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

1.1 Product identifier

Trade name/designation: **TYFO**XIT® **F15 / F20 / F30 / F40 / F50**
Article number: 1070 / 1075 / 1080 / 1090 / 1100
Product category: PC-TEC-2 Antifreeze and de-icing products

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

Use of the substance/mixture
Secondary coolant down to -50 °C for indirect refrigeration systems

1.3 Details of the supplier of the safety data sheet

Supplier
TYFOROP Chemie GmbH, Ausschläger Billdeich 77, D-20539 Hamburg
Telephone: +49 (0)40 20 94 97 0, e-mail: info@tyfo.de
E-mail (competent person): msds@tyfo.de

1.4 Emergency telephone number

Giftinformationszentrum-Nord (GIZ-Nord Poison Center): +49 (0)551 19240

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The mixture does not comply with the criteria for classification and labeling according to Regulation (EC) No. 1272/2008 (CLP).

2.2 Label elements

Not relevant.

2.3 Other hazards

Other adverse effects
This mixture does not contain any components that exhibit endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated Regulation (EU) 2017/2100 or Commission Delegated Regulation (EU) 2018/605 in quantities of 0.1 % or more by weight.

Results of PBT and vPvB assessment
The mixture does not contain any substances that meet the PBT and/or vPvB criteria according to REACH, Annex XIII.

SECTION 3: Composition / information on ingredients

3.1 Substances

Not applicable.

3.2 Mixtures

Description
Aqueous solution of potassium formate and potassium carbonate with inhibitors.

Hazardous ingredients

CAS No.	EC No.	Substance name / REACH No.	Concentration	Classification acc. CLP	SCL / M / ATE
590-29-4	209-677-9	Potassium formate 01-2119486456-26	20 - < 40 %	-	-
584-08-7	209-529-3	Potassium carbonate 01-2119532646-36	7 - < 10 %	Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335	-

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
Self-protection of the first aider.
Remove contaminated, saturated clothing immediately.
If symptoms develop or in the event of uncertainty, seek medical attention.

Following inhalation
Remove casualty to fresh air.
In all cases of doubt, or when symptoms persist, seek medical advice.

Following skin contact
After contact with skin, wash immediately with plenty of water and soap.
In all cases of doubt, or when symptoms persist, seek medical advice.

After eye contact
Rinse eyes thoroughly without delay under running water opening wide the eyelids for approx. 15 min.
In case of symptoms consult an eye specialist.

Following ingestion
Do NOT induce vomiting.
Rinse mouth thoroughly with water.
If swallowed seek medical advice immediately and show the doctor packing or label.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms
No data available.

4.3 Indication of any immediate medical attention and special treatment needed

Notes for the doctor
Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water spray jet. Alcohol resistant foam. Dry extinguishing powder. Carbon dioxide (CO_2).

Unsuitable extinguishing media
None known.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products
In case of fire formation of dangerous gases possible.
Fire gas of organic material has to be classed invariably as respiratory poison.
Carbon monoxide.
Carbon dioxide (CO_2).
Metallic oxides.

5.3 Advice for fire-fighters

Special protective equipment for firefighters
In case of fire: Wear self-contained breathing apparatus.
Use personal protection equipment.

Additional information
Co-ordinate fire-fighting measures to the fire surroundings. Use water spray jet to protect personnel and to cool endangered containers. Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water. Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Avoid skin and eye contact.
Use personal protection equipment.

For emergency responders
Ensure adequate ventilation.
Personal protection equipment.
Keep away unprotected persons.

6.2 Environmental precautions

Discharge into the environment must be avoided.
Prevent further leakage or spilling if this can be done safely.
Prevent spread over a wide area (e.g. by containment or oil barriers).

6.3 Methods and material for containment and cleaning up

For containment
If there is a risk of entry into the sewerage system, erect barriers and/or cover the sewerage system.

For cleaning up
Absorb with liquid-binding material (sand, diatomaceous earth, acid- or universal binding agents).
After taking up the material dispose according to regulation.

