Safety Data Sheet

acc. to OSHA HCS

Printing date 02/22/2021 Reviewed on 11/12/2020

1 Identification

· **Product identifier**

· **Trade name: BÖHLER HL 46-MC**
· **CAS Number:** -
· **EINECS Number:** -
· **Application of the substance / the mixture**
Flux cored wire
The product is a manufactured article in the sense of Article 3 No. 3, 1907/2006/EC (REACh). The purpose of the present safety data sheet is therefore to provide instruction on safe usage of the product.

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
voestalpine Böhler Welding Austria GmbH
Böhler-Welding-St. 1
8605 Kapfenberg

Tel.: +43/50304/31-0
Fax: +43/50304/71-95193
www.voestalpine.com/welding

voestalpine Böhler Welding USA
1601 Gillingham Suite 110
Sugar Land, TX 77478
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www.voestalpine.com/welding
-

· **Information department:**

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-

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· **Emergency telephone number:**

NCEC

+1 202 464 2554 (USA, Canada)

+44 1865 407333 (English)

+44 1235 239670 (English, French, Spain)
-

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2 Hazard(s) identification

· **Classification of the substance or mixture**
Classified according to the criteria of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Canadian Controlled Products Regulations.

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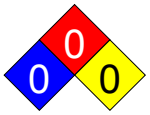
The Product does not meet the criteria for classification in any hazard class according to GHS.

· **Label elements**
· **GHS label elements** Void
· **Hazard pictograms** Void
· **Signal word** Void
· **Hazard statements** Void
· **Information pertaining to particular dangers for man and environment:**
· **NFPA ratings (scale 0 - 4)**



Health = 0
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 0
Fire = 0
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 7439-96-5 EINECS: 231-105-1	manganese	0.1-2.5%

4 First-aid measures

· **Description of first aid measures**
· **General information:** No special measures required.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** Generally the product does not irritate the skin.
· **After eye contact:** Rinse opened eye for several minutes under running water.
· **After swallowing:** Seek medical treatment.
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Suitable to surrounding conditions
· **Special hazards arising from the substance or mixture** No further relevant information available.

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· **Advice for firefighters** -
· **Protective equipment:** No special measures required.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Ensure adequate ventilation
Use respiratory protective device against the effects of fumes/dust/aerosol.
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:** Pick up mechanically.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**

· **PAC-1:**		
7439-89-6	iron	3.2 mg/m³
7439-96-5	manganese	3 mg/m³
7440-21-3	silicon	45 mg/m³
7440-44-0	carbon	6 mg/m³
7440-47-3	chromium	1.5 mg/m³
7440-02-0	nickel	4.5 mg/m³
7440-50-8	copper	3 mg/m³
7789-24-4	lithium fluoride	10 mg/m³
7440-32-6	titanium	30 mg/m³
7723-14-0	phosphorus	0.27 mg/m³
7727-37-9	nitrogen	7.96E+05 ppm
7439-98-7	molybdenum	30 mg/m³
7440-31-5	tin	6 mg/m³
7440-36-0	antimony	1.5 mg/m³
7440-38-2	arsenic	1.5 mg/m³

· **PAC-2:**		
7439-89-6	iron	35 mg/m³
7439-96-5	manganese	5 mg/m³
7440-21-3	silicon	100 mg/m³
7440-44-0	carbon	330 mg/m³
7440-47-3	chromium	17 mg/m³
7440-02-0	nickel	50 mg/m³
7440-50-8	copper	33 mg/m³
7789-24-4	lithium fluoride	110 mg/m³
7440-32-6	titanium	330 mg/m³
7723-14-0	phosphorus	3 mg/m³
7727-37-9	nitrogen	8.32E+05 ppm
7439-98-7	molybdenum	330 mg/m³
7440-31-5	tin	67 mg/m³
7440-36-0	antimony	13 mg/m³
7440-38-2	arsenic	17 mg/m³

