

# DATA SHEET

This Material Safety Data Sheet (MSDS) is intended for welding consumables and related products and can be used to meet the requirements of Regulation (EC) No 1907/2006 (REACH) and Regulation (EC) No 1272/2008 (CLP), which adapted the REACH requirements for MSDSs to meet the requirements of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS, fifth version). The REACH and CLP regulations must be consulted for specific requirements. This safety data sheet meets the requirements of ISO 11014-1

## Brazing Flux

Rev0 date: 02.03.2023

### SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### 1.1. Product identification

**CEWELD® Super-Flux, Universal-Flux, Alu-Flux, Gas-Flux**

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

**Product Type:** Flux for brazing

**Relevant identified use:** Industry and craft for brazing Application

#### 1.3 Details of the supplier

**Company name:** Certilas Nederland BV

**Adresse:** Gloxinialaan 2, 6851 TG HUISSEN, The Netherlands

**Phone:** +31 (0)26 30 30 080

**Responsible for the safety data sheet:** [info@certilas.com](mailto:info@certilas.com)

#### 1.4 Emergency telephone number:

**CARECEM24 emergency telephone number: +44 1235 239670 / +44 (0)870 190 6777 / +49 (0) 69 222 25285.**

**Available 24 hours a day, 7 days a week.**

**Netherlands: +31 (0)6 53 87 16 38**

**Germany, Austria: Emergency call (24h) Germany: Beratungsstelle f. Vergiftungserscheinungen, Berlin, Tel. 0049 30 19240,**

**Internet: [www.vergiftungszentrale.de](http://www.vergiftungszentrale.de)**

**Schweiz: Schweizerisches Toxikologisches Informationszentrum**

**Tel: 01 251 5151, Fax: 01 252 8833, E-Mail: [stic@access.ch](mailto:stic@access.ch), Internet: [http://toxinfo.ch/kontakt\\_de](http://toxinfo.ch/kontakt_de)**

### SECTION 2: HAZARDS IDENTIFICATION

#### 2.1 Hazard classification of substance/mixture

##### 2.1.1 Classification according to Regulation (EG) no. 1272/2008 (CLP)

**Hazard categories:**

Acute toxicity: Acute Tox. 3

Skin corrosion/irritation: Skin Corr. 1A

Serious eye damage/eye irritation: Eye Dam. 1

Reproductive toxicity: Repr. 1B

**Hazard Statements:**

Toxic if swallowed.

Causes severe skin burns and eye damage.

May damage fertility. May damage the unborn child.

Brazing/welding vapours and fumes from brazing/welding may cause metal fumes fever. Symptoms can appear 4 to 12 hours after. (headache, dizziness, dryness, cough, nausea and fever)

May cause irritation by prolonged inhalation of brazing/welding fumes.

#### 2.2 Labelling elements

GB CLP Regulation

Hazard components for labelling

boric acid

potassium bifluoride; potassium hydrogen difluoride

Potassium hydroxide

#### Supplemental label information

**Pictograms:**



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Rev0 date: 02.03.2023

### Hazard statements

H301 Toxic if swallowed.  
H314 Causes severe skin burns and eye damage.  
H360FD May damage fertility. May damage the unborn child.

### Precautionary statements

P501 Dispose of contents/container to waste treatment facility in accordance with local and national regulations .  
P314 Get medical advice/attention if you feel unwell.  
P285 In case of inadequate ventilation wear respiratory protection.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.  
P260 Do not breathe dust/fume/gas/mist/vapours/spray.  
P202 Do not handle until all safety precautions have been read and understood.  
P405 Store locked up.

### Special labelling of certain mixtures

EUH032 Contact with acids liberates very toxic gas.

### 2.3 Other hazards

The following must be observed during welding:

**Welding fumes:** Excessive exposure to fumes and gases can be harmful to health.

**High temperatures:** Extreme caution must be taken with melting metals, hot spatter or slag, which can cause skin injuries and can cause fires.

**Radiation:** Arc rays can be harmful to eyes and skin.

**Electric shocks:** Can be fatal. Do not touch current-carrying equipment.

**PBT assessment:** No testing required according to Annex XIII of Regulation (EC) 1907/2006 (REACH).

**vPvB assessment:** No testing required according to Annex XIII of Regulation (EC) 1907/2006 (REACH).

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1 Substances

Information not relevant.

### 3.2 Mixtures

**IMPORTANT** - This section covers the hazardous materials from which this product is manufactured. This data has been prepared in accordance with the criteria of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as defined and required by the Regulation of the European Parliament and Commission (EC) No 1907/2006 and (EC) No 1272/2008. Vapours and gases generated during normal use of this product are dealt with in section

Chemical name	CAS No. EG No. REACH No.	Concentration	Classification	H-phrases
Potassium bifluoride, Potassium hydrogen difluoride	7789-29-9 215-199-1 01-2119960644-32	10-50 %	Eye Dam. Skin Corr. Acute Tox. oral: ATE = 100 mg/kg	1B; H301 H314
Potassium hydroxide	1310-58-3 215-181-3 01-2119487136-33	5-10 %	Met. Corr. 1, Acute Tox. 4, Skin Corr. oral: LD50 = 333 mg/kg	1A; H290 H302 H314
Dipotassium tetra borate	12045-78-2 215-575-5 01-2119487136-33	0,1-5 %	Repr. 2;	H361fd: >= 6,8 - 100
Boric acid	10043-35-3 233-139-2	10-50 %	Repr. 1B;	H360FD: >= 5,5 - 100
Dinatriumoctaborat tetrahydrat	12280-03-4 234-541-0 01-2119490860-33	12-25 %	Repr. 1B,	H360FD