6.4 Reference to other sections

Safe handling: see section 7.
Personal protection equipment: see section 8.
Disposal: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures
Provide for appropriate ventilation/aspiration at the work station. Avoid skin and eye contact.
Avoid breathing mist/vapours/spray. Take the usual precautions when handling with chemicals.
Usual measures for fire prevention.

Advices on general occupational hygiene
Please observe work hygiene regulations.
When using do not eat, drink, smoke.
Wash hands before breaks and after work.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels
Keep container tightly closed in a cool, well-ventilated place.

Materials to avoid
Acids, oxidants. Keep away from food, drink and animal feedingstuffs.

7.3 Specific end use(s)

Recommendation
See section 1.2.

SECTION 8: Exposure control/personal protection

8.1 Control parameters

Occupational exposure limit values

No substances with occupational exposure limit values contained.

DNEL Worker

CAS No.	EC No.	Substance name	DNEL Value	DNEL Type
590-29-4	209-677-9	Potassium formate	12.35 mg/kg bw/day	Long-term dermal (systemic)
590-29-4	209-677-9	Potassium formate	43.55 mg/m³	Long-term inhalative (systemic)
584-08-7	209-529-3	Potassium carbonate	16 mg/cm²	Long-term dermal (systemic)
584-08-7	209-529-3	Potassium carbonate	10 mg/m³	Short-term inhalative (systemic)

DNEL Consumer

CAS No.	EC No.	Substance name	DNEL Value	DNEL Type
590-29-4	209-677-9	Potassium formate	6.175 mg/kg bw/day	Long-term oral (systemic)
590-29-4	209-677-9	Potassium formate	6.175 mg/kg bw/day	Long-term dermal (systemic)
590-29-4	209-677-9	Potassium formate	10.74 mg/m³	Long-term inhalative (systemic)
584-08-7	209-529-3	Potassium carbonate	8 mg/cm²	Long-term dermal (systemic)
584-08-7	209-529-3	Potassium carbonate	10 mg/m³	Short-term inhalative (systemic)

PNEC

CAS No.	EC No.	Substance name	PNEC Value	PNEC Type
590-29-4	209-677-9	Potassium formate	2 mg/l	Aquatic, freshwater
590-29-4	209-677-9	Potassium formate	0.2 mg/l	Aquatic, marine water
590-29-4	209-677-9	Potassium formate	10 mg/l	Aquatic, intermittent release
590-29-4	209-677-9	Potassium formate	1.5 mg/kg	Soil
590-29-4	209-677-9	Potassium formate	1.8 mg/l	Sewage treatment plant (STP)
590-29-4	209-677-9	Potassium formate	13.4 mg/kg	Sediment, freshwater
590-29-4	209-677-9	Potassium formate	1.34 mg/kg	Sediment, marine water

8.2 Exposure controls

Appropriate engineering controls

Technical measures to prevent exposure

Sufficient ventilation and exhaustion.

Personal protective equipment

Eye/face protection

Tightly sealed safety goggles (EN 166).

Hand protection

Glove materials data [type, thickness, breakthrough time/duration of use, permeation rate]: Butyl caoutchouc, 0.6-0.8 mm, >480 min, protection index 6. The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN374. The selection of a suitable glove depends from manufacturer to manufacturer not only on the material, but also on further quality criteria. The exact breakthrough time of the glove material is to be inquired from the protection glove manufacturer and must be strictly adhered to.

Body protection

Work clothing appropriate for chemicals.

Respiratory protection

Respiratory protection in the event of insufficient ventilation or prolonged exposure. Respiratory protection in the event of aerosol or mist formation. Recommended respiratory protection: Filter type: Particle filtering half mask (P2).

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state
Liquid.

Colour
Colourless.

Odour
Almost odourless.

