



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision date 01.07.2019

Version: 3.1, ID-No.: 1070-1100-01_GB-GB

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

1.1. Product identifier: TYFOXIT® F15, F20, F30, F40, F50

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

Relevant identified uses: Secondary coolants down to -50 °C for indirect refrigeration systems

1.3. Details of the supplier of the safety data sheet

Company: TYFOROP Chemie GmbH, Ausschläger Billdeich 77, D-20539 Hamburg

Telephone/Telefax: Tel.: +49 (0)40 20 94 97 0, Fax: +49 (0)40 20 94 97 20

E-Mail: msds@tyfo.de (E-Mail adress of person responsible for SDS)

1.4. Emergency telephone number: Tel.: +49 (0)551-19240 GIZ-Nord Poison Center

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture


Classification according to Regulation (EC) No. 1272/2008 [CLP]

Skin Irrit. 2, H315. Eye Irrit. 2, H319.

The full text of the abbreviations is listed in section 16.

2.2. Label elements

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

Hazard pictograms	Signal word
	Warning
	Hazard Statements H315 Causes skin irritation H319 Causes serious eye irritation
	Precautionary Statements (Prevention) P261 Avoid breathing mist/vapours/spray P280 Wear protective gloves/protective clothing/eye protection/face protection
	Precautionary Statements (Response) P305+P351 IF IN EYES: Rinse cautiously with water for several minutes. Remove +P338 contact lenses if present and easy to do. Continue rinsing P302+P352 IF ON SKIN: Wash with plenty of soap and water
	Precautionary Statements (Disposal) P501 Dispose of contents/container to hazardous or special waste collection point
	Hazard determinant component for labelling Potassium carbonate

2.3. Other hazards: None known.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical characterization: Aqueous solutions of Potassium formate (CAS No. 590-29-4, EC No. 209-677-9) with inhibitors.

Hazardous components

Substance / REACH registration number	Content	CAS number	EC number	INDEX number	Classification acc. CLP
Potassium carbonate 01-2119532646-36	≥ 5 % - < 12 %	584-08-7	209-529-3	-	Skin Irrit. 2, H315. Eye Irrit. 2, H319. STOT SE 3, H335

The full text of the abbreviations is listed in section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice: Remove contaminated clothing immediately.

SECTION 4: First aid measures - Continuation

- 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.
- If inhaled:** If inhaled, remove to fresh air. Get medical attention if symptoms occur.
- On skin contact:** Immediately wash thoroughly with soap and water. Get medical attention if symptoms occur.
- On contact with eyes:** Wash affected eyes for at least 15 minutes under running water with eyelids held open and contact an ophthalmologist.
- On ingestion:** Immediately rinse mouth thoroughly and then drink plenty of water. Do NOT induce vomiting without medical advice. Get medical attention.

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

The most important known symptoms and effects are described in sections 2 and/or 11. Further important symptoms and effects are so far not known.

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

Treatment: Symptomatic treatment (decontamination, vital functions).

SECTION 5: Firefighting measures

5.1. Extinguishing media

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

Unsuitable extinguishing media: None known.

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting: Exposure to combustion products may be a hazard to health.

Hazardous combustion products: Carbon oxides.

5.3. Advice for fire-fighters

Special protective equipment: 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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.

6.2. Environmental precautions

Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). 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: Soak up with inert absorbent material. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container. 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 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: See Engineering measures in section 8.
Local/total ventilation: Use only with adequate ventilation.
Advice on safe handling: Avoid inhalation of vapour or mist. Do not swallow. Avoid contact with eyes. Avoid contact with skin. Handle in accordance with good industrial hygiene and safety practice. Take care to prevent spills, waste and minimize release to the environment.
Advice on protection against fire and explosion: Observe the general rules of industrial fire protection. No special measures necessary.
Hygiene measures: When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers: Store containers tightly sealed in a cool, dry and well ventilated place. Store in accordance with the particular national regulations.
Advice on common storage: Do not store with acids and oxidizing agents. Keep away from food, beverages and animal feedstuffs.