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Rev0 date: 02.03.2023

Silicon dioxide	7631-86-9 231-545-4 01-2119379499-16	0,1-2,5 %		
Potassium borofluoride	14075-53-7 237-928-2	25-50%		
Potassium fluoride	7789-23-3 232-151-5 01-21199707-37	25-50%	Acute Tox.3,	H301, H311, H331

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

**After inhalation:** Not applicable to the product itself. In case of inhalation of welding fumes, ventilate the area. Immediately remove the patient from the contaminated area to fresh air. Call the doctor. Show the doctor this safety data sheet.

**After contact with skin:** Not applicable to the product itself. Risk of burns during the welding process.

**After contact with eyes:** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Burns from radiation see doctor.

**After ingestion:** Not applicable.

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

Not applicable to the product itself. Check control parameters specified in paragraph 8.1 during welding.

**Inhalation** Burning in the mouth and throat.

**Eye contact** redness and Smarting in eyes.

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

No other indication.

## SECTION 5: FIREFIGHTING MEASURES

### 5.1. Extinguishing media

**Suitable media:** Extinguish fire with: metal fire powder, dry sand, Cement or dry inert sorbent.

**Unsuitable media:** water, foam or carbon dioxide (CO2).

### 5.2. Special hazards arising from the substance or mixture

The product is non-flammable and non-combustible, no risk of material in stock.

### Special hazards arising from the mixture:

In case of fire, dangerous fumes can be formed: protect the respiratory tract.

**Risks arising from combustion:** avoid inhaling the fumes.

### 5.3 Advice for firefighters

Make sure when using that the operating area is free of flammable and / or explosive. Use personal protective equipment if necessary.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

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

General ventilation and local fume extraction must be adequate to keep fume concentrations within safe limits. Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding.

### 6.2. Environmental precautions

Not applicable to the product itself. In the case of welding process, prevent the formation of dust clouds. Keep the environment clean by collecting the dust manually in order to prevent as much as possible its entry into drains, surface water or groundwater.

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

Store in a dry place.

### 6.4 Reference to other sections

Please refer to sections 7 / 8 and 13.

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Rev0 date: 02.03.2023

### SECTION 7: HANDLING AND STORAGE

#### 7.1. Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice. During welding use adequate individual protective measures. Operate in a ventilated area equipped with welding fume extractors. Do not smoke, eat or drink in areas where the product is being used.

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

No product relevant restrictions for packed material. Observe general rules for the storage of welding consumables, store in a dry place and without major temperature fluctuations.

#### 7.3 Specific end use

None.

### SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

#### 8.1. Control parameters

Read and understand the instructions and the labels on the package. Welding fumes are a variable mixture of gases and fine particles emitted into the air, which are a source of danger when inhaled or ingested. The extent of the risk depends on the composition and concentration of the vapors and the duration of exposure. The composition of the vapours depends on the material being machined, the processes and consumables used, the coatings on the workpiece (such as paint, plating or coating), and the presence of oil or residues from cleaning or degreasing. The Exposure must be systematically investigated, taking particular account of the circumstances of the worker or nearby workers who may be exposed. A recommended way to determine the composition and quantity of the vapours and gases to which workers are exposed is to take a sample of air from the welding helmet or from the breathing zone of the worker. There are no European Union (EU) specific exposure limits (OEL) for welding fumes. The lowest available 8-hour limit value (TLV) for particulate matter not otherwise regulated (PNOR) was set by Belgium at 10 mg/m<sup>3</sup> and 3 mg/m<sup>3</sup> for PNOR as an inhalable fraction. The individual complex compounds in the steam may have lower OELs than the Belgian PNOR limit. A hygiene engineer and/or the EU Member State should be consulted to determine the specific steam ingredients and their exposure limits. The GESTIS international database of limit values on the website [http://limitvalue.ifa.dguv.de/WebForm\\_gw2.aspx](http://limitvalue.ifa.dguv.de/WebForm_gw2.aspx) can be used for international OELs for chemical reagents. European Union OELs are listed for EU countries

As there is no specific limit values for welding operation, for information refer guideline values proposed by ACGIH (2010) for dust:

