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MODULE M

Safety at work welding trade atmospheres

Health and safety risks when shielded welding



Health and safety risks when shielded welding

- Risks arising shielded welding are similar to other types of fusion welding.
- Threatens thus, electric shock, burns.
- At stainless steel welding shielding gas is argon risk of ozone.
- At welding of high alloy steels oxides of the alloying elements, particularly nickel and chromium, so it must be ensured proper extraction.



Threats to health damaging effects of radiation

- ▶ During welding, the arc generated radiation infrared (heat), visible, and ultraviolet.
- ▶ At TIG welding (TIG), then additionally frequency radiation and intense UV radiation, which arises because of the long arc which is not protected (slag from the package).
- ▶ None other radiations during normal welding arises.
- ▶ Welder is obliged to protect the prescribed PPE. See CSN 05 0601, Annex A.
- ▶ Ordinary and reliable protection of all parts of the body welder's health is absolutely necessary.



Threats to health damaging effects of radiation

- ▶ On the welding work to be used in curtains, covers, curtains, order not to jeopardize other workers and outside the welding station.
- ▶ For deployment of these curtains, covers and curtains (they must be made of material prescribed by the standard) is responsible welder.
- ▶ Resources noise must be placed outside the welding work to the worker as much as possible to protect against noise.



Exceeding the tolerable microclimate conditions

- ➡ Against radiant heat welder is protected by the PLO.



Work with increased risk

- Before beginning the welding work must be evaluated areas in which the weld and adjacent areas (above, below and beside the weld) whether there is a job with an increased risk.
- Working with an increased risk of such work, during which there is an increased risk of injury (electric shock, burns, suffocation, poisoning), or permanent damage to health (welding aerosols, radiation, noise) or a fire or explosion.



Work with increased risk

- ▶ It is mainly the following welding work:
 - ▶ In enclosed and confined spaces (pressure vessels, boilers, tanks, deck boats, etc.)
 - ▶ In wet, damp or hot conditions, reducing the electrical resistance of protective equipment and the human skin.
 - ▶ On the containers, piping, and which contain or are contaminated with substances hazardous to health (toxic, corrosive, etc.)
 - ▶ Areas with risk of fire or explosion.
 - ▶ Vessels, piping and equipment which are under pressure or containing flammable or combustion supportive material (gasoline, diesel, etc.)
 - ▶ Under water,
 - ▶ In an environment exceeding the maximum permissible concentration of dust, fumes or gas welding. other pollutants in the working environment (see CSN 05 0600)
 - ▶ In a higher radiation intensity than it is hygienically acceptable,
 - ▶ To work with lasers class IIIb and IV., or electron welding, it is not excluded hitting a worker or reflected beam,
 - ▶ Workplace where the equivalent noise level exceeds the maximum permitted n (see DIN 05 0600).



Work with increased risk

- ▶ For work with an increased risk we consider welding work on tanks, pipes and equipment, which can not reliably determine whether their content is dangerous.
- ▶ With the increased risk of weld is permitted only on the written word and the fulfillment of all it ordered security measures.
- ▶ For issuing a written order and fulfillment ordered additional security measures corresponding to authorized personnel.
- ▶ An authorized officer is the person designated by the employer (the head of the department where it will be welded).
- ▶ Must be a qualified person ensure that activity for the entire period of service with increased risk.



Work with increased risk

- ▶ If necessary (assembly, welding by private persons) may be authorized commissioned officer and welder, it is because of their qualifications, assumptions or otherwise unable to work these organizational arrangements.
- ▶ Authorized officer fills in part related to the workplace, workers and ordered security measures written statement. Written order is filled at least in triplicate. The original and the first copy will receive a welder, a second copy gets accredited organizations authorized worker whose job is to fill this command. Copies of the order will be passed after the end of work, another employee who is responsible for the safe completion of work.
- ▶ The information in the written statement must be clear, it must be given validity period of the order, if necessary, and supervision of other staff.
- ▶ Written order for repetitive work can be replaced by an approved technological procedure.



Safety rules during welding electrocution

- ▶ Welding electrocution
- ▶ §7 (1) Is of electrical conductors are placed on the non-flammable insulating substrate.
- ▶ §7 (2) Replacing the electric wires and welding the terminals other than those specified or approved leads and terminals (e.g. various metal objects, parts, constructions, chains, ropes) is not permitted.
- ▶ §7 (3) The arc welding in a hazardous area with subsequent fire, the electrical power sources are placed outside this environment, unless the manufacturer or importer possible otherwise.

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Safety rules during welding electrocution

- §7 (4) In the arc welding electrode holder with delay in order to prevent accidental arcing and splashing molten metal.
- §7 (5) Butts electrodes are deposited on a designated safe place (e.g. into a fireproof container with sand).
- §7 (6) The welded item must be provided so that when an electric current passes through the welding other than the designated routes and for other than the designated subjects. These paths and objects should be determined so as to avoid the possibility of fire.
- §7 (7) After the welding is to be disconnected from the welding power source.

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Welding work according to CSN 05 0600 and Decree 87/2000 Coll.

- ▶ Section 5 Welding work
- ▶ Section 5 (1) Welding work intended for welding project documentation is considered stable welding work; others are considered temporary welding work.
- ▶ Section 5 (2) Welding work is secure so as to avoid especially
 - a. Fire or explosion followed by fire and fire spread.
 - b. The creation of obstacles which impede or prevent the escape of persons.
 - c. Endangering the lives and health of people the fundamental and specific risks.
- ▶ These requirements also apply to adjacent spaces.

