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Safety Data Sheet

acc. to OSHA HCS

Printing date 07/25/2016

Reviewed on 07/25/2016

1 Identification

· Product identifier

- · Trade name: BÖHLER DMO-IG
- · Application of the substance / the mixture Rods and Wires for Welding
- · Details of the supplier of the safety data sheet
- *Manufacturer/Supplier:* voestalpine Böhler Welding Austria GmbH Böhler-Welding-St. 1 8605 Kapfenberg

Telefon: +43 (0) 3862 301-28-299 Fax: +43 (0) 3862 301-95-299 www.voestalpine.com/welding

 Information department: Research and Development
 DI Stefan Schormann
 +43 3862 301 - 28291; stefan.schormann@voestalpine.com
 Emergency telephone number: +43 3862 301-0

2 Hazard(s) identification

Classification of the substance or mixture

The product is not classified according to the Globally Harmonized System (GHS).

- · Label elements -
- · GHS label elements Void
- · Hazard pictograms Void
- · Signal word Void
- · Hazard statements Void
- NFPA ratings (scale 0 4)

 $\begin{array}{c} \textbf{Health} = 0\\ \textbf{Fire} = 0\\ \textbf{Reactivity} = 0 \end{array}$

· HMIS-ratings (scale 0 - 4)

HEALTHImage: OFIREImage: OFireImage: OREACTIVITYImage: O

· 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.

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0.1-2.5%

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· Dangerous components:

CAS: 7439-96-5 manganese EINECS: 231-105-1

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.
- · 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: No special measures required.
- · 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.

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.

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• **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. The usual precautionary measures for handling chemicals should be followed.

- Breathing equipment: Filter P2
- · Protection of hands:
- Heat protection gloves (non-combustible)

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation Rubber gloves

Acid resistant 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.

Information on basic physic General Information	cal and chemical properties	
Appearance:	Solid	
Color:	According to product specification	
Odor:	Odorless	
Odor threshold:	Not determined.	

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· 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.
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.
 Organic solvents: 	0.0 %
· VOC content:	0.0 g/l / 0.00 lb/gl
Other information	No further relevant information available.

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:

Cupper oxide.

copper oxide.

Chromoxide.

The present OSHA PEL (Permissible Exposure Limit) - published in the U.S. Federal Register 71, pages: 10099-10385 - for hexavalent Chromium (Cr +6) is 0.005 mg/m3 which will result in a significant reduction from the 5 mg/ m3 general welding fume (NOC) level. It applies to soluble chromates of the types found in covered stainless electrode fumes.

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.

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11 Toxicological information

Information on toxicological effects

· 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.

Workers exposed to hexavalent chrome (CrVI) are at an increased risk of developing lung cancer. It is also possible that occupational exposure to (CrVI) may result in asthma, and damage to the nasal epithelia and skin. To avoid any risk follow the requirements of the OSHA rule for hexavalent chromium published on February 28, 2006 in the U.S. Federal Register, pages:10099-10385 which established an 8-hour time-weighted average (TWA) exposure limit of 5 micrograms of hexavalent chrome per cubic meter of air (5 μ g/m³). This is a considerable reduction from the previous PEL of 1 milligram per 10 cubic meters of air (1 mg/10 m³, or 100 μ g/m³) reported as Probably Chromium(VI)oxide, which is equivalent to a limit of 52 μ g/m³ as (Cr+6)). This rule also contains ancillary provisions for worker protection such as requirements for exposure determination, preferred exposure control methods, including a compliance alternative for a small sector for which the new PEL is infeasible, respiratory protection, protective clothing and equipment, hygiene areas and practices, medical surveillance, recordkeeping, and start-up dates that include four years for the implementation of engineering controls to meet the PEL.

· 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.
- · Additional ecological information:
- · General notes: Generally not 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.

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· Uncleaned packagings:

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

14 Transport information	
· UN-Number · DOT, ADR, ADN, IMDG, IATA	Void Void
· UN proper shipping name · DOT, ADR, ADN, IMDG, IATA	Void
· Transport hazard class(es)	
· DOT, ADR, ADN, IMDG · Class	Void
· 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 MARPOL73/78 and the IBC Code 	l of 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
TSCA (Toxic Substances Control Act): All ingredients are listed.
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. (Contd. of page 5)

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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	
TLV (Threshold Limit Value established by ACGIH)	
7439-98-7 molybdenum	A
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.