	National occupational exposure limits	Ingredient	CAS No.	EG No.	Exposure limit mg/m <sup>3</sup> -ppm	Short-term Exposure limit mg/m <sup>3</sup> -ppm	Remark
National occupational exposure limits	Potassium bifluoride, Potassium hydrogen difluoride	7789-29-9	215-199-1		Dermal long-term (systemic) 0.36 mg/kg (worker) Inhalation Long-term (local) 2.5 mg/m <sup>3</sup> (worker) Ground 12 mg/kg (Soil) Waste water treatment plant (STP) 51 mg/l (STP) 0.89 mg/l (Sweet Water)		
	Potassium hydroxide	1310-58-3	215-181-3				
	Dipotassium tetra borate	12045-78-2	215-575-5		Oral long-term (systemic) 1.2 mg/kg (consumer) Acute (systemic) 1.2 mg/kg (consumer) Dermal Long-term (systemic) 242.4 mg/kg (consumer) 480.6 mg/kg (worker) Inhalation Long-term (systemic) 5.16 mg/m <sup>3</sup> (consumer) 10.25 mg/m <sup>3</sup> (worker) Water 2.02 mg/l (Sea Water) 2.02 mg/l (Sweet Water) Ground 5.4 mg/kg (Soil)		
	Boric acid	10043-35-3	233-139-2		Oral Acute (local) 0.98 mg/kg (consumer) Acute (systemic) 0.98 mg/kg (consumer) Dermal Long-term (systemic) 196 mg/kg (consumer) 392 mg/kg (worker) Inhalativ Langzeit (systemisch) 4,15 mg/m <sup>3</sup> Verbraucher 8.28 mg/m <sup>3</sup> (workers) Waters 1.35 mg/l (seawater) 1.35 mg/l (freshwater) Sediment 1.8 mg/kg (seawater) 1.8 mg/kg (freshwater) Waste water treatment plant (STP) 1.75 mg/l (waste water treatment plant (STP)) Sporadic release 9.1 mg/l (Sporadic release)		
	Dinatriumoctaborat tetrahydrat	12280-03-4	234-541-0		Oral long-term (systemic) 0.81 mg/kg (consumer) Acute (systemic) 0.81 mg/kg (consumer) Dermal Long-term (systemic) 163.3 mg/kg (consumer) 326 mg/kg (worker) Inhalation Long-term (systemic) 3.5 mg/m <sup>3</sup> (consumer) 6.9 mg/m <sup>3</sup> (worker)		

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Rev0 date: 02.03.2023

				Water 2.02 mg/l (marine water) 2.02 mg/l (fresh water) Soil 5.4 mg/kg (salt) Wastewater treatment plant (STP) 10 mg/l (wastewater treatment plant (STP))	
	Silicon dioxide	7631-86-9	231-545-4	4,0 mg/m <sup>3</sup> (worker)	
	Potassium borofluoride	14075-53-7	237-928-2	1,0 mg/m <sup>3</sup> (worker)	calculated as fluorine; EU, DFG, Y, H
	Potassium fluoride	7789-23-3	232-151-5		

### 8.2. Exposure controls

Provide adequate local ventilation. If there is a risk of dust formation, install the devices to be able to comply with the exposure limit values.

#### 8.2.1 Appropriate engineering controls

- Provide appropriate ventilation in the workplace
- Apply technical measures necessary to avoid exceeding limit values for occupational exposure
- Respect the rules of hygiene. Do not eat or drink in the workplace. Do not smoke

#### 8.2.2 Personal protective equipment

- Protection Eye / Face: Wear safety mask with lenses inattiniche of proper protective equipment in the welding technology used (not less than 5 DIN)
- Skin protection: work clothes that cover completely: apron, gaiters and gloves crust. Replace them at the first sign of wear
- Respiratory protection: Avoid inhalation of welding fumes. Provide an adequate intake.

#### 8.2.3 Control of environmental exposure

Avoid release to the environment. Observe all local and national rules.

#### ENVIRONMENTAL EXPOSURE CONTROLS.

The emissions generated by manufacturing processes, including those generated by ventilation equipment, should be checked to ensure compliance with environmental standards.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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

appearance:	FLUX
Colour:	White to brown
Odour:	odourless
Odour threshold.	Not applicable
pH value.	Not applicable
Melting point/freezing point.	Not applicable
Initial boiling point.	Not applicable.
Boiling range.	Not applicable
Flash point.	Not applicable
Evaporation rate	Not applicable
Flammability (solid, gaseous)	Not applicable
Lower flammability limit.	Not applicable.
Upper flammability limit.	Not applicable
Lower flammability limit.	Not applicable
Upper flammability limit.	Not applicable
Vapour pressure.	Not applicable
Vapour density/ relative density	Not applicable.
Density.	Not applicable
Water solubility: (at 20 °C)	Soluble
Solubility	virtually insoluble
Partition coefficient: n-octanol/water	Not applicable
Auto-ignition temperature.	Not applicable
Decomposition temperature.	Not applicable.
Viscosity	Not applicable
Explosion Properties	Not applicable.
Oxidizing properties	Not applicable

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Rev0 date: 02.03.2023

### 9.2. Other information

Solid content. 99,75 %  
VOC (Directive 1999/13/EC) : 0  
VOC (volatile carbon) : 0

## SECTION 10: STABILITY AND REACTIVITY

### 10.1. Reactivity

No hazardous reactions known.

### 10.2. Chemical stability

The product is stable in normal conditions of use and storage.

### 10.3. Possibility of hazardous reactions

No reference to the product itself.

### 10.4. Conditions to avoid

No reference to the product itself.

### 10.5. Incompatible materials

Molten aluminum can react violently with water giving rise to oxides.

### 10.6. Hazardous decomposition products

In case of fire, vapors can be harmful to health.

Welding fumes and gases. Coating of surfaces, e.g. paints/primers, oils and others. You can rely on the composition of the gases and odours to which the user is exposed.

See the respective national limit values for welding fumes and substances in welding fumes.

## ABSCHNITT 11. TOXIKOLOGISCHE ANGABEN

According to currently available data, this product has not yet produced health damages. Anyway, it must be handled according to good industrial practices.