Safety relevant basis data

Parameter	Value	Method	Source / Remark
Odour threshold	not determined		
Melting point/freezing point	Solidification point <-15 - <-50 °C	DIN ISO 3016	
Boiling point or initial boiling point and boiling range	>100 °C	ASTM D1120	
Flammability			not applicable
Upper explosion limit			not applicable
Lower explosion limit			not applicable
Flash point			not applicable
Ignition temperature			not applicable
Decomposition temperature	not determined		
pH value	11.5 - 12.5 (20 °C)	ASTM D1287	
Viscosity (kinematic)	1.6 - 2.4 mm^2/s (20 °C)	DIN 51562	
Solubility(ies)	Water solubility		soluble
Partition coefficient n-octanol/water (log value)	-2.10		CAS No. 590-29-4 potassium formate
Vapour pressure	approx. 20 hPa (20 °C)	calculated	
Density and/or relative density	1.220 - 1.360 g/cm^3 (20 °C)	DIN 51757	
Relative vapour density	not determined		
Particle characteristics			not applicable

9.2 Other information

Other safety characteristics

Parameter	Value	Method	Source / Remark
Explosive properties			not explosive
Oxidizing properties			non-oxidizing

SECTION 10: Stability and reactivity

10.1 Reactivity
The product is considered non-reactive under normal conditions of use.

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

10.3 Possibility of hazardous reactions
No hazardous reaction when handled and stored according to provisions.

10.4 Conditions to avoid
None if used as intended.

10.5 Incompatible materials
Acids, oxidants.

10.6 Hazardous decomposition products
No decomposition products will result from proper storage and handling.

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No. 1272/2008

Acute toxicity

Animal data

Parameter	Ingredient	Effective dose	Method	Source / Remark
Acute oral toxicity	CAS No. 590-29-4 potassium formate	LD50: >2000 mg/kg. Species: Rat.		ECHA
Acute oral toxicity	CAS No. 584-08-7 potassium carbonate	LD50: >2000 mg/kg. Species: Rat.		ECHA
Acute dermal toxicity	CAS No. 590-29-4 potassium formate	LD50: >2000 mg/kg. Species: Rabbit.	OECD 402	ECHA
Acute dermal toxicity	CAS No. 584-08-7 potassium carbonate	LD50: >2000 mg/kg. Species: Rabbit.		ECHA
Akute inhalation toxicity	CAS No. 590-29-4 potassium formate	LC50: >5 mg/l. Species: Rat. Exposure time: 4 h.	EPA OTS 798.1150	ECHA

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

Skin corrosion/irritation

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

Serious eye damage/irritation

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

Sensitisation to the respiratory tract

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

Skin sensitisation

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

SECTION 11: Toxicological information

Germ cell mutagenicity

Parameter	Ingredient	Method	Remark
In vitro mutagenicity/ genotoxicity	CAS No. 590-29-4 potassium formate	OECD 471 (Ames Test)	not mutagenic
In vitro mutagenicity/ genotoxicity	CAS-No. 584-08-7 potassium carbonate	OECD 476	not mutagenic

Carcinogenicity

Animal data

Ingredient	Effective dose	Method	Remark
CAS No. 590-29-4 potassium formate	NOAEL: 2000 mg/kg/day. Species: Rat (oral).	OECD 453	Animal testing did not show any carcinogenic effects

Reproductive toxicity

Animal data

Ingredient	Effective dose	Method	Result / Evaluation
CAS No. 590-29-4 potassium formate	NOAEL: 1292 mg/kg/day. Species: Rat (oral).	OECD 416	negative

Overall Assessment on CMR properties
Based on available data, the classification criteria are not met.

Specific target organ toxicity - single exposure

STOT SE 1 and 2

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

STOT SE 3

Irritation to respiratory tract

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

Narcotic effects

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

Specific target organ toxicity - repeated exposure

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

Aspiration hazard

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

Symptoms related to the physical, chemical and toxicological characteristics

In case of ingestion
No data available.

11.2 Information on other hazards

Endocrine disrupting properties
This mixture does not contain any components that exhibit endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated Regulation (EU) 2017/2100 or Commission Delegated Regulation (EU) 2018/605 in quantities of 0.1 % or more by weight.

