SVETS KOMMISSIONEN

AG 32 Occupational hygiene and workplace design

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Annex to memos AG 32 Ad-hoc-group SDS

Sent to:
Members of AG 32 Ad-hoc SDS

For information:
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Guideline for content of SDS for consumables for welding

1. Background and objective

AG 32's Ad-hoc group "Information about welding fumes in SDS" prepares the question of content of Safety Data Sheets, SDS, for discussion with the Swedish Chemicals Agency and for information to the industry in general about what should be included about welding fumes in an SDS.

The aim is to contribute to increasing the uniformity and quality of the information in the SDS on welding consumables. This guidance is based on the REACH and CLP regulations within the EU, as well as guidance from ECHA. This guidance does not override these legal requirements. Compilation of safety data sheets, SDS, for welding consumables must be carried out by competent personnel.

The sections covered in the guideline are those considered to be most essential to support the creation of SDSs for welding consumables. You must also avoid repeating information in different sections. You can instead make references between sections.

The guideline was last updated at the meeting on September 4th, 2024.

2. Proposal for handling welding fumes in an SDS for consumables

Welding consumables in the form of welding electrodes is classified as a chemical mixture and must therefore be supplied with a safety data sheet, (Safety Data Sheet, SDS).

Section SDS	Guidance content
2.1 Classification of the substance or mixture	A welding consumable is defined as a chemical mixture, according to European legislation. Therefore, classification of welding consumables must be done in accordance with the CLP Regulation (EC) No. 1272/2008, and thus be based on the hazard classification of the constituent substances in the form in which the welding consumable is delivered. If there are no hazards with the welding consumable as delivered, the product must not be classified or labelled in accordance with the CLP regulation. If there are hazards with the product as it is delivered, e.g. nickel content ≥1%, only hazard statements should be used for the hazards that apply to the product as supplied. NOTE: It should be considered that skin contact does not occur for a tube electrode where all the nickel content is in the powder enclosed in the electrode. In principle, this also applies to coated electrodes that do not contain nickel in the casing. Welding consumables shall not be classified (Section 2.1) with respect to hazards arising from welding fumes. Hazards with respect to welding fumes are addressed in Section 2.3 Other Hazards, Section 10 Reactivity and Stability, and Section 11 Toxicological Information.

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<table>
<tr><td>2.2. Label elements</td><td>The product must not be labelled in any other way than as it is classified. Labelling in this section refers to labelling according to the CLP regulation with applicable hazard pictograms, signal words, hazard statements and precautionary statements.

Regarding exemptions from labelling requirements for metals in massive form and alloys according to Article 23 of the CLP Regulation, labelling does not need to take place unless the product pose a risk to human health by inhalation, ingestion or skin/eye contact, or to the aquatic environment in the form in which the products appear on the market, even if they are classified as hazardous according to the criteria in CLP.

If the exception for labelling alloys in Article 23 of the CLP Regulation is applied, the reasons for the assessment must be reported in this section (2.2) of the SDS.</td></tr>
<tr><td>2.3 Other hazards</td><td>It is under this section in the SDS that the hazards of welding fumes are addressed (see also other sections). The following must be taken into account:

"Long-term inhalation of welding fumes can cause lung cancer, heart disease, high blood pressure and chronic obstructive pulmonary disease, also known as COPD. Development of asthma and pneumonia has also been associated with welding fume inhalation. Pregnant welders have a greater risk of giving birth to children with a lower birth weight and giving birth prematurely. For further information and references, see section 11 of this guidance."

For welding consumables containing manganese or aluminium, the following must be noted:

"Welding fumes containing lead, manganese or aluminium can affect the nervous system"

In addition, for "gases:"

"Supplied gas can cause a lack of oxygen with suffocation as a consequence. Gas generation, e.g. CO, can cause poisoning"

In this section, hazard statements and hazard pictograms according to the CLP Regulation shall not be stated.