### 11.1 Information on toxicological effects

Conditions to avoid: none in the form supplied.

When welding, fumes and gases generated can be dangerous to health.

Acute toxicity	Inhalation of vapours may cause drowsiness, dizziness, coughing and headaches. cause dizziness, dizziness, coughing and headache. Inhalation of powder or vapours may cause metal fume fever. Short-term overexposure may cause dizziness, nausea and irritation of mucous membranes in nose, throat and eyes. nose, throat and eyes. Overexposure to manganese may cause nerve damage
Irritation	May cause burns. Radiation: Arc rays may be harmful to eyes and skin.
Corrosive effects	-
Sensitisation	-
Mutagenicity	-
Carcinogenicity	Certain nickel and chromium compounds such as Cr(VI) are suspected of causing cancer. cause cancer. Quartz has a carcinogenic effect in humans IARC Group 2B, potentially carcinogenic substances (International Agency for Research on Cancer, abbr. IARC). Welding fumes may have a carcinogenic effect in humans.
Repeated dose toxicity	-
Reproductive toxicity	-
LD50 Oral	<b>14075-53-7 Kaliumborfluorid</b> Oral LD50 5.854 mg/kg (Ratte) <b>12045-78-2 Kaliumtetraborat-4-hydrat</b> Oral LD50 3.690 mg/kg (Ratte) Dermal LD50 >2.000 mg/kg (Kaninchen) <b>7789-23-3 Kaliumfluorid</b>

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## Brazing Flux

Rev0 date: 02.03.2023

	Oral LD50 245 mg/kg (Ratte)
Delayed and immediate effects	Short-term overexposure may cause dizziness, nausea and irritation of mucous membranes in the nose, throat and eyes. nose, throat and eyes. Overexposure to manganese may cause nerve damage. nerve damage. Certain nickel and chromium compounds such as Cr(VI) are suspected of causing cancer. cause cancer.
as well as chronic effects from	Prolonged exposure to smoke during welding work can impair lung function.

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1 Toxicity

The welding process can effect the enviroment if fume is released directly into the atmosphere. Residues from welding consumables could degrade and accumulate into soils and ground water

Acute toxicity for fish	<b>14075-53-7 Kaliumborfluorid</b> LC50 760 mg/l (Leuciscus idus) EC50 >100 mg/l (Daphnia magna) 550 mg/l (Pseudomonas putida) NOEC 188 mg/l (Daphnia magna) 100 mg/l (Pseudokirchneriella subcapitata) <b>7789-23-3 Kaliumfluorid</b> LC50 >2,6 mg/l (Fish) EC50 270 mg/l (daphnia) <b>10043-35-3 Borsäure</b> LC50 760 mg/l (Daphnia magna) 456 mg/l (Pimephales promelas) EC50 229 mg/l (Pseudokirchneriella subcapitata)
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### 12.2 Persistence and degradability

Not applicable

### 12.3 Bioaccumulation

Bioconcentration factor (BCF):

iron: 140000

Maganese: 59052

Cas 7440-48-4: 4000

### 12.4 Mobility in soil

Mobility in soil: immobile

### 12.5 Results of PBT and vPvB assessment

This preparation contains no substance considered to be persistent, bio accumulating nor toxic (PBT).

This preparation contains no substance considered to be very persistent nor very bio accumulating (vPvB).

### 12.6 Additional information

Information not available.



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## Brazing Flux

Rev0 date: 02.03.2023

### SECTION 13: DISPOSAL CONSIDERATIONS

#### 13.1. Waste treatment methods

##### Disposal considerations

Dispose of any product, residue or packing material according to national and local regulations.

Spent fume extraction filters shall be disposed of as dangerous waste.

Do not dispose together with domestic waste. Do not empty into drains.

##### Waste code (EWC)

Waste code (EWC): 12 01 13 - welding waste

The waste code (EWC) is a recommendation. In the event of non-compliant handling, the end user is personally responsible for a suitable EWC code.

### SECTION 14: TRANSPORT INFORMATION

#### 14.1 UN number

Not applicable.

#### 14.2 Proper shipping name in accordance with UN-standards

Not applicable.

#### 14.3 Transport hazard class(es)

Not applicable.

#### 14.4 Packaging group

Not applicable.

#### 14.5 Environmental hazards

Not applicable.

#### 14.6 Special precautions to the user

Not applicable.

#### 14.7 Transport in bulk according to Annex II to MARPOL and the IBC Code

Information not relevant.

### SECTION 15: REGULATORY INFORMATION

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

##### EU regulations

The product does not need to be labelled in accordance with EC directives or respective national laws. Regulation (EC) No 1907/2006 of the European Parliament and of the Council, (REACH).

European Parliament and Council Regulation (EC) No. 1272/2008, CLP.

##### National regulations

EH40/2005 Workplace exposure limits

Waste Ordinance (2011:927)

Local laws and regulations should be carefully observed.

#### 15.2. Chemical safety assessment

No chemical safety assessment has been processed for the mixture and the substances it contains.



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## Brazing Flux

Rev0 date: 02.03.2023

### SECTION 16: OTHER INFORMATION



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 1 of 6

### Guidance and Recommendations for Exposure Scenarios, Risk Management Measures and to identify Operational Conditions under which metals, alloys and metallic articles and mixtures may be safely welded regarding welding fumes and gases exposure

Welding/Brazing produces fumes, which can affect human health.

