monoxide**SECTION 11: Toxicological information****11.1. Information on toxicological effects****Toxicokinetics, metabolism and distribution**

No data available.

Acute toxicity

Based on available data, the classification criteria are not met.

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CAS No	Chemical name				
	Exposure route	Dose	Species	Source	Method
67-47-0	5-(Hydroxymethyl)-2-furaldehyde				
	oral	LD50 2500 mg/kg	Rat.	ChemID	
98-01-1	2-furaldehyde				
	oral	LD50 65 mg/kg	Rat		
	dermal	ATE 1100 mg/kg			
	inhalation vapour	ATE 3 mg/l			
	inhalation aerosol	ATE 0,5 mg/l			
50-00-0	formaldehyde ... %				
	oral	ATE 100 mg/kg			
	dermal	ATE 300 mg/kg			
	inhalation vapour	ATE 3 mg/l			
	inhalation aerosol	ATE 0,5 mg/l			

Irritation and corrosivity

Causes skin irritation.
Causes serious eye irritation.

Sensitising effects

Skin sensitisation: Adverse effect observed

Carcinogenic/mutagenic/toxic effects for reproduction

Based on available data, the classification criteria are not met.

5-(Hydroxymethyl)-2-furaldehyde:

In-vitro mutagenicity: There is evidence in literature for negative results as well as positive results at higher concentrations.

No experimental indications of mutagenicity in-vivo exist.

Carcinogenicity:

In mice, female, 2 years, oral at 188 mg/kg, 375 mg/kg increased liver tumor incidence.

In rats, 2 years, oral up to 750 mg/kg no evidence of carcinogenicity.

In mice, male, 2 years, oral up to 750 mg/kg no evidence of carcinogenicity.

Lit: NTP TECHNICAL REPORT ON THE TOXICOLOGY AND CARCINOGENESIS STUDIES OF 5-(HYDROXYMETHYL)-2-FURFURAL(CAS NO. 67-47-0) IN F344/N RATS AND B6C3F1 MICE (GAVAGE STUDIES)

STOT-single exposure

May cause respiratory irritation. (5-(Hydroxymethyl)-2-furaldehyde)

STOT-repeated exposure

Based on available data, the classification criteria are not met.

5-(Hydroxymethyl)-2-furaldehyde:

Subchronic oral toxicity: (Mouse. 3 months.): NOAEL = 375 mg/ kg (reduced body weight.)

Chronic oral toxicity: (Mouse. 2 years.): NOAEL = 375 mg/ kg (reduced body weight.)

Lit: NTP TECHNICAL REPORT ON THE TOXICOLOGY AND CARCINOGENESIS STUDIES OF 5-(HYDROXYMETHYL)-2-FURFURAL(CAS NO. 67-47-0) IN F344/N RATS AND B6C3F1 MICE (GAVAGE STUDIES)

Chronic oral toxicity: (Rat. 11 months.): NOEL = 80 mg/ kg (Enlargement of the spleen.)

Lit: Fundam. Appl. Toxicol., 4:843-853

Aspiration hazard

Based on available data, the classification criteria are not met.

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Specific effects in experiment on an animal

No data available.

SECTION 12: Ecological information

12.1. Toxicity

5-(Hydroxymethyl)-2-furaldehyde:

Acute crustacea toxicity: LC 50 (72h) = 34 mg/l (27 mg/l - 43 mg/l) daphnia magna

Acute crustacea toxicity: LC 50 (24h) = 62 mg/l (53 mg/l - 78 mg/l) daphnia magna

CAS No	Chemical name					
	Aquatic toxicity	Dose	[h] [d]	Species	Source	Method
98-01-1	2-furaldehyde					
	Acute fish toxicity	LC50 24 mg/l	96 h	Salmo	Hommel	

12.2. Persistence and degradability

biodegradation in water: readily biodegradable.

12.3. Bioaccumulative potential

No indication of bioaccumulation potential.

Partition coefficient n-octanol/water

CAS No	Chemical name	Log Pow
67-47-0	5-(Hydroxymethyl)-2-furaldehyde	0,090
98-01-1	2-furaldehyde	0,83

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

12.6. Other adverse effects

No data available.

Further information

Do not allow to enter into surface water or drains.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Advice on disposal

Observe in addition any national regulations! Consult the local waste disposal expert about waste disposal.

Non-contaminated packages may be recycled.

According to EAKV, allocation of waste identity numbers/waste descriptions must be carried out in a specific way for every industry and process.

Control report for waste code/ waste marking according to EAKV:

Waste disposal number of waste from residues/unused products

160305 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; off-specification batches and unused products; organic wastes containing hazardous substances; hazardous waste

Waste disposal number of used product

160305 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; off-specification batches and unused products; organic wastes containing hazardous substances; hazardous waste

Waste disposal number of contaminated packaging

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150110 WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED; packaging (including separately collected municipal packaging waste); packaging containing residues of or contaminated by hazardous substances; hazardous waste

Contaminated packaging

Handle contaminated packages in the same way as the substance itself.