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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Recommendations for Exposure Sciencifs, Risk Management Messures and to identify Operational Continuous units which and after human heads and the evidorment. Furnes are a varying matture of ultiforme gases and fine and and an exposure of the evidence of the evidence of the evidorme of	Welding Exposure Scenario WE	S - ENGL EWA2011	
Considering the emission of funces when welding, brazing or culting of metals. It is recommended to (1) among risk management messares brazing applying general information and guidelines provided by the source scenario and (2) using the information provided by the Safety Data Sheet, issued in accordance with REACH, by the welding consumable manufasturer. The employee shall nearce that the risk from welding times to the safety and heath of workers is eliminated or reduced to a minimum. The following principle shall be applied. - Set welling process with the lowest emission preameter. - Set welling process with the lowest emission regarding the exposure to welding funces of PPE is taken into account are all other messares is applied. - Wear the relevant process is applied. - Wear the relevant process is provided by this source with de duy cycle. - Wear the relevant process is applied. - Not the	Recommendations for Conditions un Welding/Brazing produces fumes y particles which, if inhaled or sw concentration of the fume and du consumbles being used, coating activities. A systematic approach to and ancillary worker that can be ex	Exposure Scenarios, Risk Management Measures and to identify Operational nder which metals, alloys and metallic articles may be safely welded which can after thuman health and the environment. Fumes are a varying mixture of airborne gases and fine allowed, constitute a health hazard. The degree of risk will depend on the composition of the fume, ation of exposure. The fume composition is dependent upon the material being worked, the process and so on the work such as paint, galvanizing or plating, oil or contaminants from cleaning and degreesing the assessment of exposure is necessary, taking into account the particular circumstances for the operator posed.	
The endpoyer shall exame that the risk from welding fumes to the safety and health of workers is eliminated or reduced to a minimum. The following projective the lowest emission parameter:	Considering the emission of fume: through applying general informati Data Sheet, issued in accordance	s when welding, brazing or cutting of metals, it is recommended to (1) arrange risk management measures on and guidelines provided by this exposure scenario and (2) using the information provided by the Safety with REACH, by the welding consumable manufacturer.	
In addition, compliance with the National Regulations regarding the exposure to welding funces 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 profection measures: ISO 4083 Welding process Reference Numbers according to ISO 4083 EN ISO 15012-12004 Health and safety in velding and alled processes - Requirements is testing and maxing of equipment for all fittingions - Pat 2: Determination of the minimum air volume flow rate of captor hoods and nozzes EN 149:2001 Respiratory protective devices - Filtering half masks to proteed against particles - Requirements, Itesting and alled processes - Requirements (setting and maxing of equipment for all fittingion - Pat 2: Determination of the minimum air volume flow rate of captor hoods and nozzes EN 149:2001 Respiratory protective devices - Filtering half masks to proteed against particles - Requirements, Itesting, marking (FFF1 - FF22 - FF73) EN 1835:2000 Respiratory protective devices - Patricle filters Requirements, Itesting, maxing (DH - 1, DH - 1, DH); EN 143:2000 Respiratory protective devices - Patricle filters Requirements, Itesting, marking (PF - FF2 - FF7); EN 143:2000 Respiratory protective devices Patricle filters Requirements, Itesting, marking (PF, P2, P3); Directive 1980/24EC Article 5: On the protection of the health and safety of worksrs from the risks related to chemical agents at work Berufacture of the original process / material combinations', reference is made to footholes. The description of these footholes: Class: approximate ranking to millage risk by selecting process/material combinations', reference is made to footholes. The description of these footholes: Class: approximate ranking to millage risks V and requirement is 5-fodd Content Ventilation (GV) to With additional contegrative table baseling and structure (Varker from the surrounded area, is maintained Conten	The employer shall ensure that th following principle shall be applied 1 - Select the applicable process 2 - Set welding process with the 3 - Apply the relevant collective p account after all other measure 4 - Wear the relevant personal pu	e risk from welding fumes to the safety and health of workers is eliminated or reduced to a minimum. The material combinations with the lowest class, whenever possible. lowest emission parameter. ordective measure in accordance with class number. In general, the use of PPE is taken into es is applied. rotective equipment in accordance with the duty cycle.	