Welding and allied processes generate a varying mixture of fumes (airborne particles) and gases, which, if inhaled or swallowed, constitute a health hazard.

The degree of risk will depend on the composition of the fume, the concentration of the fume and duration of exposure.

The fume composition is dependent upon the material being worked, the process and consumables being used, coatings on the work such as paint, galvanizing or plating, oil or contaminants from cleaning and degreasing activities.

The amount of fumes generated is dependent on the welding process, the welding parameters, the shielding gas, the type of consumable and the potential coating on the work.

A systematic approach to the assessment of exposure is necessary, taking into account the particular circumstances for the operator and ancillary worker that can be exposed.

### General Rules to reduce exposure to welding fumes and gases

Considering the emission of fumes when welding brazing or cutting of metals, it is recommended to (1) arrange risk management measures through applying general information and guidelines provided by this document and (2) using the information provided by the Safety Data Sheet, issued in accordance with REACH, by the welding consumable manufacturer.

The employer shall ensure that the risk from welding fumes to the safety and health of workers is eliminated or reduced to a minimum. Start every new work with an Occupational Safety & Health Risk Inventory.

The following principles shall be applied, unless local regulation say otherwise:

- 1. Substitution:**  
Select the applicable process/base material combinations with the lowest emission, whenever possible  
Set welding process with the lowest emission parameters (e.g. welding parameters/arc mode transfer, shielding gas composition) \*
- 2. Technological Means:**  
Apply the relevant collective protective measures (general ventilation, local exhaust ventilation) in accordance with class number.
- 3. Organizational Measures:**  
Limit the time a worker is exposed to welding fumes,  
Establish and apply Welding Procedure Specifications
- 4. Personal Protective Equipment:**  
To protect the worker, wear the relevant personal protective equipment in accordance with the duty cycle

In addition, compliance with the National Regulations regarding the exposure of welders and related personnel to welding fumes, their components with specific occupational exposure limit, and gaseous substances with specific occupational exposure limits shall be verified. It is therefore strongly recommended to seek clarification of specific national legislation that may apply.

*\* In MIG / MAG process , innovative waveform controlled processes generate less welding fumes and particles than conventional processes - The use of such processes can be an additional measure to reduce the exposure of the welder and or workers*

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## Brazing Flux

Rev0 date: 02.03.2023



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 2 of 6

### Risk Management Measures for Individual process/base material combinations

According to the welding or allied process and the base material to be welded, a general guidance on *Technological means* is proposed in the table below.

An approximate ranking to mitigate the risk of welding fumes and gases exposure is given for each welding or allied process/base material combination.

The individual process/base material combinations are ranked from the lowest emission ones (Class I) to the highest emission ones (Class VIII).

*NOTE: The International Institute of Welding (IIW) assessed the publication of IARC Monograph 118. Based on the current state of knowledge, IIW confirms its statement from 2011 on "Lung cancer and welding" and encourages all those responsible to reduce the exposure to welding fume to a minimum. It also recommends that to eliminate the excess risk of lung cancer, welders and their managers must ensure that exposure to welding fume is minimized, at least to national guidelines. This IIW statement is posted both on IIW and EWA website.*

For each class, general recommendations on Ventilation/Extraction/Filtration and Personal Protection Equipment are proposed.

Class <sup>1</sup>	Process (according to ISO 4063)	Base Materials	Remarks	Ventilation / Extraction / Filtration <sup>14</sup>	PPE <sup>2</sup> DC<15%	PPE <sup>2</sup> DC>15%
<b>Non-confined space<sup>10</sup></b>						
<b>I</b>	GTAW 141	All	Except Aluminum	GV low <sup>3</sup>	n.r.	n.r.
	SAW 12					
	Autogenous 3					
	PAW 15					
	ESW/EGW 72/73					
	Resistance 2					
	Stud welding 78					
	Solid state 521					
	Gases Brazing 9	All	Except Cd- alloys	GV low <sup>3</sup>	n.r.	n.r.
<b>II</b>	GTAW 141	Aluminum	n.a.	GV medium <sup>4</sup>	n.a.	FFP2 <sup>5</sup>
<b>III</b>	MMAW 111	All	Except Be-, V-, Mn-, Ni- alloys and Stainless <sup>6</sup>	GV low <sup>7</sup> LEV low <sup>12</sup>	Improved helmet <sup>18</sup>	FFP2 <sup>5</sup>
	FCAW 136/137	All	Except Stainless and Ni- alloys <sup>6</sup>			
	GMAW 131/135	All	Except Cu-, Be-, V- alloys <sup>6</sup>			
	Powder Plasma Arc 152	All	Except Be-, V-, Cu-, Mn-, Ni-alloys and Stainless <sup>6</sup>			
<b>IV</b>	All processes class I	Painted / primed / oiled / galvanized	No Pb containing primer	GV low <sup>3</sup>	FFP2 <sup>5</sup>	FFP3 <sup>5</sup> , TH2/P2, or LDH3
	All processes class III	Painted / primed / oiled / galvanized	No Pb containing primer	GV low <sup>7</sup> LEV low <sup>12</sup>		
<b>V</b>	MMAW 111	Stainless, Ni-, Be-, and V- alloys	n.a.	LEV high <sup>10</sup>	TH3/P3, LDH3 <sup>11</sup>	TH3/P3, LDH3 <sup>11</sup>
	FCAW 136/137	Stainless, Mn- and Ni-alloys				
	GMAW 131	Cu-alloys				
	Powder Plasma Arc 152	Stainless, Mn-, Ni-, and Cu- alloys				