SECTION 11: Toxicological information

Other information
The product is to be handled with the caution usual with chemicals.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity

Parameter	Ingredient	Effective dose	Method
Acute (short-term) fish toxicity	CAS No. 590-29-4 potassium formate	LC50: >1000 mg/l. Species: Oncorhynchus mykiss. Test duration: 96 h.	EPA OTS 797.1400
Chronic (long-term) fish toxicity	not determined		
Acute (short-term) toxicity to crustacea	CAS No. 590-29-4 potassium formate	EC50: >1000 mg/l. Species: Daphnia magna. Test duration: 48 h.	OECD 202
Chronic (long-term) toxicity to crustacea	CAS No. 590-29-4 potassium formate	EC50: >100 mg/l. Species: Daphnia magna. Test duration: 48 h.	OECD 211
Acute (short-term) toxicity to algae and cyanobacteria	CAS No. 590-29-4 potassium formate	EC50: >1000 mg/l. Species: Pseudokirchneriella subcap. Test duration: 72 h.	OECD 201
Chronic (long-term) toxicity to algae and cyanobacteria	not determined		
Toxicity to microorganisms	CAS No. 590-29-4 potassium formate	EC10: 18 mg/l. Species: activated sludge. Test duration: 28 d.	OECD 301D

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

12.2 Persistence and degradability

Parameter	Value	Method	Source / Remark
Biodegradation	Degradation rate: 92 %. Test duration: 28 d.	OECD 301D	CAS No. 590-29-4 potassium formate. Readily biodegradable (to OECD criteria).

12.3 Bioaccumulative potential

Parameter	Value	Method	Source / Remark
Bioconcentration factor (BCF)	BCF: 3.16	QSAR	CAS No. 590-29-4 potassium formate

12.4 Mobility in soil

Assessment/classification
No data available.

12.5 Results of PBT and vPvB assessment

Assessment/classification
The mixture does not contain any substances that meet the PBT and/or vPvB criteria according to REACH, Annex XIII.

12.6 Endocrine disrupting properties

See sections 2.3 and 11.2.

12.7 Other adverse effects

Additional ecotoxicological information

Additional information
Do not allow uncontrolled discharge of product into the environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste codes/waste designations according to EWC

Waste code product	Waste name
160114*	Antifreeze fluids containing hazardous substances

Appropriate disposal / Product
Dispose of waste according to applicable legislation.

Appropriate disposal / Package
Dispose of waste according to applicable legislation.

Remark
The waste code must be allocated in compliance with the EWC-regulation referring to the specific process and the sector.

SECTION 14: Transport information

Parameter	Land transport (ADR-RID)	Sea transport (IMDG)	Air transport (ICAO/IATA-DGR)
14.1 UN number or ID number	-	-	-
14.2 UN proper shipping name	-	-	-
14.3 Transport hazard class(es)	-	-	-
14.4 Packing group	-	-	-
14.5 Environmental hazards	-	-	-

14.6 Special precautions for user

No data available.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable.

All transport carriers
No dangerous goods as defined by the transport regulations - ADR/RID, IMDG, ICAO/IATA-DGR.

SECTION 15: Regulatory information

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

EU Regulations

Restrictions on use
REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII): -.

15.2 Chemical Safety Assessment

A chemical safety assessment was not conducted.

SECTION 16: Other information

Abbreviations and acronyms
For abbreviations and acronyms, see: ECHA Guidance on information requirements and chemical safety assessment, chapter R.20 (Table of terms and abbreviations).

Skin Irrit. 2: Skin irritation, Category 2.
Eye Irrit. 2: Eye irritation, Category 2.
STOT SE 3: Specific target organ toxicity (single exposure), Category 3.

SECTION 16: Other information

Key literature references and sources for data
Data sheets of the sub-supplier.

Classification for mixtures and used evaluation method according to regulation (EC) No. 1272/2008 [CLP]
The product is classified according to the classification criteria in Annex I of Regulation (EC) No. 1272/2008, based on the available hazard data of the ingredients.
Classification method: Test data. Calculation.

Additional information

Vertical lines in the left hand margin indicate an amendment from the previous version.

National and local regulations concerning chemicals shall be observed.

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.

Please observe the following disclaimer! Our safety data sheets have been compiled according to effective EU directives, WITHOUT taking into account the special national directives concerning the handling of hazardous substances. Each user is responsible for the implementation of the national special regulations.

Relevant H- and EUH-phrases (Number and full text)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.