Instead, the symbol for "general danger" from the EU sign directive, 92/58/EEC, can be used. ATTENTION! Additional information must be entered in connection with the symbol.
 

Alternatively, pictograms may be specified with reference to ISO 17846:2004 (under revision 2024). For example, the following:
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<tr><td>3.1 Substances</td><td>Under this section, a welding consumable shall not be notified, as it is a mixture, see section 3.2.</td></tr>
<tr><td>3.2 Mixtures</td><td>In this section, the chemical composition of the welding consumables (mixture) must be specified (for example, name of the substance, CAS no., classification of the substance, concentration range).</td></tr>
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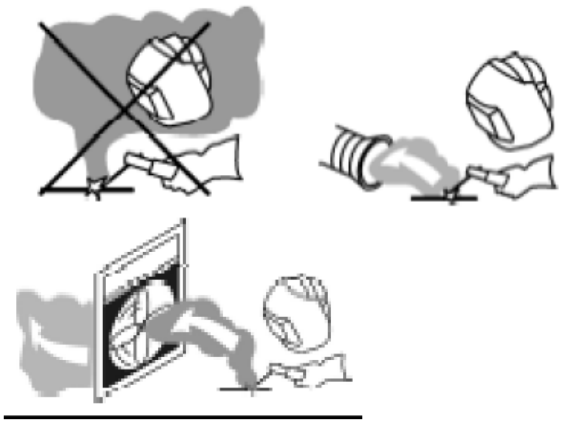
	Information on the composition of the welding fume is normally found in the fume data sheet of the welding consumable but may also be given in section 10.6 or 11. It must also be explained that certain substances are enriched in the welding fumes and therefore, risk assessment cannot be based entirely on the chemical composition of the welding consumable.
4.1 Description of first aid measures	Under this section, it is stated that the use of welding consumables may cause risks. The following must be considered: • Electrical shock • Inhalation (including lack of oxygen, e.g. when welding in confined spaces) • Skin contact • Eye contact Examples of wording: *Electric shock: Turn off and disconnect power. Use non-conductive materials to remove the casualty from live parts. If breathing stops, give artificial respiration. In case of cardiac arrest, begin cardiopulmonary resuscitation (CPR). Get help. Call a doctor immediately (call 112).* *Inhalation: If breathing stops, give artificial respiration. In case of breathing difficulties supply fresh air. Call medical personnel.* *Skin contact: Rinse burn as soon as possible with cold water. Use emergency shower. Do not attempt to remove clothing stuck in the wound. Severe burns must be treated by a doctor.* *Eye contact: Particles in eyes: Rinse with water. Metal particles can stick to the cornea. If symptoms persist, contact a doctor. Symptoms resulting from exposure to the arc radiation (welding flash) usually appear after a few hours.*
4.2 Most important symptoms and effects, both acute and delayed	In this section, brief information on the most important symptoms and effects, both acute and delayed, of exposure shall be given. If information on this is given in other sections, reference should be made to the relevant section, to avoid repetition.
8.1 Control parameters	Under this section, the relevant national limit values, listed below, for the relevant consumable and welding process shall be specified. Swedish occupational exposure limit values, NGV (for 8-hour working day), according to AFS 2018:1 Occupational exposure limit values: A Swedish limit value for welding fumes is missing. There is an NGV for inorganic respirable dust of 2.5 mg/m^3. NGV for respirable aluminium 2 mg/m^3. NGV for fluoride 2 mg/m^3. NGV for respirable iron 3.5 mg/m^3. NGV for inhalable cadmium 0.004 mg/m^3. NGV for chromium as total dust 0.5 mg/m^3. NGV for hexavalent inhalable chromium 0.005 mg/m^3. NGV for respirable manganese 0.05 mg/m^3. NGV for nickel oxide as inhalable fraction 0.1 mg/m^3 (0,05 mg/m^3 fr. 2025-01-18) NGV for carbon monoxide 20 ppm (23 mg/m^3). NGV for nitrogen dioxide 0.5 ppm (0.96 mg/m^3).

