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

	ndertaking						
	1.1. Product identifier Trade name/designation:						
	FK4027	FK4027					
	Article No.: 10070						
*			re and uses advised against				
	Use of the substance/mixture: thick film ink						
	Relevant identified uses:						
	Life cycle stage [l						
	IS: Use at industrial site						
	Sector of uses [Sl	-					
	SU 3: Industrial uses: Uses Product Categorie	s of substances as such or in preparation	tions at industrial sites				
	PC 9a: Coatings and paints						
	Process categorie						
	PROC 10: Roller application or						
		ease categories [ERC]					
		e leading to inclusion into/onto article					
	Article categories AC 0: Other	[AC]					
	1.3. Details of the supplie	r of the safety data sheet					
	Supplier (manufacturer/im	porter/only representative/do	ownstream user/distributor):				
	Fraunhofer IKTS-DD, TFC, RS Dickschichttechnik und funktioneller Druck Thick-Film Technology and Functional Printing Winterbergstraße 28						
01277 Dresden Germany							
	Telephone: +49-351-2553-791						
	Telefax: +49-351-2554-236						
	E-mail: service@ikts-tfc.de						
	Website: www.ikts.fraunhofer.o	de					
E-mail (competent person): service@ikts-tfc.de							
*	1.4. Emergency telephone						
		7916/-7900 (Only available during of	fice hours)				
	SECTION 2: Hazards ide						
*	2.1. Classification of the s	ubstance or mixture					
		Regulation (EC) No 1272/2008					
Hazard classes and hazard Hazard statements Classification procedure categories </th							
	Skin corrosion/irritation (Skin Irrit. 2)	H315: Causes skin irritation.	Calculation method.				
	Serious eye damage/eye irritation	H319: Causes serious eye irritation.	Calculation method.				
	(Eye Irrit. 2)						

Hazardous to the aquatic environment H412: Harmful to aquatic life with long

lasting effects.

(Aquatic Chronic 3)

Calculation method.

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2.2. Label elements Labelling according to Regulation (EC) No. 1272/2008 [CLP] Hazard pictograms:



GHS07

Exclamation mark Si

	warmi		
Haman	monto	f	h

Hazard statements	for health hazards
11215	

H315	Causes skin irritation.		
H319	Causes serious eye irritation.		

Hazard statements for environmental hazards		
H412	Harmful to aquatic life with long lasting effects.	

Supplemental hazard information: -

P280 Wear protective gloves/protective clothing and eye/face protection.

Precautionary statements Response

Trecautionary stat	recordionary statements response		
P302 + P352	IF ON SKIN: Wash with plenty of water/Soap.		
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if p and easy to do. Continue rinsing.			
P332 + P313	If skin irritation occurs: Get medical advice/attention.		
P337 + P313	If eye irritation persists: Get medical advice/attention.		

Special rules for supplemental label elements for certain mixtures:

67,5 % percent of the mixture consists of ingredient(s) of unknown acute toxicity (oral).

67,5 % percent of the mixture consists of ingredient(s) of unknown acute toxicity (dermal).

- 99,5 % percent of the mixture consists of ingredient(s) of unknown acute toxicity (inhalative).
- 69,4 % percent of the mixture consists of components of unknown hazards to the aquatic environment.

2.3. Other hazards

No data available

SECTION 3: Composition/information on ingredients

* 3.2. Mixtures

Description:

Glass and inorganic additives embedded in an organic vehicle.

Hazardous ingredients / Hazardous impurities / Stabilisers:				
Product identifiers Substance name Classification according to Regulation (EC) No 1272/2008 [CLP]				
Terpineol Eye Irrit. 2 (H319), Skin Irrit. 2 (H315) Warning	18 - ≤ 30.61 weight-%			
chromium (III) oxide Substance with a community workplace exposure limit.	0 - ≤ 0.55 weight-%			
	Substance name Classification according to Regulation (EC) No 1272/2008 [CLP] Terpineol Eye Irrit. 2 (H319), Skin Irrit. 2 (H315)			

Full text of H- and EUH-phrases: see section 16.

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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). Remove victim out of the danger area. Remove contaminated, saturated clothing. If unconscious but breathing normally, place in recovery position and seek medical advice. Do not leave affected person unattended.

Following inhalation:

Provide fresh air. In case of respiratory tract irritation, consult a physician.

In case of skin contact:

After contact with skin, wash immediately with plenty of water and soap. If skin irritation or rash occurs: Get medical advice/attention.

After eye contact:

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Consult an ophthalmologist.

Following ingestion:

Rinse mouth. Get medical advice/attention if you feel unwell.

Self-protection of the first aider:

Use personal protection equipment.

