

# Thermo ZF / Thermo ZF + / Thermo ZF Sigma

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations  
Issue date: 2/12/2020 Revision date: 12/13/2023 Version: 2.0

### SECTION 1: Identification

#### 1.1. Identification

Product form : Substance  
Name : Copper  
Trade name : Thermo ZF / Thermo ZF + / Thermo ZF Sigma  
CAS-No. : 7440-50-8  
Formula : Cu

#### 1.2. Recommended use and restrictions on use

Use of the substance/mixture : Wire Electrical Discharge Machining

#### 1.3. Supplier

Thermocompact  
181, Route de Sarves - Metz-Tessy - CS 70021  
PRINGY CEDEX, 74371  
FRANCE  
T +33 (0)4 50 27 20 02 - F +33 (0)4 50 27 17 37  
[thermo@thermocompact.com](mailto:thermo@thermocompact.com) - [www.thermocompact.com](http://www.thermocompact.com)

#### 1.4. Emergency telephone number

No additional information available

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### GHS US classification

Not classified

#### 2.2. GHS Label elements, including precautionary statements

##### GHS US labeling

No labeling applicable

#### 2.3. Other hazards which do not result in classification

No additional information available

#### 2.4. Unknown acute toxicity (GHS US)

No additional information available

### SECTION 3: Composition/Information on ingredients

#### 3.1. Substances

Substance type : Mono-constituent  
Name : Copper  
CAS-No. : 7440-50-8

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Name	Product identifier	%	GHS US classification
Chromium (Impurity)	CAS-No.: 7440-47-3	< 1	Not classified
Magnesium (Impurity)	CAS-No.: 7439-95-4	< 1	Flam. Sol. 2, H228
Zirconium (Impurity)	CAS-No.: 7440-67-7	< 0.1	Flam. Sol. 2, H228

Full text of hazard classes and H-statements : see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First-aid measures

### 4.1. Description of first aid measures

- First-aid measures after inhalation : In case of inhalation of fumes of molten material or dust: Move the affected person away from the contaminated area and into the fresh air. Get medical advice/attention if you feel unwell.
- First-aid measures after skin contact : Rinse with plenty of water. If case of redness or irritation, call a doctor.
- First-aid measures after eye contact : Rinse eyes with water as a precaution. If case of redness or irritation, call a doctor.
- First-aid measures after ingestion : Get medical advice/attention.

### 4.2. Most important symptoms and effects (acute and delayed)

- Symptoms/effects after inhalation : Inhalation of fumes may cause metal fume fever.

### 4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

## SECTION 5: Fire-fighting measures

### 5.1. Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media : Special powder against metallic fire (Class D). Sand.
- Unsuitable extinguishing media : Water. Halogenated compounds.

### 5.2. Specific hazards arising from the chemical

- Hazardous decomposition products in case of fire : Toxic vapors may be released. Metallic oxides.

### 5.3. Special protective equipment and precautions for fire-fighters

- Firefighting instructions : Contain the extinguishing fluids by bunding. Do not breathe fumes.
- Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

#### 6.1.1. For non-emergency personnel

- Emergency procedures : Avoid contact with skin and eyes. Do not attempt to take action without suitable protective equipment.

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### 6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

### 6.2. Environmental precautions

Avoid release to the environment.

### 6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Mechanically recover the product. Shovel into suitable and closed container for disposal. Dispose of materials or solid residues at an authorized site.

### 6.4. Reference to other sections

Concerning disposal elimination after cleaning, see item 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Ensure good ventilation of the work station. Avoid contact with skin and eyes.  
Hygiene measures : Do not drink, eat or smoke in the workplace.

### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in original container. Protect from moisture. Store in a dry, cool place. After opening, store the product at less than 25°C, and at less than 60% relative humidity. Use within 10 days of unpacking.  
Incompatible materials : acids.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Copper (7440-50-8)	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Copper, as Cu
ACGIH OEL TWA	0.2 mg/m <sup>3</sup> (Fume) 1 mg/m <sup>3</sup> (Dusts and mists)
Remark (ACGIH)	TLV® Basis: Irr; GI; metal fume fever
Regulatory reference	ACGIH 2023
<b>USA - OSHA - Occupational Exposure Limits</b>	
Local name	Copper
OSHA PEL (TWA) [1]	0.1 mg/m <sup>3</sup> (Fume (as Cu)) 1 mg/m <sup>3</sup> (Dusts and mists (as Cu))
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1
<b>USA - NIOSH - Occupational Exposure Limits</b>	
NIOSH REL (TWA)	1 mg/m <sup>3</sup> Copper (dusts and mists), as Cu 0.1 mg/m <sup>3</sup> (fume)

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<b>Chromium (7440-47-3)</b>	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Metallic chromium, as Cr(0)
ACGIH OEL TWA	0.5 mg/m <sup>3</sup> (I - Inhalable particulate matter)
Remark (ACGIH)	TLV® Basis: Resp tract irr
Regulatory reference	ACGIH 2023
<b>USA - ACGIH - Biological Exposure Indices</b>	
Local name	CHROMIUM
BEI (BLV)	0.7 µg/l Parameter: Total chromium - Medium: urine - Sampling time: End of shift at end of workweek - Notations: Pop
Regulatory reference	ACGIH 2023
<b>USA - OSHA - Occupational Exposure Limits</b>	
Local name	Chromium
OSHA PEL (TWA) [1]	0.5 mg/m <sup>3</sup> (II) compounds (as Cr) 0.5 mg/m <sup>3</sup> (III) compounds (as Cr) 1 mg/m <sup>3</sup> metal and insol. salts (as Cr)
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1
<b>USA - NIOSH - Occupational Exposure Limits</b>	
NIOSH REL (TWA)	0.5 mg/m <sup>3</sup>
<b>Zirconium (7440-67-7)</b>	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Zirconium and compounds, as Zr
ACGIH OEL TWA	5 mg/m <sup>3</sup>
ACGIH OEL STEL	10 mg/m <sup>3</sup>
Remark (ACGIH)	TLV® Basis: Resp irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2023
<b>USA - OSHA - Occupational Exposure Limits</b>	
Local name	Zirconium compounds (as Zr)
OSHA PEL (TWA) [1]	5 mg/m <sup>3</sup>
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1
<b>Magnesium (7439-95-4)</b>	
No additional information available	

### 8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station.  
Environmental exposure controls : Avoid release to the environment.

### 8.3. Individual protection measures/Personal protective equipment

#### Hand protection:

Protective gloves. Breakthrough time : refer to the recommendations of the supplier

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### Eye protection:

Not required for normal conditions of use

### Skin and body protection:

Not required for normal conditions of use

### Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory equipment

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Massive.
Color	: Pink
Odor	: odorless
Odor threshold	: No data available
pH	: Not applicable
Melting point	: 1083 °C
Freezing point	: No data available
Boiling point	: No data available
Flash point	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: Not flammable.
Vapor pressure	: Not applicable
Relative vapor density at 20°C	: No data available
Relative density	: 8.9
Solubility	: Water: Insoluble
Partition coefficient n-octanol/water (Log Pow)	: Not applicable
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, kinematic	: Not applicable
Viscosity, dynamic	: No data available
Explosion limits	: No data available
Explosive properties	: No data available
Oxidizing properties	: Non oxidizing.

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

### 10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

### 10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

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### 10.4. Conditions to avoid

None to our knowledge.

### 10.5. Incompatible materials

acids.

### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified  
Acute toxicity (dermal) : Not classified  
Acute toxicity (inhalation) : Not classified

#### Copper (7440-50-8)

LC50 inhalation rat (mg/l)	> 5.11 mg/l/4h (OECD 436 method)
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Skin corrosion/irritation : Not classified  
pH: Not applicable  
Serious eye damage/irritation : Not classified  
pH: Not applicable  
Respiratory or skin sensitization : Not classified  
Germ cell mutagenicity : Not classified  
Carcinogenicity : Not classified  
Reproductive toxicity : Not classified  
STOT-single exposure : Not classified  
STOT-repeated exposure : Not classified  
Aspiration hazard : Not classified  
Viscosity, kinematic : Not applicable  
Symptoms/effects after inhalation : Inhalation of fumes may cause metal fume fever.