	NGV for nitrogen monoxide 2 ppm (2.5 mg/m^3). NGV for ozone 0,1 ppm (0.2 mg/m^3). NGV for respirable lead 0.05 mg/m^3. NOTE 1: For some substances there are also short-term limit values (KGV). NOTE 2: In this section, it must also be stated whether the substance has comments according to the list of occupational exposure limit values (AFS 2018:1), for example C for carcinogenicity. NOTE 3: Lead and cadmium are covered by biological limit values according to AFS 2019:3. A performed risk assessment determines if medical controls are necessary.
8.2 Exposure controls	Under this section, measures to limit exposure to welding fumes must be specified. It is recommended that exposed personnel use process ventilation (e.g. local exhaust ventilation) and/or respiratory protection (fan-assisted). Local exhaust ventilation (or other process ventilation) must always be used. The purpose of the ventilation is to suck the welding fumes away from the welder's breathing zone and to reduce the concentration of fumes in the work area. Respiratory protection should be used when welding, even if integrated or movable local exhaust ventilation is used. Respirators can be divided into two groups; positive and negative pressure respirators. Positive pressure respirators is a breathing protection that is supplied with air either via a personal fan or via compressed air from a compressor. Most often, these respirators consist of a welding helmet fed with filtered air. (Sjögren B. Hälsoeffekter gaser och partiklar bildade vid svetsning. Kunskapssammanställning, Arbetsmiljöverket Rapport 2013:5) In this section, pictograms from ISO 17846:2024 (under revision 2024) can be used. For example:  Or for respiratory protection from AFS Workplace design: 

10.6 Hazardous decomposition products	Carcinogenic and other health-hazardous substances in the welding fumes must be stated here. It is sufficient to enter the substance name, i.e. information about health hazards does not need to be entered.
11 Toxicological information	Long-term inhalation of welding fumes can cause lung cancer. Inhalation of welding fumes can cause heart disease and also high blood pressure. Long-term inhalation of welding fumes can cause chronic obstructive pulmonary disease, also known as COPD. Inhalation of welding fumes can cause asthma and pneumonia. Pregnant welders have a greater risk of giving birth to children with a lower birth weight and giving birth prematurely. The above effects have been summarized in: Sjögren B, Albin M, Broberg K, Gustavsson P, Tinnerberg H, Johanson G. An occupational exposure limit for welding fumes is urgently needed. Scand J Work Environ Health. 2022; 48: 1-3 Welding fumes containing manganese or aluminum can affect the central nervous system. The manganese and aluminum in the welding fumes mainly come from the consumable. Also note that manganese is enriched in the welding fumes. Welding in surface-treated materials can release various substances that must be considered, for example: - When welding in polyurethane varnish, allergenic diisocyanates are formed which can cause asthma. - When welding in polymer varnish, hydrochloric acid can form, which is corrosive. - If older base material is rust-proof, there may be lead in the surface treatment that is released during welding, which can affect the central nervous system. - Welding in galvanized material can release zinc and cause metal fume fever. Therefore, the base material in surface-treated articles must be exposed at least 10 cm from the heating point. Several counties have mandatory medical examinations for welders. The Swedish Work Environment Authority has not issued any regulations regarding mandatory medical examinations for welders. Medical examinations of welders (including spirometry) should be considered before the start of welding work to detect diseases (e.g. asthma) and after a few years of welding to detect work-related complaints and effects on lung function. Support for this recommendation can be found in the Swedish Work Environment Authority's AFS 2019:3 (Paragraph 80) Occupational Medical Supervision. Because welding fumes can cause pneumonia, welders over the age of 50 should be offered vaccination against pneumococcal disease. (Sjögren B. Hälsoeffekter gaser och partiklar bildade vid svetsning. Kunskapssammanställning, Arbetsmiljöverket Rapport 2013:5)

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