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· **PAC-3:**

7439-89-6	iron	150 mg/m³
7439-96-5	manganese	1,800 mg/m³
7440-21-3	silicon	630 mg/m³
7440-44-0	carbon	2,000 mg/m³
7440-47-3	chromium	99 mg/m³
7440-02-0	nickel	99 mg/m³
7440-50-8	copper	200 mg/m³
7789-24-4	lithium fluoride	680 mg/m³
7440-32-6	titanium	2,000 mg/m³
7723-14-0	phosphorus	18 mg/m³
7727-37-9	nitrogen	8.69E+05 ppm
7439-98-7	molybdenum	2,000 mg/m³
7440-31-5	tin	400 mg/m³
7440-36-0	antimony	80 mg/m³
7440-38-2	arsenic	100 mg/m³

7 Handling and storage

· **Handling:**
· **Precautions for safe handling** Ensure that suitable extractors are available on processing machines
· **Information about protection against explosions and fires:** No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**

7439-96-5 manganese

PEL	Ceiling limit value: 5 mg/m³ as Mn
REL	Short-term value: 3 mg/m³ Long-term value: 1 mg/m³ fume, as Mn
TLV	Long-term value: 0.02* 0.1** mg/m³ as Mn; *respirable **inhalable fraction

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:** Wash hands before breaks and at the end of work.
· **Breathing equipment:** Filter P2

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· **Protection of hands:**
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves** Leather gloves
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:** Safety glasses
· **Body protection:**
Protective work clothing
Wear hand, head, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Solid
Color:	According to product specification
· **Odor:**	Odorless
· **Odor threshold:**	Not determined.
· **pH-value:**	Not applicable.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Not determined.
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Density:**	Not determined.
· **Relative density**	Not determined.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Water:**	Insoluble.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Dynamic:**	Not applicable.
· **Kinematic:**	Not applicable.
· **Solvent separation test**	
VOC content:	0.00 %
Solids content:	100.0 %
· **Other information**	No further relevant information available.

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10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:**
Reasonably expected fume constituents of this product would include:
Copper Oxide
copper oxide.
Chromoxide.
Nickel oxide.
Reasonably expected gaseous constituents would include Carbon monoxide and Carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 and ANSI/AWS F1.2-1992. In order to determine and evaluation of the existing problem areas, the standards EN ISO15011 –parts 1,4 can also be applied.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
The product is not subject to classification according to internally approved calculation methods for preparations:
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.

· **NTP (National Toxicology Program)**
None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.

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· **Additional ecological information:**
· **General notes:** Water hazard class 1 (Self-assessment): slightly hazardous for water
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:** Must be specially treated adhering to official regulations.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**	Void
· **DOT, ADR, ADN, IMDG, IATA**	Void
· **UN proper shipping name**	
· **DOT, ADR, ADN, IMDG, IATA**	Void
· **Transport hazard class(es)**	
· **DOT, ADR, ADN, IMDG, IATA**	
· **Class**	Void
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	Void
· **Environmental hazards:**	
· **Marine pollutant:**	No
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	Not dangerous according to the above specifications.
· **UN "Model Regulation":**	- Void

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
No further relevant information available.
· **Sara**

· **Section 355 (extremely hazardous substances):**
None of the ingredient is listed

· **Section 313 (Specific toxic chemical listings):**

7439-96-5	manganese

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· **TSCA (Toxic Substances Control Act):**
All components have the value ACTIVE.

· **Hazardous Air Pollutants**

7439-96-5	manganese
7723-14-0	phosphorus

· **Proposition 65**

· **Chemicals known to cause cancer:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Cancerogenity categories**

· **EPA (Environmental Protection Agency)**

7439-96-5	manganese	D

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **GHS label elements** Void
· **Hazard pictograms** Void
· **Signal word** Void
· **Hazard statements** Void
· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Additional information:**
Recommendations for exposure scenarios, measures for risk management and identification of working conditions under which metals, metal alloys and products made of metal can be safely worked can be found attached.
Detailed information can be found on our webpage www.voestalpine.com (Environment, REACH at voestalpine).