4.2. Most important symptoms and effects, both acute and delayed Skin corrosion/irritation Serious eye damage/eye irritation

Skin corrosion/initiation Serious eye damage/eye initiation

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

SECTION 5: Firefighting measures

* 5.1. Extinguishing media

Suitable extinguishing media:

alcohol resistant foam, Extinguishing powder, Carbon dioxide (CO2). Co-ordinate fire-fighting measures to the fire surroundings.

Unsuitable extinguishing media:

Water

* 5.2. Special hazards arising from the substance or mixture Hazardous combustion products:

Gases/vapours, toxic (CO, CO2) 5.3. Advice for firefighters

Wear a self-contained breathing apparatus and chemical protective clothing.

5.4. 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

6.1.1. For non-emergency personnel

Personal precautions:

Remove persons to safety.

Protective equipment:

Wear protective gloves/protective clothing/eye protection/face protection.

6.1.2. For emergency responders

Personal protection equipment:

Personal protection equipment: see section 8

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6.2. Environmental precautions

Do not allow to enter into surface water or drains.

6.3. Methods and material for containment and cleaning up

For containment:

Absorb with liquid-binding material (sand, diatomaceous earth, acid- or universal binding agents).

6.4. Reference to other sections

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

6.5. Additional information

Use appropriate container to avoid environmental contamination.

SECTION 7: Handling and storage

* 7.1. Precautions for safe handling

Protective measures

Advices on safe handling:

Wear personal protection equipment (refer to section 8).

Fire prevent measures:

The formation of combustible vapours is possible at temperatures above: 88 °C Keep away from sources of ignition - No smoking.

Environmental precautions:

Do not allow to enter into surface water or drains.

Advices on general occupational hygiene

When using do not eat, drink or smoke. Avoid contact with eyes and skin.

7.2. Conditions for safe storage, including any incompatibilities Technical measures and storage conditions:

Keep in a cool, well-ventilated place.

Packaging materials:

Keep/Store only in original container.

Requirements for storage rooms and vessels: Keep container tightly closed.

Hints on storage assembly:

Prohibition on mixed storage has to be followed.

Storage class (TRGS 510, Germany): 10 - Combustible liquids that cannot be assigned to any of the above storage classes

7.3. Specific end use(s)

Recommendation:

Observe technical data sheet.

SECTION 8: Exposure controls/personal protection

* 8.1. Control parameters

8.1.1. Occupational exposure limit values

Limit value type (country of origin)	Substance name	 Long-term occupational exposure limit value Short-term occupational exposure limit value Instantaneous value Monitoring and observation processes Remark
WEL (GB)	chromium (III) oxide CAS No.: 1308-38-9 EC No.: 215-160-9	① 0.5 mg/m ³
PL	chromium (III) oxide CAS No.: 1308-38-9 EC No.: 215-160-9	1 0.5 mg/m ³

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Limit value type Substance name 1 Long-term occupational exposure limit value (country of ② Short-term occupational exposure limit value origin) ③ Instantaneous value ④ Monitoring and observation processes 5 Remark chromium (III) oxide MY 0.5 mg/m³ CAS No.: 1308-38-9 EC No.: 215-160-9 BG chromium (III) oxide 2 mg/m³ CAS No.: 1308-38-9 EC No.: 215-160-9 CZ chromium (III) oxide 0.5 mg/m³ CAS No.: 1308-38-9 2 1.5 mg/m³ EC No.: 215-160-9 ⑤ (kov a sloučeniny, anorganický, vdechovatelná frakce) IOELV (EU) chromium (III) oxide 2 mg/m³ CAS No.: 1308-38-9 (metal and compounds, inorganic, insoluble) EC No.: 215-160-9 RO chromium (III) oxide ① 2 mg/m³ CAS No.: 1308-38-9 (metal) EC No.: 215-160-9 OSHA (US) chromium (III) oxide ① 0.5 mg/m³ CAS No.: 1308-38-9 EC No.: 215-160-9 chromium (III) oxide Alberta (CA) 0.5 mg/m³ CAS No.: 1308-38-9 EC No.: 215-160-9 BC (CA) chromium (III) oxide 0.5 mg/m³ CAS No.: 1308-38-9 EC No.: 215-160-9 JP chromium (III) oxide 0.5 mg/m³ CAS No.: 1308-38-9 (metal) EC No.: 215-160-9 NIOSH (US) chromium (III) oxide 0.5 mg/m³ CAS No.: 1308-38-9 EC No.: 215-160-9 ΤW chromium (III) oxide 0.5 mg/m³ CAS No.: 1308-38-9 EC No.: 215-160-9 NL chromium (III) oxide 0.5 mg/m³ CAS No.: 1308-38-9 (metaal) EC No.: 215-160-9 SI chromium (III) oxide 2 mg/m³ CAS No.: 1308-38-9 2 2 mg/m³ EC No.: 215-160-9 (kovina in spojine, anorgansko, netopljiv; frakcija ki jo je mogoče vdihniti) RU chromium (III) oxide 1 mg/m³ CAS No.: 1308-38-9 3 3 mg/m³ EC No.: 215-160-9 TR chromium (III) oxide 2 mg/m³ CAS No.: 1308-38-9 (metal ve bileşikler, inorganik, çözünmez) EC No.: 215-160-9 Québec (CA) chromium (III) oxide 0.5 mg/m³ CAS No.: 1308-38-9 EC No.: 215-160-9 ACGIH (US) chromium (III) oxide 0.5 mg/m³ CAS No.: 1308-38-9 (inhalable fraction) EC No.: 215-160-9