In the table "Bisk Management Measures for individual process / material combinations" below, reference is made to the following standards for collective and personal procession measures EN ISO 15012-12:00 Health and safety in welding and allied processes - Requirements testing and marking of equipment for all filtration - Part 1. Testing of the separation efficiency for welding turne EN ISO 15012-12:00 Health and safety in welding and allied processes - Requirements, testing and marking of equipment for all filtration - Part 2. Determination of the maintum air volume flow rate of captor floxeds and the safet in welding and allied processes - Requirements, testing and marking of equipment for all filtration - Part 2. Determination of the maintum air volume flow rate of captor floxeds and the safet in welding and allied processes - Requirements, testing and marking of equipment to rate flow of the safet in welding and allied processes - Requirements, testing and marking of equipment testing, marking (FPP I - FFP2 - FFP3) EN 1353:2000 Respiratory protective devices - Diversed filtering devices incorporating a heart of a lood. EN 143:2000 Respiratory protective devices - Diversed filtering devices incorporating a heart of a lood. Bear 143:2000 Respiratory incessive devices - Diversed filtering devices incorporating a heart of a lood. Bear 200 Respiratory incessive devices - Diversed filtering devices incorporating a heart of a lood. Bear 200 Respiratory incessive devices - Diversed filtering devices incorporating a heart of a lood. Bear 200 Respiratory incessive devices - Diversed filter devices from testing and the safet of contines - Bear 200 Respiratory incessive devices - Diversed filter Scienterit und Gesundhet bei der Arbeit) Bear 200 Respiratory incessive devices - Diversed filter Scienterit - Class: approximate ranking for mitigate risk by selecting process/material combinations ', reference is made to foodnets. The description of these foodnets - Respiratory incessive and the advice in the safet in the	In addition, compliance with the N verified.	vational Regulations regarding the exposure to welding fumes of welders and related personnel shall be	
EX 04083 Weiding process Reference Numbers according to ISC 4063 EN ISO 15012-1:2004 Health and safely in weiding and alied processes - Requirements testing and marking of equipment or air filtration - Part 1: Testing of the separation efficiency for weiding und alied processes - Requirements, testing and marking of equipment for air filtration - Part 2: Determination of the minimum air volume flow rate of captor hoods and nozzies EN 149-2001 Respiratory prodective devices - Filtering half masks to prodect against particles - Requirements, testing, marking (FFP) - FFP2 - FFP2 - FFP2 EN 1835:2000 Respiratory prodective devices - Light dup combinition compressed aff line breaking appoartus Respiratory prodective devices - Device filtering devices incorporating a helmed to a hood. Respiratory prodective devices - Device filtering devices incorporating a helmed to a hood. Respiratory prodective devices - Device filtering devices incorporating a helmed to a hood. Respiratory prodective devices - Device filters - FRequirements, testing, marking (F1, F2, F3) Directive 1989/2/4/EC EN 143.2000 Respiratory protective devices - Device filters - FRequirements, testing, marking (F1, F2, F3) Directive 1989/2/4/EC Article 6.2 on the protection of the health and safety or workers from the risks related to chemical agents at work BGR 190 Benutzung von Alemschutzgeräten (Berufsenossesnechaftliche Regel für Sicherheit und Gesundheit bei der Abeit) Tre description of these foundes: Sch wheisstechnische Arbeiten (Technische Regel für Sicherheit und Gesundheit bei der Abeit) General Ventilities (GV) Low. With a dditional Locoal Exhaust Ventiliation (LEV) and extract	In the table "Risk Management Me	easures for individual process / material combinations" below, reference is made to the following standards	
EN ISO 15012-2:2008 Health and safety in welding and alied processes - Requirements testing and marking of equipment for 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. EN 1292:11986 Respiratory protective devices - Device against particles - Requirements, testing, marking (FP1 - FFP2) EN 1292:1292:1292:1292:1292:1292:1292:1292	ISO 4063 EN ISO 15012-1:2004	Welding process Reference Numbers according to ISO 4063 Health and safety in welding and allied processes - Requirements testing and marking of equipment or air firstion - Part 1 - Testing of the segnation efficiency for welding time	