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Welding Exposure Scenario WES - ENGL **EWA2011**

Recommendations for Exposure Scenarios, Risk Management Measures and to identify Operational Conditions under which metals, alloys and metallic articles may be safely welded

Welding/Brazing produces fumes which can affect human health and the environment. Fumes are a varying mixture of airborne gases and fine particles which, if inhaled or swallowed, constitute a health hazard. The degree of risk will depend on the composition of the fume, 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. 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.

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 exposure scenario 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. The following principle shall be applied:

1- Select the applicable process/material combinations with the lowest class, whenever possible.
2- Set welding process with the lowest emission parameter.
3- Apply the relevant collective protective measure in accordance with class number. In general, the use of PPE is taken into account after all other measures is applied.
4- Wear the relevant personal protective equipment in accordance with the duty cycle.

In addition, compliance with the National Regulations regarding the exposure to welding fumes of welders and related personnel shall be verified.

In the table "Risk Management Measures for individual process / material combinations" below, reference is made to the following standards for collective and personal protection measures:

ISO 4063	Welding process Reference Numbers according to ISO 4063
EN ISO 15012-1:2004	Health and safety in welding and allied processes - Requirements testing and marking of equipment or air filtration - Part 1: Testing of the separation efficiency for welding fume
EN ISO 15012-2:2008	Health and safety in welding and allied processes - Requirements, testing and marking of equipment for air filtration - Part 2: Determination of the minimum air volume flow rate of captor hoods and nozzles
EN 149:2001	Respiratory protective devices - Filtering half masks to protect against particles - Requirements, testing, marking (FFP1 - FFP2 - FFP3)
EN 1835:2000	Respiratory protective devices. Light duty construction compressed air line breathing apparatus incorporating a helmet or a hood. Requirements, testing, marking (LDH1 - LDH2 - LDH3).
EN 12941:1998	Respiratory protective devices. Powered filtering devices incorporating a helmet or a hood. Requirements, testing, marking (TH1 - TH2 - TH3).
EN 143:2000	Respiratory protective devices — Particle filters — Requirements, testing, marking (P1, P2, P3)
Directive 1998/24/EC	Article 6.2 on the protection of the health and safety of workers from the risks related to chemical agents at work
BGR 190	Benutzung von Atemschutzgeräten (Berufsgenossenschaftliche Regel für Sicherheit und Gesundheit bei der Arbeit)
TRGS 528	Schweisstechnische Arbeiten (Technische Regeln für Gefahrstoffe)

Also in the table "Risk Management Measures for individual process / material combinations", reference is made to footnotes.
The description of these footnotes:

[1] 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
[2] Personal Protective Equipment (PPE) required avoiding exceeding the National Exposure Limit Value (DC: Duty cycle expressed on 8 hours)
[3] 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.
[4] General Ventilation (GV) Medium (double compared to Low)
[5] Filtrating half mask (FFP2)
[6] When an alloyed consumable is used, measures from "Class V" are required
[7] General Ventilation (GV) Low. When no Local Exhaust Ventilation, the ventilation requirement is 5-fold
[8] Filtrating half mask (FFP3), helmet with powered filters (TH2/P2), or helmet with external air supply (LDH2)
[9] Reduced (negative) pressured Area: A separate, ventilated area where reduced (negative) pressure, compared to the surrounded area, is maintained
[10] Local Exhaust Ventilation (LEV) High, extraction at source (includes table, hood, arm or torch extraction)
[11] Helmet with powered filters (TH3/P3), or helmet with external air supply (LDH3)
[12] Local Exhaust Ventilation (LEV) Low, extraction at source (includes table, hood, arm or torch extraction)
[13] Local Exhaust Ventilation (LEV) Medium, extraction at source (includes table, hood, arm or torch extraction)
[14] Recommended measures to comply with national maximum allowable limits. Extracted fumes, for all materials except unalloyed steel and aluminium, shall be filtered before release in the outside environment.
[15] A confined space, despite its name, is not necessarily small. Examples of confined spaces include ship, silos, vats, utility vaults, tanks, etc.
[16] Improved helmet, designed to avoid direct flow of welding fumes inside
[n.a.] Not applicable
[n.r.] Not recommended