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Welding work according to CSN 05 0600 and Decree 87/2000 Coll.

- ▶ §5 (3) Parts and materials of the welding work are deployed so as to retain the possibility of free passage and confined and avoid collision points. Welding equipment to ensure, so as to prevent movement or the movement of their parts, and the damage that would lead to the emergence or spread of fire or explosion followed by a fire with a possible aggravation of the conditions for the escape of persons.
- ▶ §5 (4) The weld material is deposited on the work so as to prevent movement or moving parts, the system which may cause damage to the welding device, in particular damage to moving parts of the conductors and electrical welding equipment, gas piping, hoses, damage could lead to the emergence or spread of fire or explosion and the subsequent fire.

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Welding work according to CSN 05 0600 and Decree 87/2000 Coll.

- ▶ Section 5 (5) Transitional welding workplaces are equipped with appropriate fire extinguishers and other extinguishing agents under special legislation. Besides these extinguishers are still fitted with at least two portable fire extinguishers with a suitable filling, of which one portable fire extinguisher powder extinguishing agent with a weight of 5 kg. In the case of welding in the flat with respect to the type of welding, unless they are directly threatened by the other areas is minimal equipment one portable fire extinguisher powder extinguishing agents, weighing less than 5 kg.
- ▶ Section 5 (6) Of fixed welding workstations can not save or store flammable and combustible supporting substances unless they are part of the technology. In the event that such matters in the technology necessary to determine the fire safety measures to prevent the possibility of occurrence and spread of fire or explosion followed by fire and ensure the containment and evacuation.

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Welding work according to CSN 05 0600 and Decree 87/2000 Coll.

- ▶ Section 5 (7) commands and prohibitions, or other important information on the welding workplace and on devices characterized by safety markings. Warning and table specifying the type and quantity of gas cylinders are placed also at the entrance to the facility where they are placed.
- ▶ Section 5 (8) When welding in areas from 2 m height over the places to be protected from the effects of these works, in terms of fire protection department provides protection zones. The band lays down the minimum distance from which prior to the commencement of welding remove flammable materials and ensure their safe isolation, or to implement other effective measures, especially against the effects of hot particles. Protective zones in terms of fire protection set individually with regard to the technology used and the welding process so that the center of the protection zone is always the point of welding minimum is determined by a circle with a radius of 10 m in the horizontal plane. When welding at altitudes in excess of 2 m for each additional 1 m in height extending protection zone of at least 0.3 m to 7 m in height; for each additional 1 m in height extending guard band of 0.1 m up to 20 m. These increments are added to the radius. Protective zones for welding performed at heights exceeding 20 m are set individually. When applying the technology using compressed gas (e.g. oxygen cutting) and the interaction of the airflow with the air velocity exceeding 1 m.sec⁻¹ protection distance extending into the area defined by an ellipse and a distance of 20 m according to an individual assessment of the fire hazard.

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Welding work according to CSN 05 0600 and Decree 87/2000 Coll.

- ▶ §5 (9) Fixed welding workplaces with a distinct demarcation method characterized
 - a) Fire safe distance, if the definition provided in the documentation for the device, or,
 - b) Protection band.
- ▶ §5 (10) Current leads and gas distribution tube for welding device are passed and stored so as to avoid damage sharp folds, the material, grease, chemicals, the effects of the welding process and the like. In case of danger of mechanical damage, the device protects the hard cover .

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Welding work according to CSN 05 0600 and Decree 87/2000 Coll.

- ▶ § 5 (11) If any part is damaged welding equipment, welding can not start or to continue.
- ▶ §5 (12) For welding with a hydraulic drive device that utilizes flammable working fluids are a possible leakage place combustible media protected housings similarly as in the presence of flammable substances.
- ▶ §5 (13) Welding machines and equipment in the space in which can cause dangerous concentrations can only be made on machines and equipment that can not be removed from the compartment. From space machinery it is necessary to remove the combustible dust, to prevent dust escaping into the space in machinery and equipment, and measure the concentration of explosive dust in the air before the start of welding and during.

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Welding work according to CSN 05 0600 and Decree 87/2000 Coll.

- ▶ §5 (14) The welding can be performed only on machines and equipment that are blocked against unwanted actuation.
- ▶ §5 (15) The replacement of fresh air supply of oxygen is unacceptable.
- ▶ §5 (16) In areas where there may be flammable gases, vapors or dusts are not placed gas cylinder for welding or acetylene, and the current source of electrical energy to the welding work. At each exit of these spaces are removed from spaces burners and gas supply hose for welding.
- ▶ § 5 (17) Containers, pipes and devices, which can not reliably determine whether their contents are not dangerous fire, proceed as if the fire was dangerous.

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Welding work according to CSN 05 0600 and Decree 87/2000 Coll.

- ▶ §5 (18) There is a risk withdrawal of the welding wire or hoses attach these to the fixed structure or to any other suitable solid device.
- ▶ § 5 (19) As subscription welding more persons determined to advance the way of mutual communication.
- ▶ § 5 (20) Instructs the welder to turn on the power source or circuit once it is ready to begin work and took up work position.

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General principles of safety according to CSN 05 0601 and Decree 87/2000 Coll.

- ▶ Applies to all welding methods
- ▶ Permission welding
- ▶ Welding services can perform:
- ▶ Persons who have a valid welding certificate or a certificate of welding worker, the appropriate type of course and scope of approval according to CSN 05 0705 (possibly by a series EN 287, EN 1418, CSN 05 0710).
- ▶ Persons who are training in welding under the direct supervision of a professional welding instructor.

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