EN 149:2001 Respiratory protective devices - Filtering half masks to protect against particles - Requirements, testing, marking (FPT) - 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 (LDH 1 - LDH 2 - LDH 3). EN 1294:1:1998 Respiratory protective devices - Powered filtering devices incorporating a helmet or a hood. Requirements, testing, marking (PL Pt 2, P3) Directive 1998/24/EC Article 62 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: 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 (PFE) required aviding 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) 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) 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) 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	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 1335:2000 Respiratory protective devices. Light duty construction compressed air line breathing apparatus incorporating a helmet or a hood. Requirements, testing, marking (LTH - LTH2 - LDH3). EN 1234:1:1998 Respiratory protective devices. Powered filtering devices incorporating a helmet or a hood. Requirements, testing, marking (TH - LTH2 - TH3). 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 Alemschutzgeräten (Berufsgenossenschaftliche Regel für Sicherheit und Gesundheit bei der Arbeit) TRGS 528 Schweistechnische Arbeiten (Technische Regelin für Gefahrstoffe) Also in the table "Risk Management Measures for individual process/ material combinations", reference is made to footnotes. Tre description of these footnotes:	EN 149:2001	Respiratory protective devices - Filtering half masks to protect against particles - Requirements, testing, marking (FFP1 - FFP2 - FFP3)	
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 Apticle 6.2 on the protection of the health and safety of workers from the risks related to chemical agents at work BGR 190 BGR 190 Schweisstechnische Arbeiten (Technische Regel für Sicherheit und Gesundheit berutzung von Atemschutzgeräten (Berufsgenossenschaftliche Regel für Sicherheit und Gesundheit berutzung von Atemschutzgeräten (Berufsgenossenschaftliche Regel für Sicherheit und Gesundheit berufzung von Atemschutzgeräten (Berufsgenossenschaftliche Regel für Sicherheit und Gesundheit berufschutzen (CPE) Also in the table "Risk Management measures shall be applied Personal Protective Equipment (IPPE) required avoiding exceeding the National Exposure Limit Value (DC: Duty cycle expressed on 8 hours) General Ventilation (CV) Low. With additional Local Exhaust Ventilation (LEV) and extracted air to the outside, the GV or LEV capacity may be reduced to 15 of the original requirement. General Ventilation (GV) Medium (double compared to Low) Firitrating haff mask (FFP3). Heimet 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) Local Exhaust Ventilation (LEV) Heidum, ex	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 143:2000 Respiratory protective devices—Particle filters—Requirements, testing, marking (P1, P2, P3) Directive 1998/24/EC: Arbite 6.2 on the protection of the health and safety of workers from the risks related to chemical agents at work BGR 190 BGR 1	EN 12941:1998	Respiratory protective devices. Powered filtering devices incorporating a helmet or a hood. Requirements, testing, marking (TH1 - TH2 - TH3).	
BGR 190 Benutzing 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 Wesures for individual process / material combinations", reference is made to footnotes. Te description of these footnotes: 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 (VPE) 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) Low. With additional Local Exhaust Ventilation requirement is 5-fold General Ventilation (GV) Low. When no Local Exhaust Ventilation requirement is 12-fold General Ventilation (LEV) Medium (double compared to Low) Filtrating half mask (FFP2) 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, area Semeral Ventilation (LEV) Low, extraction at source (includes table, hood, arm or torch extraction) Helmet with powered filters (TH3/P3), or helmet with external air supply (LDH2) Local Exhaust Ventilation (LEV) Medium, extraction at source (includes table,	EN 143:2000 Directive 1998/24/EC	Respiratory protective devices — Particle filters — Requirements, testing, marking (P1, P2, P3) Article 6.2 on the protection of the health and safety of workers from the risks related to chemical agents at work	
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¹⁶ Improved helmet, designed to avoid direct flow of welding fumes inside n Not applicable nr. Not recommended	 aluminium, shall be filtered bef A confined space, despite its n 	ore release in the outside environment. ame, is not necessarily small. Examples of confined spaces include ship, silos, vats, utility vaults, tanks, etc.	
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	nr. Not recommended		