7.3. Specific end uses

For the relevant identified uses listed in section 1 the advice mentioned in this section 7 is to be observed.

SECTION 8: Exposure control/personal protection

8.1. Control parameters

Components with occupational exposure limits

No substances with occupational exposure limit values contained.

DNEL values - information on component Potassium formate

End use	Exposure routes	Potential health effects	Value
Workers	Inhalation	Acute systemic effects	435 mg/m ³
Workers	Inhalation	Short-term systemic effects	435 mg/m ³
Workers	Inhalation	Long-term systemic effects	435 mg/m ³
Workers	Skin contact	Acute systemic effects	6175 mg/kg body weight/day
Workers	Skin contact	Short-term systemic effects	6175 mg/kg body weight/day
Workers	Skin contact	Long-term systemic effects	6175 mg/kg body weight/day
Workers	Skin contact	Acute local effects	20.6 mg/cm ²
Workers	Skin contact	Short-term systemic effects	20.6 mg/cm ²
Workers	Skin contact	Long-term local effects	20.6 mg/cm ²
Consumers	Inhalation	Acute systemic effects	107.4 mg/m ³
Consumers	Inhalation	Short-term systemic effects	107.4 mg/m ³
Consumers	Inhalation	Long-term systemic effects	107.4 mg/m ³
Consumers	Skin contact	Acute systemic effects	3088 mg/kg body weight/day
Consumers	Skin contact	Short-term systemic effects	3088 mg/kg body weight/day
Consumers	Skin contact	Long-term systemic effects	3088 mg/kg body weight/day
Consumers	Skin contact	Acute local effects	10.3 mg/cm ²
Consumers	Skin contact	Short-term systemic effects	10.3 mg/cm ²
Consumers	Skin contact	Long-term local effects	10.3 mg/cm ²
Consumers	Ingestion	Long-term systemic effects	30.9 mg/kg body weight/day

PNEC values - information on component Potassium formate

Fresh water	Marine water	Water (intermittent release)	Fresh water sediment	Marine water sediment	Soil	Sewage treatment plant
2 mg/l	0.2 mg/l	10 mg/l	13.4 mg/kg	1.34 mg/kg	1.5 mg/kg	1.8 mg/l

8.2. Exposure controls

Engineering measures: Ensure adequate ventilation, especially in confined areas. Minimize workplace exposure concentrations.
Personal protective equipment
Eye protection: Safety glasses with side-shields (frame goggles, e.g. EN 166).

SECTION 8: Exposure control/personal protection - Continuation

Hand protection:	Chemical resistant protective gloves (EN 374). Material: butyl rubber. Protective index 6. Break through time: >480 minutes. Glove thickness: 0.6 - 0.8 mm. Remarks: Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the manufacturer. Wash hands before breaks and at the end of workday.
Skin and body protection:	Wash skin thoroughly after contact.
Respiratory protection:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Filter type: Particulate type (P).

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance:	liquid (all products).
Colour:	colourless (all products).
Odour:	almost odourless (all products).
Odour threshold:	No data available.
pH value (20 °C):	11.0 - 12.0 (all products). (ASTM D 1287)
Solidification temperature (ca., [°C]):	F15: <-15, F20: <-20, F30: <-30, F40: <-40, F50: <-50 (ASTM D 1177)
Initial boiling point/boiling range:	>100 °C (all products). (ASTM D 1120)
Flash point:	not applicable (all products). (DIN EN 22719, ISO 2719)
Evaporation rate:	No data available (all products).
Flammability (solid, gas):	not applicable (all products).
Upper explosion limit:	not applicable (all products).
Lower explosion limit:	not applicable (all products).
Vapour pressure (20 °C):	ca. 20 hPa (all products). (calculated)
Vapour density:	No data available.
Density (20 °C, ca., [g/cm³]):	F15: 1.22, F20: 1.26, F30: 1.28, F40: 1.34, F50: 1.36 (DIN 51757)
Solubility:	Water solubility: soluble (all products).
Partition coefficient n-octanol/H₂O:	No data available (all products).
Auto-ignition temperature:	No data available (all products).
Decomposition temperature:	No data available (all products).
Viscosity (20 °C, ca., [mm²/s]):	F15: 1.67, F20: 1.73, F30: 1.79, F40: 2.05, F50: 2.36 (DIN 51562)
Explosive properties:	not explosive (all products).
Oxidizing properties:	not oxidizing (all products).
9.2. Other Information:	No other information.