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## Brazing Flux

Rev0 date: 02.03.2023



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 3 of 6

Class <sup>1</sup>	Process (according to ISO 4063)	Base Materials	Remarks	Ventilation / Extraction / Filtration <sup>14</sup>	PPE <sup>2</sup> DC<15%	PPE <sup>2</sup> DC>15%
Non-confined space <sup>15</sup>						
VI	GMAW 131 Powder Plasma Arc 152	Be-, and V- alloys	n.a.	Reduced (negative) pressured area <sup>8</sup> LEV low <sup>12</sup>	TH3/P3, LDH3 <sup>11</sup>	TH3/P3, LDH3 <sup>11</sup>
VII	Self shielded FCAW 114	Un-, high alloyed steel	Cored wire, not containing Ba	Reduced (negative) pressured area <sup>8</sup> LEV medium <sup>13</sup>	TH3/P3, LDH3 <sup>11</sup>	TH3/P3, LDH3 <sup>11</sup>
	Self-shielded FCAW 114	Un-, high alloyed steel	Cored wire, containing Ba	Reduced (negative) pressured area <sup>8</sup> LEV high <sup>10</sup>		
	All	Painted / primed / galvanized	Paint / Primer containing Pb			
	Arc Gouging and Cutting 8	All	n.a.			
	Thermal Spray	All	n.a.			
	Gases Brazing 9	Cd- alloys	n.a.			
Closed system or Confined space <sup>16</sup>						
I	Laser Welding 52	All	Closed system	GV medium <sup>4</sup>	n.a.	n.a.
	Laser Cutting 84					
	Electron Beam 51					
VIII	All	All	Confined space	LEV high <sup>10</sup> External air supply	LDH3 <sup>11</sup>	LDH3 <sup>11</sup>

### Notes:

- Class: approximate ranking to mitigate risk by selecting process/material combinations with the lowest value. Identified collective and individual risk management measures shall be applied
- Personal Protective Equipment (PPE) required avoiding exceeding the National Exposure Limit Value (DC: Duty cycle expressed on 8 hours)
- General Ventilation (GV) Low. With additional Local Exhaust Ventilation (LEV) and extracted air to the outside, the GV or LEV capacity may be reduced to 1/5 of the original requirement.
- General Ventilation (GV) Medium (double compared to Low)
- Filtrating half mask (FFP2)
- When an alloyed consumable is used, measures from "Class V" are required
- General Ventilation (GV) Low. When no Local Exhaust Ventilation, the ventilation requirement is 5-fold
- Filtrating half mask (FFP3), helmet with powered filters (TH2/P2), or helmet with external air supply (LDH2)
- Reduced (negative) pressured Area: A separate, ventilated area where reduced (negative) pressure, compared to the surrounded area, is maintained
- Local Exhaust Ventilation (LEV) High, extraction at source (includes table, hood, arm or torch extraction)
- Helmet with powered filters (TH3/P3), or helmet with external air supply (LDH3)
- Local Exhaust Ventilation (LEV) Low, extraction at source (includes table, hood, arm or torch extraction)
- Local Exhaust Ventilation (LEV) Medium, extraction at source (includes table, hood, arm or torch extraction)
- Recommended measures to comply with national maximum allowable limits. Extracted fumes, for all materials except unalloyed steel and aluminum, shall be filtered before release in the outside environment.
- A confined space, despite its name, is not necessarily small. Examples of confined spaces include ship, silos, vats, utility vaults, tanks, etc.
- Improved helmet, designed to avoid direct flow of welding fumes inside
- n.a. Not applicable
- n.r. Not recommended

### International Standards & EU Regulations

The following ISO standards and European Union Directives address general information for risk assessments of exposure to welding fumes and gases released by welding and allied processes.  
In addition, national regulations and recommendations need to be consulted and applied.

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## Brazing Flux

Rev0 date: 02.03.2023



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 4 of 6

ISO 4063:2009	Welding and allied processes -- Nomenclature of processes and reference numbers
ISO EN 21904-1:2020	Health and safety in welding and allied processes -- Equipment for capture and separation of welding fume -- Part 1: General requirements
ISO EN 21904-2:2020	Health and safety in welding and allied processes -- Equipment for capture and separation of welding fume -- Part 2: Requirements for testing and marking of separation efficiency
ISO EN 21904-3:2018	Health and safety in welding and allied processes -- Requirements, testing and marking of equipment for air filtration -- Part 3: Determination of the capture efficiency of on-torch welding fume extraction devices
ISO EN 21904-4:2020	Health and safety in welding and allied processes -- Equipment for capture and separation of welding fume -- Part 4: Determination of the minimum air volume flow rate of capture devices
ISO 15607:2003	Specification and qualification of welding procedures for metallic materials -- General rules
EN ISO 15609:	Specification and qualification of welding procedures for metallic materials - Welding procedure specification part1 -> part 6
ISO 17916:2016	Safety of thermal cutting machines
EN 149:2001+A1:2009	Respiratory protective devices. Filtering half masks to protect against particles. Requirements, testing, marking
EN 14594:2018	Respiratory protective devices. Continuous flow compressed air line breathing devices. Requirements, testing and marking
EN 12941:1998+A2:2008	Respiratory protective devices. Powered filtering devices incorporating a helmet or a hood. Requirements, testing, marking
EN 143:2000	Respiratory protective devices. Particle filters. Requirements, testing, marking
Directive 98/24/EC	on the protection of the health and safety of workers from the risks related to chemical agents at work
Directive 2004/37/EC	on the protection of workers from the risks related to exposure to carcinogens or mutagens at work
Directive 2017/2398	Amending Directive 2004/37/EC on chromium VI exposure limit
Directive 2017/164/EU	indicative occupational exposure limit values (for nitrogen oxides)
Directive 2019/130	Amending Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work