SECTION 14: Transport information

Land transport (ADR/RID)

- 14.1. UN number:** No dangerous good in sense of this transport regulation.
- 14.2. UN proper shipping name:** No dangerous good in sense of this transport regulation.
- 14.3. Transport hazard class(es):** No dangerous good in sense of this transport regulation.
- 14.4. Packing group:** No dangerous good in sense of this transport regulation.

Inland waterways transport (ADN)

- 14.1. UN number:** No dangerous good in sense of this transport regulation.
- 14.2. UN proper shipping name:** No dangerous good in sense of this transport regulation.
- 14.3. Transport hazard class(es):** No dangerous good in sense of this transport regulation.
- 14.4. Packing group:** No dangerous good in sense of this transport regulation.

Marine transport (IMDG)

- 14.1. UN number:** No dangerous good in sense of this transport regulation.
- 14.2. UN proper shipping name:** No dangerous good in sense of this transport regulation.
- 14.3. Transport hazard class(es):** No dangerous good in sense of this transport regulation.
- 14.4. Packing group:** No dangerous good in sense of this transport regulation.

Air transport (ICAO-TI/IATA-DGR)

- 14.1. UN number:** No dangerous good in sense of this transport regulation.
- 14.2. UN proper shipping name:** No dangerous good in sense of this transport regulation.
- 14.3. Transport hazard class(es):** No dangerous good in sense of this transport regulation.
- 14.4. Packing group:** No dangerous good in sense of this transport regulation.

14.5. Environmental hazards

ENVIRONMENTALLY HAZARDOUS: no

14.6. Special precautions for user

Refer to section 6-8

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

not relevant

SECTION 15: Regulatory information

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

EU regulatory information

Restrictions on use (REACH, annex XVII):

- Entry 3: 2-furaldehyde
- Entry 28: formaldehyde ... %

- 2010/75/EU (VOC): No information available.
- 2004/42/EC (VOC): No information available.
- Information according to 2012/18/EU (SEVESO III): Not subject to 2012/18/EU (SEVESO III)

Additional information

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The mixture is classified as hazardous according to regulation (EC) No 1272/2008 [CLP].
REACH 1907/2006 Appendix XVII, No (mixture): 3, 28

National regulatory information

Employment restrictions: Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC).
Water contaminating class (D): 2 - clearly water contaminating

15.2. Chemical safety assessment

For the following substances of this mixture a chemical safety assessment has been carried out:

SECTION 16: Other information

Changes

Rev. 1.0; 12.12.2019 Initial release
Rev. 1.1; 27.11.2018 Changes in chapter: 2,3,4,5,6,7,8,10,15,16.
Rev. 1.2; 12.12.2019 Changes in chapter: 1,2,3,4,6,7,8,11,15,16.

Abbreviations and acronyms

ADR: Accord européen sur le transport des marchandises dangereuses par Route
CAS Chemical Abstracts Service
DNEL: Derived No Effect Level
IARC: INTERNATIONAL AGENCY FOR RESEARCH ON CANCER
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
GefStoffV: Gefahrstoffverordnung (Ordinance on Hazardous Substances, Germany)
LOAEL: Lowest observed adverse effect level
LOAEC: Lowest observed adverse effect concentration
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
NOAEL: No observed adverse effect level
NOAEC: No observed adverse effect concentration
NTP: National Toxicology Program
N/A: not applicable
OSHA: Occupational Safety and Health Administration
PNEC: predicted no effect concentration
PBT: Persistent bioaccumulative toxic
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
SARA: Superfund Amendments and Reauthorization Act
SVHC: substance of very high concern
TRGS Technische Regeln fuerGefahrstoffe
TSCA: Toxic Substances Control Act
VOC: Volatile Organic Compounds
VwVwS: Verwaltungsvorschrift wassergefaehrdender Stoffe
WGK: Wassergefaehrdungsklasse

Classification for mixtures and used evaluation method according to Regulation (EC) No. 1272/2008 [CLP]

Classification	Classification procedure
Skin Irrit. 2; H315	Calculation method
Eye Irrit. 2; H319	Calculation method
STOT SE 3; H335	Calculation method
Aquatic Chronic 3; H412	Calculation method

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Relevant H and EUH statements (number and full text)

H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H412	Harmful to aquatic life with long lasting effects.

Further Information

Classification according EC regulation 1272/2008 (CLP): - Classification procedure:

Health hazards: Calculation method.

Environmental hazards: Calculation method.

Physical hazards: On basis of test data and / or calculated and / or estimated.

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)