SECTION 10: Stability and reactivity

10.1. Reactivity:	No hazardous reactions if stored and handled as prescribed/indicated.
10.2. Chemical stability:	The products are stable if stored and handled as prescribed/indicated.
10.3. Possibility of hazardous reactions:	No hazardous reactions if stored and handled as prescribed/indicated.
10.4. Conditions to avoid:	No conditions to avoid anticipated.
10.5. Incompatible materials:	Substances to avoid: strong oxidising agents. Strong acids.
10.6. Hazardous decomposition products:	No hazardous decomposition products if stored and handled as prescribed/indicated.

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. Information on compon. Potassium formate: Acute oral toxicity: LD50 (Mouse): 5500 mg/kg. Acute inhalation toxicity: LC50 (Rat): >0.67 mg/l (4 h). Acute dermal toxicity: LD50 (Rat): >2000 mg/kg.

SECTION 11: Toxicological information - Continuation

Skin corrosion/irritation:	Information on component Potassium carbonate: Acute oral toxicity: LD50 (Rat): 1870 mg/kg. Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract. Acute inhalation toxicity: No data available. Symptoms: mucosal irritations, cough, shortness of breath. Possible damages: damage of respiratory tract. Acute dermal toxicity: No data available. Causes skin irritation.
Serious eye damage/eye irritation:	Information on component Potassium formate: No skin irritation (Rabbit), method: OECD test guideline 404. Information on component Potassium carbonate: Skin irritation (Rabbit). Causes serious eye irritation.
Respiratory or skin sensitisation:	Information on component Potassium formate: No eye irritation (Rabbit), method: EPA OTS 798.4500. Information on component Potassium carbonate: Eye irritation (Rabbit). Skin sensitisation: Not classified based on available information. Respiratory sensitisation: Not classified based on available information.
Germ cell mutagenicity:	Information on component Potassium formate: Skin contact: not sensitising (Guinea pig), method: OECD test guideline 406. Not classified based on available information.
Carcinogenicity:	Information on component Potassium formate: Genotoxicity in vitro: not mutagenic: Tests: 1. Bacteria, Ames-Test, method: OECD test guideline 471, 2. Chromosome aberration test in vitro, method: OECD test guideline 473, 3. In vitro mammalian cell gene mutation test, method: OECD test guideline 476. Information on component Potassium carbonate: Genotoxicity in vitro: not mutagenic: (Bacteria, Ames-Test). Not classified based on available information.
Reproductive toxicity:	Information on compon. Potassium formate: NOAEL (Rat): 2000 mg/kg/day, NOAEL (Mouse): 2000 mg/kg/day, meth.: OECD test guidel. 453. Not classified based on available information.
Specific target organ toxicity (single exposure):	Information on compon. Potassium formate: NOAEL (Rat): 1292 mg/kg/day, method: OECD test guideline 416. Not classified based on available information.
Specific target organ toxicity (repeated exposure):	Information on component Potassium carbonate: May cause respiratory irritation. Not classified based on available information.
Repeated dose toxicity:	Not classified based on available information.
Aspiration toxicity:	Information on component Potassium formate: NOAEL (Rat): 3877 mg/kg/day, method: OECD test guideline 408. Not classified based on available information.

