Тема занятия: «Угрозы для здоровья сварщиков»

Цель занятия: выучить новый лексический материал по теме «Угрозы для здоровья сварщиков»; совершенствовать навыки чтения и перевода текста профессионального направления; систематизировать знания, ответив на контрольные вопросы по теме занятия.

Уважаемые студенты! Ознакомьтесь с материалами практического занятия на тему «Угрозы для здоровья сварщиков». Конспект занятия выполняйте **в рабочей тетради письменно**, **обязательно указывая дату занятия, тему занятия, номер упражнения.** Ответы предоставить преподавателю на проверку **до 06. 02. 2023 г.** в электронном виде **(фотоотчёт)** на e-mail mikagol2605@mail.ru. Телефон преподавателя для консультации и возникающих вопросов: 072-14-15-816.

С уважением, Голодюк Марина Викторовна.

1. Запишите новую лексику в словарь, выучите новую лексику.

2. Прочитайте и устно переведите текст «Health Risks of Welding Fume/Gases».

3. Дайте письменно ответы на вопросы к тексту и выполните задания.

Health Risks of Welding Fume/Gases

Vocabulary:

irritation – раздражение

respiratory tract – дыхательные пути

susceptibility – чувствительность; восприимчивость

fever – жар, лихорадка; какое-л. заболевание, основным симптомом которого является очень высокая температура

tickling – першение (в горле)

chest tightness – стесненное дыхание

flu – грипп

coughing – кашель

limb – конечность (человека или животного)

siderosis – сидероз

pneumonia – воспаление легких, пневмония

pulmonary oedema – отек легких

asphyxiation – удушье

exposure – подвергание какому-л. воздействию; выставление, оставление на солнце, под дождем и т. п.

cancer – рак

What is welding fume/gases?

Welding fume is a mixture of airborne fine particles. Toxic gases may also be generated during welding and cutting.

Particulate fume

More than 90% of the particulate fume arises from vaporization of the consumable electrode, wire or rod as material is transferred across the arc or flame. The range of welding particles size is shown in relation to the more familiar types of dust and fume. The respirable fractions of particles (especially less than 3μm) are potentially the more harmful as they can penetrate to the innermost parts of the lung.

Gases

Gases encountered in welding may be:

- Fuel gases which, on combustion, form carbon dioxide and, if the flame is reducing, carbon monoxide;

- Shielding gases such as argon, helium and carbon dioxide, either alone or in mixtures with oxygen or hydrogen;

- Carbon dioxide and monoxide produced by the action of heat on the welding flux or slag;

- Nitric oxide, nitrogen dioxide and ozone produced by the action of heat or ultraviolet radiation on the atmosphere surrounding the welding arc;

- Gases from the degradation of solvent vapours or surface contaminants on the metal.

The degree of risk to the welder's health from fume/gases will depend on composition, concentration, the length of time the welder is exposed, the welder's **susceptibility.**

Health hazards from particulate fume

The potential hazards from breathing in particulate fume are:

1. Irritation of the respiratory tract. Fine particles can cause dryness of the throat, **tickling, coughing** and if the concentration is particularly high, tightness of the chest and difficulty in breathing.

2. Metal fume fever. Breathing in metal oxides such as zinc and copper can lead to an acute **flu**-like illness called 'metal fume **fever'**. It most commonly occurs when welding galvanized steel; symptoms usually begin several hours after exposure with a thirst, cough, headache, sweat, pain in the **limbs** and fever. Complete recovery usually occurs within 1 to2 days of removal from the exposure, without any lasting effects.

3. Longer term effects. The continued inhalation of welding fume over long periods of time can lead to the deposition of iron particles in the lung, giving rise to a benign condition called **siderosis.** There is evidence that welders have a slightly greater risk of developing lung **cancer** than the general population. In certain welding situations, there is potential for the fume to contain certain forms of chromium and/or nickel compounds – substances which have been associated with lung cancer in processes other than welding. As yet, no direct link has been clearly established.

Nevertheless, as a sensible precaution and to minimize the risk, special attention should be paid to controlling fumes which may contain them.

Additional hazards

A number of other specific substances known to be hazardous to health can be found in welding fume such as barium and fluorides which do not originate from the metal. If the metal contains a surface coating, there will also be a potential risk from any toxic substances generated by thermal degradation of the coating.

Health hazards from gases

The potential hazards from breathing in gases during welding are:

1. Irritation of the respiratory tract. Ozone can cause delayed irritation of the respiratory tract which may progress to bronchitis and occasionally pneumonia. Nitrogen oxides can cause a dry irritating cough and **chest tightness**. Symptoms

usually occur after a delay of 4 to 8 hours. In severe cases, death can occur from **pulmonary oedema** (fluid on the lungs) or **pneumonia**.

2. Asphyxiation. There may be a risk of asphyxiation due to replacement of air with gases produced when welding in a workshop or area with inadequate ventilation. Special precautions are needed when welding in confined spaces where there is the risk of the buildup of inert shielding gases. Carbon monoxide, formed as a result of incomplete combustion of fuel gases, can also cause asphyxiation by replacing the oxygen in the blood.

Establishing safe levels of fume in the workplace

The COSHH Regulations* require that **exposure** is controlled below specific limits. The limits, known as occupational exposure limits, are detailed in EH 40 which is revised periodically. The majority of limits listed are for single substances. Only a few relate to substances which are complex mixtures; welding fume is one of these. It has an occupational exposure limit but account must also be taken of the exposure limits of the individual constituents. So, in considering what would be safe exposure levels to welding fume, not only should exposure be controlled to within the welding fume limit but also the individual components must be controlled to within their own limits. The assessment of exposure to fume from welding processes is covered in EH 54.

Substances may have a maximum exposure limit (MEL) or an occupation exposure standard (OES).

A MEL is the maximum concentration of an airborne substance to which people may be exposed under any circumstances. Exposure must be reduced as far as is reasonably practicable and at least below any MEL. An OES is the concentration of an airborne substance, for which (according to current information) there is no evidence that it is likely to cause harm to a person's health, even if they are exposed day after day. Control is thought to be adequate if exposure is reduced to or below the standard.

The OESs and the MELs of some of the substances found in welding fume are listed in Table below; the absence of other substances from this list does not indicate that they are safe. If the fume contains only substances such as iron or aluminum which are of low toxicity, an 8 hour (TWA) OES of 5mg/m3 applies; this figure is the

average concentration of particulate fume that should not be exceeded in an 8 hour day.

*** Control of Substances Hazardous to Health (COSHH) Regulations.**

The Control of Substances Hazardous to Health (COSSH) Regulations 2002 requires employers to monitor the safe use of chemicals and hazardous substances at work. It requires them to: control exposure to hazardous substances to prevent ill health both now and any future cumulative effects they may have, protect both employees and others who might be exposed, compile records of employees using these materials, supply employees with suitable personal protective equipment.

Дайте письменно ответы на вопросы:

1. What is the difference between welding fume and welding gas?
2. What does the major part of the particulate fume arise from?
3. What does the degree of risk to the welder's health from fume or gases depend on?
4. Under what condition is control over the exposure of welders to hazardous fumes or gases considered adequate?
5. Do the COSHH Regulations state only single substances?