

1. Introductory information

Welding work - it is understood as the performance of work related to the preparation for welding (cutting, grinding, processing), welding by various methods and cutting metal parts with a torch.

Welding methods (mostly spotted on LG's territory):

- 111 - arc coated electrode (MMA) ①,
- 114 - arched self-shielding flux-cored wire,
- 121 - arc covered with a wire electrode,
- 131 - consumable electrode shielded with inert gases (MIG) ①,
- 135 - consumable electrode shielded by active gases (MAG) ①,
- 136 - cored wire in active gas shield,
- 137 - cored wire in an inert gas shield,
- 141 - non-consumable tungsten electrode in an inert gas shield (TIG) ①,
- 31 - oxygen-acetylene.

Cutting methods:

- 311 - oxygen-acetylene,
- 83 - plasma (PAW) ②,
- 312 - propane / oxygen ③.



①



②



③

2. Mandatory personal protective equipment of the welder

1. Requirements for the welder's work wear:

- in accordance with EN ISO 11612 & 14116 - flame-retardant, hardly fusible,
- in accordance with EN 11611 - class 1 - welding with a small limit of splashes,
- in accordance with EN 1149-5 - electrostatic clothing.

2. Requirements for work shoes:

- in accordance with EN 20349 - work shoes class S3, resistant to sparks and splashes.

3. Requirements for protective gloves:

- in accordance with EN 407 - gloves protecting the welder against small splashes and burns.

4. Requirements for the protection of the eyes and face of the welder:

- in accordance with EN 169 - standard welding filters (for welding shields, glasses),
- in accordance with EN 379 - automatic welding filters (for welding helmets).

Remember!

When performing welding work, it is required having and using appropriate personal protective equipment:

- a) eye protection depending on the welding method used,
- b) suitable work shoes for welding work,
- c) suitable work clothes for welding work,
- d) depending on the type of work - other adequate PPE.



EN ISO 11612:2015
A1 A2 B1 C1



EN ISO 11611:2015
A1 A2 CLASS 1



EN 1149-5:2008

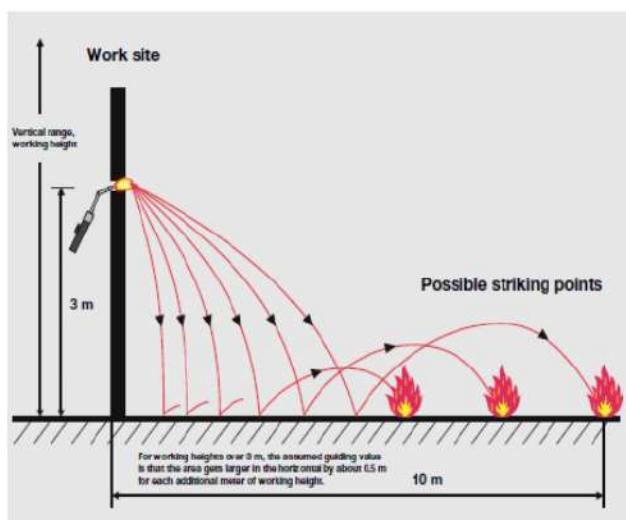
Appropriate marking of the welder's work wear confirms that the clothing complies with certain standards - it is not allowed to use work wear other than those intended for this purpose and without the CE marking.

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5. Requirements for the welder's respiratory protection:

- Complies with **EN 175** and **EN 12941** standards - airflow helmets and protection for arc welding, plasma cutting, gouging and grinding and for welding work in confined spaces, where the requirements define:
 - **Standard 10. Work on suspended ceilings**
 - **Standard 11. Works in tanks, tunnels, canals.**
- FFP2 class single-use respirators compliant with **EN149**,
- Reusable filtering half masks with replaceable filters in accordance with **EN 143** standard.

1. The area of work in which welding works are performed should be adequately protected against entry by outsiders by means of various types (bollards, white-red tapes, portable railings or portable steel fences).
2. Welding, grinding and gouging stations should be equipped with handheld fire extinguishing equipment - powder extinguishers with the mass of the extinguishing agent at least 4 kg, intended for extinguishing fires of ABC groups and fire blankets - in the amount of at least, 1 set for 2 welding stations. If the welding stations are remote from each other by at least 20m - each of them should be equipped with portable extinguishing agents.
3. Welding stations, if possible, should be shielded with special screens protecting against harmful UV radiation, if their use is not possible for various reasons, the stations should be shielded with a steel fence at least 1.5 m high and a permanent structure impervious to rays. or another type and method of effective protection of the site (non-flammable sheet, sheet metal).
4. Welding, grinding and gouging stations should be free of all flammable substances and other substances which, in contact with sparks or flame, could lead to fire, fire or explosion, at a safe distance at least 5m from the site.
5. If welding, cutting or grinding is performed in an open space - it should be performed only in favorable weather conditions, performing the above-mentioned activities in rainy and / or stormy weather is not allowed.