SECTION 12: Ecological information

12.1. Toxicity

Information on component Potassium formate

Toxicity to	Value / exposure time	Species
fish	LC50: >1000 mg/l / 96 h LC50: >1000 mg/l / 96 h	Oncorhynchus mykiss (Rainbow trout) Pimephales promelas (Fathead minnow)
daphnia and other aquatic invertebrates	EC50: >1000 mg/l / 48 h	Daphnia magna (Water flea)
algae	EC50: >1000 mg/l / 72 h	Desmodesmus subspicatus (Green algae)
bacteria	NOEC: ≥18 mg/l / 72 h	Activated sludge (domestic) Method: OECD test guideline 301 D

SECTION 12: Ecological information - Continuation

12.2. Persistence and degradability: Information on component Potassium formate: Biodegradability: Biodegradation: 92 % (28 d), method: OECD test guideline 301 D. Result: readily biodegradable.

12.3. Bioaccumulative potential: No data available.

12.4. Mobility in soil: No data available.

12.5-Results of PBT and vPvB assessment: The products do not contain a substance fulfilling the PBT criteria (persistent/bioaccumulative/toxic) or the vPvB criteria (very persistent/very bioaccumulative).

12.6. Other adverse effects: No data available.

12.7. Further information: No further information.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product: Dispose of in accordance with local regulations. According to the European Waste Catalogue (EWC), 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.

Contaminated packaging: Dispose of as the product. Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

	ADR/ RID	ADN	IMDG	IATA/ ICAO
	Not classified as a dangerous good under transport regulations			
14.1. UN number	-	-	-	-
14.2. UN proper shipping name	-	-	-	-
14.3. Transport hazard classes	-	-	-	-
14.4. Packing group	-	-	-	-
14.5. Environmental hazards	-	-	-	-
14.6. Special precautions for user	-	-	-	-

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not evaluated.

SECTION 15: Regulatory information

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

Legal basis	Remark / Evaluation
Regulation (EC) No. 649/2012 of the European Parliament and the Council concerning the export and import	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59)	Not applicable
Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer	Not applicable
Regulation (EC) No. 850/2004 on persistent organic pollutants	Not applicable
Seveso III - Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances	Not applicable

Other regulations
 No further information.

15.2. Chemical Safety Assessment

Chemical Safety Assessments were not carried out for the products.

SECTION 16: Other information**Full text of the abbreviations of classifications and H-Statements used in sections 2 and 3**

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
H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation

Other abbreviations used in this safety data sheet in alphabetical order

ADN	European agreement concerning the international carriage of dangerous goods by inland waterways
ADR	European agreement concerning the international carriage of dangerous goods by road
ASTM	American Society for Testing and Materials
CAS number	Chemical Abstracts Service number
CLP	Regulation (EC) No. 1272/2008 on classification, labeling and packaging of chemical substances and mixtures
DIN	German Institute for Standardisation/German Industrial Standard
DNEL	Derived No Effect Level
EC50	Median Effective Concentration
EC number	EINECS number (European Inventory of Existing Substances) or ELINCS number (European List of Notified Chemical Substances)
EPA OTS	Environmental Protection Agency, Office of Toxic Substances (U.S.A.)
IATA	International Air Transport Association
IBC	International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
INDEX number	Identification code for hazardous substances, Annex VI of Regulation (EC) No. 1272/2008
ISO	International Organisation for Standardisation/International Standard
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
OECD	Organisation for Economic Cooperation and Development
PNEC	Predicted No Effect Concentration
REACH	Regulation (EC) No. 1907/2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Regulation concerning the international carriage of dangerous goods by rail

Further information

Sources of key data used to compile the safety data sheet: Internal technical data, data from component SDS, OECD eChem Portal search results and European Chemicals Agency [ECHA].

Revision date: 01.07.2019

Date of previous version: 01.11.2017

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

The information provided in this safety data sheet (SDS) 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 considered a warranty or quality specification of any type. The information provided relates only to the specific product identified at the top of this SDS and may not be valid when the SDS product is used in combination with any other materials or in any process, unless specified in the text. Product 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 product in the user's end product, if applicable.