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Reviewed on 07/25/2016

Safety Data Sheet acc. to OSHA HCS

Printing date 07/25/2016

Trade name: BÖHLER DMO-IG

Welding Exposure Scenario WES - ENGL

EWA2011

Risk Management Measures for individual process / base material combinations

Class ¹	Process	Base	Remarks	Ventilation /	PPE ²	PPE ²			
	(according to ISO 4063)	Materials		Extraction / Filtration ¹⁴	DC<15%	DC>15%			
	Non-confined space'								
	GTAW 141								
	SAW 12			au 3					
	Autogeneous 3	All	Except Aluminium	GV low*	n.r.	n.r.			
	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.			
	GTAW 141	Aluminium	n.a.	GV medium ⁴	n.a.	FFP2°			
	MMAW 111	All	Except Be-, V- , Mn-,						
			Ni- alloys and	-					
			Stainless	GV low'	Improved	FFP2			
	FCAW 136/137	All	Except Stainless and	LEV low"	helmet				
			Ni- alloys *						
	GMAW 131/135	All	Except Cu-, Be-, V-						
			alloys	-					
	Powder Plasma Arc 152	All	Except Be-, V-, Cu-,						
			Mn-, Ni-alloys and						
			Stainless	ou 3					
IV	All processes class I	Painted /	No Pb containing	GV IOW	FFD2 ⁵	FFP3,			
		primea / oilea	primer	Quinnel		TH2/P2,			
	All processes class III	Painted /	NO PD containing	GV IOW					
V	MMANA/ 111	Steipless Ni	primer	LEV IOW	TU2/D2	TU2/D2			
v	111	Be, and V-	11.a.	LEV High	LDH3 ¹¹	1004311			
		allove			LDIII3				
	ECAW 136/137	Stainless	1						
	10,00	Mn- and Ni-							
		allovs							
	GMAW 131	Cu-allovs	1						
	Powder Plasma Arc 152	Stainless	1						
		Mn-, Ni-, and							
		Cu- allovs							
VI	GMAW 131	Be-, and V-	n.a.	Reduced (negative) pressured area	TH3/P3.	TH3/P3.			
	Devudes Diserve Are 152	alloys		LEV low ¹²	LDH3 ¹¹	LDH3 ¹¹			
1/11	Powder Plasma Arc 152	- Ila biab	Cared wire not	De trad (see the) area of a se	-				
VII	Sell silleided FCAVV 114	ollowed steel	coreu wire, not	LEV medium ¹³					
	Self chielded ECAW 114	Lin high	Cored wire	Reduced (negative) pressured area	TH3/P3	TH3/D3			
	Sell silleided FCAW 114	alloved steel	containing Ba	LEV high ¹⁰	10H311	1.0H311			
	All	Dainted /	Daint / Drimer	Lev ligh	20110	Lono			
		primed	containing Ph						
	Arc Gouging and	All	na	1					
1	Cutting 8		11.00.						
1	Thermal Spray	All	na	1					
1	Gases Brazing 9	Cd- allovs	na	1	1				
	Closed system or Confined space ¹⁵								
	Laser Welding 52	All	Closed system	GV medium ⁴	n a.	n.a.			
1 '	Laser Cutting 84	1				<u>.</u> .			
1	Electron Beam 51	1			1				
VIII	All	All	Confined space	LEV high ¹⁰ External air supply	LDH3 ¹¹	1.0H31			
		1000							

· Department issuing SDS: Research and Development

- · Contact: DI Stefan Schormann
- · Date of preparation / last revision 07/25/2016 / 7
- Abbreviations and acronyms:

- 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

(Contd. on page 10)

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road) IMDG: International Maritime Code for Dangerous Goods

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Safety Data Sheet

acc. to OSHA HCS

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Trade name: BÖHLER DMO-IG

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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.