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## Brazing Flux

Rev0 date: 02.03.2023



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 5 of 6

### Use Descriptor System according to REACH Regulation

REACH use descriptor system is a system developed by ECHA<sup>1</sup> to facilitate chemical risk assessment and supply chain communication.

Welding fumes and gases are secondary non-intentional byproducts generated during welding operations. As such, they are not considered as substances or mixtures under REACH definition. They are not intended to be used by workers or consumers.

However, occupational exposure to welding fumes and gases may represent a risk similar to the ones of the substances and mixtures regulated by REACH.

The identification of hazards, the evaluation of their risks and the putting in place of control measures to secure the health and safety can be implemented with REACH methodology. This system has been applied to welding fumes and gases.

The system firstly describes the Life Cycle Stage. The EWA welding consumable manufacturers define 2 life cycle stages: a) manufacture of the product and b) the application at an industrial site.

In addition, REACH uses five descriptors:

- Sector of use (SU), [NOTE: previously listed SU3 and SU10 have been removed by ECHA<sup>1</sup>]
- Process category (PROC),
- Product category (PC),
- Article category (AC) and
- Environmental release category (ERC)

to describe identified uses.

The applicable descriptors for welding consumables are:

Manufacture of consumables:

SU14 SU15 PC7 PC38 PROC5 PROC21 PROC22 PROC23 PROC24 PROC25 ERC2 ERC3 AC7

Industrial and Professional welding:

SU15 SU17 PC7 PC38 PROC21 PROC22 PROC23 PROC24 PROC25 ERC5 ERC8c ERC8f AC1 AC2 AC7

SU14	Manufacture of basic metals, including alloys
SU15	Manufacture of fabricated metal products, except machinery and equipment
SU17	General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
PC7	Base metals and alloys
PC38	Welding and soldering products, flux products
PROC5	Mixing or blending in batch processes
PROC21	Low energy manipulation of substances bound in materials and/or articles
PROC22	Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting
PROC23	Open processing and transfer operations with minerals/metals at elevated temperature
PROC24	High (mechanical) energy work-up of substances bound in materials and/or articles
PROC25	Other hot work operations with metals
ERC2	Formulation of preparations
ERC3	Formulation into solid matrix
ERC5	Industrial use resulting in inclusion into or onto a matrix
AC1	Vehicles
AC2	Machinery, mechanical appliances, electrical/electronic articles
AC7	Metal articles

<sup>1</sup> Guidance on Information Requirements and Chemical Safety Assessment, Chapter R.12: Use description, Version 3.0 December 2015 ([https://echa.europa.eu/documents/10162/13632/information\\_requirements\\_r12\\_en.pdf](https://echa.europa.eu/documents/10162/13632/information_requirements_r12_en.pdf))

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## Brazing Flux

Rev0 date: 02.03.2023

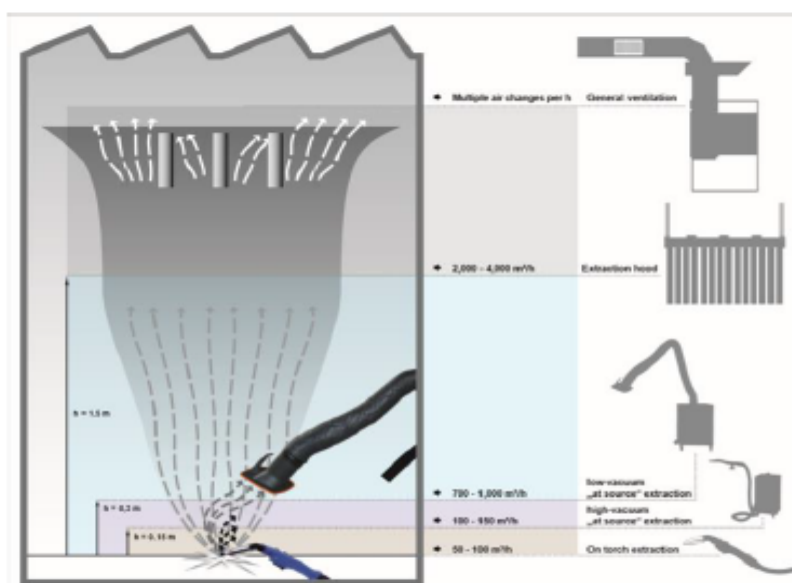


## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 6 of 6

### Annex: Illustration of welding fume extraction systems (optional)



Note: Illustration of welding fume extraction systems is only an example. Compliance, with national country legislation, is needed if different

*This document has been prepared by the members of EWA technical committees. These members are working for different European producers of welding equipment and welding consumables ( which are members of EWA). All EWA technical information documents are based on EWA members' experience and technical knowledge at the time of publication. Such technical information documents provide voluntary guidance and are not binding.*

*EWA hereby disclaims any liability that may arise from the use of such technical information documents, including, but not limited to, non-performance, mis-interpretation, and improper use of the technical information".*

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## Brazing Flux

Rev0 date: 02.03.2023

### References to key literature and data sources

Regulation (EC) No 1907/2006 of the European Parliament and of the Council, (REACH).