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Welding Exposure Scenario WES - ENGL **EWA2011**

Risk Management Measures for individual process / base material combinations

Class[1]	Process (according to ISO 4063)	Base Materials	Remarks	Ventilation / Extraction / Filtration[14]	PPE[2] DC<15%	PPE[2] DC>15%
Non-confined space[15]						
I	GTAW 141	All	Except Aluminium	GV low[3]	n.r.	n.r.
	SAW 12					
	Autogeneous 3					
	PAW 15					
	ESW/EGW 72/73					
	Resistance 2					
	Stud welding 78					
	Solid state 521					
	Gases Brazing 9	All	Except Cd- alloys	GV low[3]	n.r.	n.r.
II	GTAW 141	Aluminium	n.a.	GV medium[4]	n.a.	FFP2[5]
III	MMAW 111	All	Except Be-, V- , Mn-, Ni- alloys and Stainless[6]	GV low[7] LEV low[12]	Improved helmet[16]	FFP2[5]
	FCAW 136/137	All	Except Stainless and Ni- alloys [6]			
	GMAW 131/135	All	Except Cu-, Be-, V-alloys[6]			
	Powder Plasma Arc 152	All	Except Be-, V-, Cu- , Mn-, Ni-alloys and Stainless [6]			
IV	All processes class I	Painted / primed / oiled	No Pb containing primer	GV low[3]	FFP2[5]	FFP3, TH2/P2, or LDH2[8]
	All processes class III	Painted / primed / oiled	No Pb containing primer	GV low [7] LEV low[12]		
V	MMAW 111	Stainless, Ni-, Be-, and V-alloys	n.a.	LEV high[10]	TH3/P3, LDH3[11]	TH3/P3, LDH3[11]
	FCAW 136/137	Stainless, Mn- and Ni-alloys				
	GMAW 131	Cu-alloys				
	Powder Plasma Arc 152	Stainless, Mn-, Ni-, and Cu- alloys				
VI	GMAW 131	Be-, and V-alloys	n.a.	Reduced (negative) pressured area [9] LEV low[12]	TH3/P3, LDH3[11]	TH3/P3, LDH3[11]
	Powder Plasma Arc 152					
VII	Self shielded FCAW 114	Un-, high alloyed steel	Cored wire, not containing Ba	Reduced (negative) pressured area [9] LEV medium[13]	TH3/P3, LDH3[11]	TH3/P3, LDH3[11]
	Self shielded FCAW 114	Un-, high alloyed steel	Cored wire, containing Ba	Reduced (negative) pressured area [9] LEV high[10]		
	All	Painted / primed	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[15]						
I	Laser Welding 52	All	Closed system	GV medium[4]	n.a.	n.a.
	Laser Cutting 84					
	Electron Beam 51					
VIII	All	All	Confined space	LEV high[10] External air supply	LDH3[11]	LDH3[11]

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· ***Training hints*** -

· ***Department issuing SDS:***
Research and Development
Procurement/Logistics

· ***Contact:***
Deniece Fiedler
Chris Smith

· ***Date of preparation / last revision*** *02/22/2021 / 15*

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· **Abbreviations and acronyms:**
NCEC - National Chemical Emergency Centre (=Carechem24)
ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
TRGS: Technische Regeln für Gefahrstoffe (Technical Rules for Dangerous Substances, BAuA, Germany)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
· **** Data compared to the previous version altered.***