6. When welding or cutting with a gas burner, the potential area of fire from fragments of hot metal elements should be anticipated and appropriate and effective security measures to prevent fire or burns to other employees or third parties, or damage to property.

Remember!



Work gloves, work clothes and work shoes of the welder.



Handheld extinguishing agents, with which welding stations should be equipped should be operational and complete and should be replaced immediately after use. The contractor is obliged to provide an appropriate amount of extinguishing agents on his own.

3. Compulsory measures of collective protection

4. Mandatory documentation of the welder

1. Welding, gouging, and torch cutting are activities that a person can perform with the appropriate permissions.
2. Each welding method requires separate qualifications, such qualifications are valid for 2 years, provided that the welder performs the work on an ongoing basis, if not - the qualifications expire after 6 months.
3. Documents authorizing to conduct welding works, in accordance with legal regulations, are:
 - a) Welder's book,
 - b) Welding certificate
 - c) Certificate of completion of the course
4. A subcontractor directing employees to welding works should have copies of their employees' licenses and copies of medical certificates confirming having appropriate health predispositions to perform this type of work.

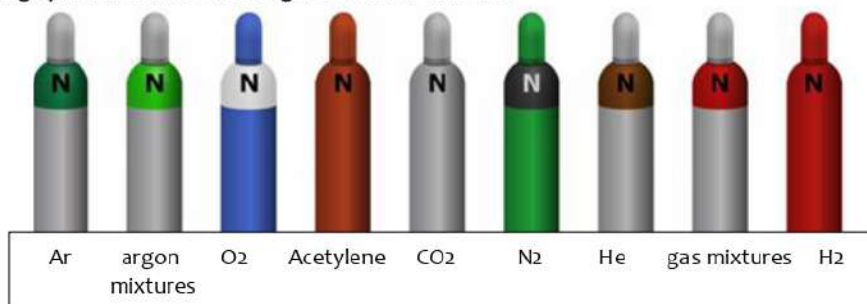
IMPORTANT! It is not allowed to commission welding work to an employee who has not undergone appropriate medical examinations verifying his health predispositions for this position.

5. Rules for the storage of technical gases

1. When performing welding work (welding, gouging, cutting with a torch), various types of compressed technical gases or their mixtures are used:

- Argon (Ar),
- Oxygen (O₂),
- Nitrogen (N₂),
- Carbon dioxide (CO₂),
- Hel (He),
- Argon mixtures (Argon + CO₂),
- Flammable gas mixture (Propane-Butane),
- Acetylene,
- Hydrogen (H₂).

2. Marking cylinders with technical gases or their mixtures



Risks related to the use of technical gases:

- oxygen - increases the combustion process, small flame -> large flame
- CO₂ - risk of abnormal levels of carbon dioxide in the blood (hypercapnia) which can lead to poisoning, brain swelling and death.
- inert (shielding) gases, e.g. Argon, used in welding processes and located in, for example, welded pipelines, may lead to unconsciousness or even asphyxiation (displacement of air).

Remember!



Combustible gas cylinders and non-flammable can be stored in one room, except for cylinders with oxidizing gases. Acetylene cylinder storage and oxygen at the same time (in one place) is strictly prohibited.

Manual rolling of the cylinder in a nearly vertical position is allowed only within the welder's workstation, while rolling in a horizontal position is prohibited.

Liquefied gas cylinders weighing up to 11 kg have a maximum storage capacity standing in 3 layers.



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3. All technical gas cylinders must have a UDT regulatory decision (legalization), which is most often issued for a period of 10 years (depending on the technical condition of the cylinder, the period may also be shorter). Confirmation of legality is the date of the next technical examination (or glued in the form of a label) on the cylinder permanently stamped on the cylinder. The maximum lifetime of a cylinder is usually 20 years from the date of manufacture.
4. Technical gas cylinders should have labels confirming compliance with transport regulations (ADR) in accordance with the EN 1089-3 standard.



- ① R and S phrases - risk warnings and safety recommendations
- ② Hazard decals (in accordance with ADR)
- ③ Chemical formulas of gases or mixtures
- ④ Name of the product
- ⑤ Option: EEC number for single-component gases or the wording "Gaseous mixture"
- ⑥ Full identification of the gas (in accordance with ADR)
- ⑦ Manufacturer's instructions
- ⑧ Name, address, telephone number of the manufacturer

5. Labeling technical gas cylinders on your own, making any changes in terms of their technical condition (grinding, welding, gluing, painting) is not allowed.
6. Technical gas cylinders when used for welding work and storage should be positioned vertically or tilted (max. 45 ° from the vertical) in a dedicated stand (trolley) and properly secured against falling (fastened with belts or chains), due to the high pressure of gases (150-300 bar).
7. It is forbidden to leave cylinders with technical gases in direct sunlight and exposure to high temperatures (e.g. direct open fire, leaving heat sources nearby - heaters). When working outdoors, the cylinders should be protected against sunlight.
8. The storage of technical gas cylinders in the facilities and areas of the plant is possible only after obtaining the consent of the LG Department responsible for a given building or area, after meeting the guidelines of this department and informing the Plant Fire Department about this fact. In other cases, the technical gases must leave the internal areas after completion of the work.
9. The worker responsible for supervising the work and welders should be trained and have knowledge and skills in the use of portable extinguishing agents in case of a fire. All such situations should be immediately reported to the Plant Fire Department and the LG Health and Safety Department.