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8.1.2. Biological limit values

No data available

8.1.3. DNEL-/PNEC-values

No data available

*

*

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Technical measures and the application of suitable work processes have priority over personal protection equipment.

8.2.2. Personal protection equipment



Eye/face protection:

Eye glasses with side protection (EN 166)

Skin protection:

Tested protective gloves must be worn (EN ISO 374). Suitable material: NBR (Nitrile rubber) 0,4mm. Breakthrough time: 480 min.

Respiratory protection:

If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.

8.2.3. Environmental exposure controls

See section 7. No additional measures necessary.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state: Liquid **Odour:** not determined

Colour: light green

Safety relevant basis data

Parameter	Value	at °C	1 Method	
			2 Remark	
рН	not applicable			
Melting point	not determined			
Freezing point	not determined			
Initial boiling point and boiling range	≥ 214 - ≤ 224 °C		② Overtaken from SDS of the organic solvent o the paste (CAS#8000-41-7)	
Decomposition temperature	not determined			
Flash point	≈ 88 °C		② Overtaken from SDS of the organic solvent o the paste (CAS#8000-41-7)	
Evaporation rate	not determined			
Auto-ignition temperature	= 264 °C		② Overtaken from SDS of the organic solvent o the paste (CAS#8000-41-7)	
Upper/lower flammability or explosive limits	not determined			
Vapour pressure	= 3 hPa	20 °C	① OECD 104	
			② Overtaken from SDS of the organic solvent o the paste (CAS#8000-41-7)	
Vapour density	not determined			
Density	= 2.12 g/cm ³	25 °C	② calculated from ingredients	
Relative density	not determined			
Bulk density	not determined	Î		

en / BG / GB / JP / CA / MY / NL / PL / RO / RU / SI / ...

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Parameter	Value	at °C	1 Method
			② Remark
Water solubility	= 2.54 g/l	20 °C	① OECD 105
			② Overtaken from SDS of the organic solvent of
			the paste (CAS#8000-41-7)
Partition coefficient: n-octanol/water	= 2.6		② Overtaken from SDS of the organic solvent of
			the paste (CAS#8000-41-7)
Dynamic viscosity	≥ 20 - ≤ 50 Pa*s	25 °C	① Brookfield SC4-21/-13RP(Y)
Kinematic viscosity	not determined		

9.2. Other information

No data available

SECTION 10: Stability and reactivity

* 10.1. Reactivity

This material is considered to be non-reactive under normal use conditions.

10.2. Chemical stability

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

10.3. Possibility of hazardous reactions

No known hazardous reactions.

10.4. Conditions to avoid

Do not store at temperatures above 30°C

10.5. Incompatible materials

Acid, Alkali (lye), Oxidising agent, strong

* 10.6. Hazardous decomposition products

No known hazardous decomposition products.

SECTION 11: Toxicological information

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

Substance name	Toxicological information
Terpineol	LD ₅₀ oral:
CAS No.: 8000-41-7	=4,300 mg/kg (Ratte) OECD 401
EC No.: 232-268-1	LD ₅₀ dermal:
	>2,000 mg/kg (Rat) OECD 402
chromium (III) oxide	LD ₅₀ oral:
CAS No.: 1308-38-9	>5,000 mg/kg (Rat)
EC No.: 215-160-9	

Acute oral toxicity:

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

Acute dermal toxicity:

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

Acute inhalation toxicity:

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

Skin corrosion/irritation:

Causes skin irritation.

Serious eye damage/irritation:

Causes serious eye irritation.

Respiratory or skin sensitisation:

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

Germ cell mutagenicity:

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

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Carcinogenicity:

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

Reproductive toxicity:

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

STOT-single exposure:

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

STOT-repeated exposure:

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

Aspiration hazard:

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

Additional information:

No data available

11.2. Information on other hazards

No data available

SECTION 12: Ecological information

* 12.1. Toxicity

Substance name	Toxicological information
Terpineol	LC ₅₀ : =70 mg/l 4 d (fish, Danio rerio (zebrafish)) OECD 203
CAS No.: 8000-41-7	LC ₅₀ : ≈68 mg/l 3 d (Algae/water plant, Pseudokirchneriella
EC No.: 232-268-1	subcapitata) OECD 201
	LC₅₀: =73 mg/l 2 d (crustaceans, Daphnia magna (Big
	water flea)) OECD 202

Aquatic toxicity:

Harmful to aquatic life with long lasting effects.