Regulation (EC) No 1272/2008 of the European Parliament and of the Council.

EH40/2005 Workplace exposure limits

Waste Ordinance (2011:927)

[www.prevent.se](http://www.prevent.se)

C&L Inventory database

### Phrase meaning

Acute Tox. 3 - oral - Acute toxicity, oral, hazard category 3

Acute Tox. 4 - inhalation - Acute toxicity, inhalation, hazard category 4

Aquatic Chronic 1 - Hazardous to the aquatic environment — Chronic hazard category 1

Eye Irrit. 2 - Eye irritation, hazard category 2

Pyr. Sol. 1 - Pyrophoric solids, hazard category 1

Skin Irrit. 2 - Skin irritation, hazard category 2

H224 - Extremely flammable liquid and vapour.

H250 - Catches fire spontaneously if exposed to air.

H260 - In contact with water releases flammable gases which may ignite spontaneously.

H301 - Toxic if swallowed.

H315 - Causes skin irritation.

H317 - May cause an allergic skin reaction.

H319 - Causes serious eye irritation.

H332 - Harmful if inhaled.

H335 - May cause respiratory irritation.

H351 - Suspected of causing cancer.

H372 - Causes damage to organs through prolonged or repeated exposure.

H373 - May cause damage to organs through prolonged or repeated exposure.

H410 - Very toxic to aquatic life with long lasting effects.

H412 - Harmful to aquatic life with long lasting effects.



### Hazard statements •

H317 - May cause an allergic skin reaction

H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled

H335 - May cause respiratory irritation

H350 - May cause cancer.

H361d - Suspected of damaging the unborn child.

H372 - Causes damage to organs through prolonged or repeated exposure.

H373 - May cause damage to organs through prolonged or repeated exposure.

### Precautionary statements

#### Prevention •

P201 - Obtain special instructions before use.

P202 - Do not handle until all safety precautions have been read and understood.

P260 - Do not breathe dust.

P264 - Wash thoroughly after handling.

P270 - Do not eat, drink or smoke when using this product.

P271 - Use only outdoors or in a well-ventilated area.

P281 - Use personal protective equipment as required.

P285 - In case of inadequate ventilation, wear respiratory protection.



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## Brazing Flux

Rev0 date: 02.03.2023

### Response •

- P304+P341** - IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P342+P311** - If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
- P302+P352** - IF ON SKIN: Wash with plenty of soap and water.
- P321** - Specific treatment, see supplemental first aid information.
- P363** - Wash contaminated clothing before reuse.
- P333+P313** - If skin irritation or rash occurs: Get medical advice/attention.
- P308+P313** - IF exposed or concerned: Get medical advice/attention.

### Storage/Disposal •

- P403+P233** - Store in a well-ventilated place. Keep container tightly closed.
- P405** - Store locked up.
- P501** - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

### LEGEND:

- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- CAS NUMBER: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE NUMBER: Identifier in ESIS (European archive of existing substances)
- CLP: EC Regulation 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX NUMBER: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as REACH Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: EC Regulation 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA STEL: Short-term exposure limit
- TWA: Time-weighted average exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation
- WGK: Water hazard classes (German).

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## Brazing Flux

Rev0 date: 02.03.2023

### GENERAL BIBLIOGRAPHY

1. Directive 1999/45/EC and following amendments
2. Directive 67/548/EEC and following amendments and adjustments
3. Regulation (EU) 1907/2006 (REACH) of the European Parliament
4. Regulation (EU) 1272/2008 (CLP) of the European Parliament
5. Regulation (EU) 790/2009 (I Atp. CLP) of the European Parliament
6. Regulation (EU) 453/2010 of the European Parliament
7. Regulation (EU) 286/2011 (II Atp. CLP) of the European Parliament
8. Regulation (EU) 618/2012 (III Atp. CLP) of the European Parliament
9. Regulation (EU) 487/2013 (IV Atp. CLP) of the European Parliament
10. Regulation (EU) 944/2013 (V Atp. CLP) of the European Parliament
11. Regulation (EU) 605/2014 (VI Atp. CLP) of the European Parliament

- The Merck Index. - 10th Edition
- Handling Chemical Safety
- Niosh - Registry of Toxic Effects of Chemical Substances
- INRS - Fiche Toxicologique (toxicological sheet)
- Patty - Industrial Hygiene and Toxicology
- N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
- ECHA website

### Note for users:

The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product. This document must not be regarded as a guarantee on any specific product property. The use of this product is not subject to our direct control; therefore, users must, under their own responsibility, comply with the current health and safety laws and regulations. The producer is relieved from any liability arising from improper uses. Provide appointed staff with adequate training on how to use chemical products.

### Changes to previous review:

The following sections were modified:

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

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