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

### 12.2. Persistence and degradability

No additional information available

### 12.3. Bioaccumulative potential

#### Copper (7440-50-8)

Partition coefficient n-octanol/water (Log Pow)	Not applicable
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### 12.4. Mobility in soil

No additional information available

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### 12.5. Other adverse effects

No additional information available

## SECTION 13: Disposal considerations

### 13.1. Disposal methods

Waste treatment methods : Dispose of in accordance with relevant local regulations.  
Additional information : The user's attention is drawn to the possible existence of specific european, national or local regulations regarding disposal.

## SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

DOT	TDG	IMDG	IATA
<b>14.1. UN number</b>			
Not applicable	Not applicable	Not regulated	Not regulated
<b>14.2. Proper Shipping Name</b>			
Not applicable	Not applicable	Not regulated	Not regulated
<b>14.3. Transport hazard class(es)</b>			
Not applicable	Not applicable	Not regulated	Not regulated
<b>14.4. Packing group</b>			
Not applicable	Not applicable	Not regulated	Not regulated
<b>14.5. Environmental hazards</b>			
Not applicable	Not applicable	Not regulated	Not regulated

### 14.6. Special precautions for user

**DOT**  
Not applicable

**TDG**  
Not applicable

**IMDG**  
Not regulated

**IATA**  
Not regulated

### 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### Copper (7440-50-8)

Subject to reporting requirements of United States SARA Section 313

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<b>Copper (7440-50-8)</b>	
CERCLA RQ	5000 lb

Commercial status of components according to the United States Environmental Protection Agency's Toxic Substances Control Act (TSCA):

Name	CAS-No.	Listing	Commercial status	Flags
Chromium	7440-47-3	Present	Active	
Zirconium	7440-67-7	Present	Active	
Magnesium	7439-95-4	Present	Active	

<b>Chromium (7440-47-3)</b>	
Subject to reporting requirements of United States SARA Section 313	
CERCLA RQ	5000 lb

### 15.2. International regulations

#### CANADA

<b>Copper (7440-50-8)</b>
Listed on the Canadian DSL (Domestic Substances List)

<b>Chromium (7440-47-3)</b>
Listed on the Canadian DSL (Domestic Substances List)

<b>Zirconium (7440-67-7)</b>
Listed on the Canadian DSL (Domestic Substances List)

<b>Magnesium (7439-95-4)</b>
Listed on the Canadian DSL (Domestic Substances List)

#### EU-Regulations

<b>Copper (7440-50-8)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

<b>Chromium (7440-47-3)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

<b>Zirconium (7440-67-7)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

<b>Magnesium (7439-95-4)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

#### National regulations

<b>Copper (7440-50-8)</b>
Listed on INSQ (Mexican national Inventory of Chemical Substances)



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### Chromium (7440-47-3)

Listed on INSQ (Mexican national Inventory of Chemical Substances)

### Zirconium (7440-67-7)

Listed on INSQ (Mexican national Inventory of Chemical Substances)

### Magnesium (7439-95-4)

Listed on INSQ (Mexican national Inventory of Chemical Substances)

## 15.3. US State regulations

### Copper (7440-50-8)

State or local regulations	U.S. - Pennsylvania - RTK (Right to Know) List
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Component	State or local regulations
Chromium(7440-47-3)	U.S. - Pennsylvania - RTK (Right to Know) List
Zirconium(7440-67-7)	U.S. - Pennsylvania - RTK (Right to Know) List
Magnesium(7439-95-4)	U.S. - Pennsylvania - RTK (Right to Know) List

## SECTION 16: Other information

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Revision date : 12/13/2023

Data sources : ECHA - European Chemicals Agency. CNESST (Commission des normes, de l'équité, de la santé et de la sécurité du travail).

### Full text of H-phrases

H228	Flammable solid
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### Abbreviations and acronyms

DOT	Department of Transportation (DOT)
ECHA	European Chemicals Agency
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
Pow (log)	n-octanol/water partition coefficient
TDG	Transportation of Dangerous Goods

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<b>Indication of changes:</b>
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This sheet was updated (refer to the date at the top of this page). (see section(s) : 3 - 5 - 7 - 8 - 9 - 11 - 14).
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Safety Data Sheet (SDS), USA

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.