* 12.2. Persistence and degradability

Substance name	Biodegradation	Remark
Terpineol	_	SDB Terpineol Version 6.4
CAS No.: 8000-41-7		von Sigma Aldrich (englisch),
EC No.: 232-268-1		überarbeitet am 23.03.2021;
		WGK laut Kenn-Nummer 3.477
		nach AwSV, Anlage 1 (4)

* 12.3. Bioaccumulative potential

Partition coefficient: n-octanol/water:

= 2.6; Remark: Overtaken from SDS of the organic solvent of the paste (CAS#8000-41-7)

12.4. Mobility in soil

No data available

* 12.5. Results of PBT and vPvB assessment

Substance name	Results of PBT and vPvB assessment
Terpineol CAS No.: 8000-41-7 EC No.: 232-268-1	_
chromium (III) oxide CAS No.: 1308-38-9 EC No.: 215-160-9	_

12.6. Endocrine disrupting properties

No data available

12.7. Other adverse effects

No data available

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

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

13.1.1. Product/Packaging disposal

Waste codes/waste designations according to EWC/AVV

Waste code product

16 05 06 * laboratory chemicals, consisting of or containing hazardous substances, including mixtures of laboratory chemicals

*: Evidence for disposal must be provided.

Waste treatment options

Appropriate disposal / Product:

Dispose of waste according to applicable legislation. Consult the appropriate local waste disposal expert about waste disposal.

Appropriate disposal / Package:

Completely emptied packages can be recycled.

SECTION 14: Transport information

Land transport (ADR/RID)	Inland waterway craft (ADN)	Sea transport (IMDG)	Air transport (ICAO-TI IATA-DGR)
14.1. UN number or	ID number		
No dangerous good in sense of these transport regulations.	No dangerous good in sense of these transport regulations.	No dangerous good in sense of these transport regulations.	No dangerous good in sense of these transport regulations.
14.2. UN proper shipping name			
No dangerous good in sense of these transport regulations.	No dangerous good in sense of these transport regulations.	No dangerous good in sense of these transport regulations.	No dangerous good in sense of these transport regulations.
14.3. Transport haza	ard class(es)		
not relevant	not relevant	not relevant	not relevant
14.4. Packing group			
not relevant	not relevant	not relevant	not relevant
14.5. Environmental hazards			
not relevant	not relevant	not relevant	not relevant
14.6. Special precautions for user			
not relevant	not relevant	not relevant	not relevant

14.7. Maritime transport in bulk according to IMO instruments No data available

SECTION 15: Regulatory information

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

No data available

15.2. Chemical Safety Assessment

Chemical safety assessments for substances in this mixture were not carried out.

SECTION 16: Other information

* 16.1. Indication of changes

- 1.2. Relevant identified uses of the substance or mixture and uses advised against
- 1.4. Emergency telephone number
- 2.1. Classification of the substance or mixture

2.2. Label elements

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3.2.	Mixtures
4.1.	Description of first aid measures
5.1.	Extinguishing media
5.2.	Special hazards arising from the substance or mixture
6.3.	Methods and material for containment and cleaning up
7.1.	Precautions for safe handling
7.2.	Conditions for safe storage, including any incompatibilities
8.1.	Control parameters
8.2.	Exposure controls
9.1.	Information on basic physical and chemical properties
10.1.	Reactivity
10.6.	Hazardous decomposition products
11.1.	Information on hazard classes as defined in Regulation (EC) No 1272/2008
12.1.	Toxicity
12.2.	Persistence and degradability
12.3.	Bioaccumulative potential
12.5.	Results of PBT and vPvB assessment
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
16.1.	Indication of changes
16.3.	Key literature references and sources for data

16.2. Abbreviations and acronyms

No data available

16.3. Key literature references and sources for data

GESTIS material database of German "IFA", accessed on 06.01.2021

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

Hazard classes and hazard categories	Hazard statements	Classification procedure
Skin corrosion/irritation (Skin Irrit. 2)	H315: Causes skin irritation.	Calculation method.
Serious eye damage/eye irritation (Eye Irrit. 2)	H319: Causes serious eye irritation.	Calculation method.
	H412: Harmful to aquatic life with long lasting effects.	Calculation method.

16.5. Relevant R-, H- and EUH-phrases (Number and full text)

Hazard statements

	H315	Causes skin irritation.
- 1		

H319 Causes serious eye irritation.

16.6. Training advice

No data available

16.7. Additional information

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.

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* Data changed compared with the previous version