IT IS FORBIDDEN TO STORE TECHNICAL GAS CYLINDERS AND MAKE IT WELDING WORK IN AREAS WHERE THERE IS A RISK OF EXPLOSION!

Remember!



Cylinder legalization marks with technical gases are placed in the upper part of the cylinder near the valve.



Trolley intended for the transport of cylinders with technical gases should be technically efficient and have equipment preventing spontaneous displacement and tipping over.

The welder is not allowed to perform unauthorized repairs in the area of reducers and cylinder valves. These activities require appropriate authorizations in this regard.

Places e.g. rooms, warehouses intended for the storage of cylinders with technical gases should have appropriate markings and fire resistance class specified in separate regulations.

Remember!

Reducers, manometer housings, knobs, indicators should be fully operational, undamaged and not cracked. If they are damaged, they must be replaced.

The torch fuses should be used during welding (cutting, gas welding).

Welding hoses cannot be cracked, especially at the burner, clamps should be used to connect them. Hose length min. 5 m, max. 20 m. It is possible to extend the hoses by at least 4 meters.

6. Rules for performing welding works

1. Performing welding works is possible only after obtaining a permit to perform such works by the Health and Safety Department of LG and the Plant Fire Department.
2. If the performance of welding works requires deactivation of fire-fighting devices - the Contractor of such works must obtain an additional permit to deactivate these devices. In other cases (e.g. when working in areas without fire protection devices), the condition set out in point a.
3. Before starting the work, the employees designated to perform welding activities should have appropriate personal and collective protective equipment as well as appropriate qualifications and health predispositions - for which the supervision of the contractor is responsible to check.
4. The equipment and fittings intended for the performance of works should be checked in terms of their technical efficiency by the performing employee these works and by the supervision of employees. The use of devices is not allowed and inefficient, damaged tools, the use of which may create a threat for people and the environment.
5. Contractor is responsible for the proper organization of workstations and the safe flow of people as well as vehicles and devices in the place where welding works are carried out.
6. The number of employees assigned to carry out welding work should be kept to the minimum necessary (to reduce the risk of exposure against UV radiation and the harmful effects of gases generated in the welding process), while ensuring that everyone has the same protective equipment (PPE).
7. If welding work involves the use of equipment for work at height and / or other devices (e.g. electrical) under certain conditions - these works should be carried out in accordance with the provisions contained in the relevant health and safety standards.
8. After the completion of welding works, the Contractor's Supervision is obliged to inspect the place (area) of the work for the first time right after the end of the work and again if it possible 4 hours from the end of the work.
9. Workstations where welding work was performed should be properly arranged, the materials stored in them should not obstruct communication and create a fire hazard.
10. **Welding stations** should be organized in accordance with the health and safety regulations specified in the regulation¹:
 - 1) a minimum room height of 3.75 m and at least 2 m² of free floor space (per each position) made of non-flammable materials, not occupied by devices and 15 m³ for each employee in the most numerous shift (permanent welding stations),
 - 2) room walls or screens should be made of non-flammable material, suppressing optical radiation and have a height of at least 2m maintaining a ventilation gap at the floor level.
 - 3) Welding rooms should be equipped with an effective ventilation system (extraction of harmful gases), a welding table and appropriate equipment enabling safe performance of works.



¹ Regulation of the Minister of Economy of April 27, 2000 on occupational health and safety at welding works

7. Good and bad practices in welding works



The storage of technical gas cylinders in places not intended for this is prohibited. It is necessary to properly label, protect and classify which types of gases may be stored with others and which may not.

Welding stations intended for long-term welding should adequately protect against the effects of adverse weather conditions and should be equipped with extraction devices.



Performing welding works it is strictly forbidden without appropriate personal protective equipment and other safeguards. Welding in Clean Room zones does not release the employee from the use of appropriate work clothes and work shoes, as well as UV screens and extraction devices.



Additionally, you should pay attention to closing the welding circuit with the ground wire. It should be placed as close to the welding point as possible.



Remember!

During welding work, it is forbidden to hang welding hoses on shoulders, knees and in the course of installations and devices that if the hose is damaged and leakage of technical gas pose a risk of fire.



The profession of welder occupies one of the leading places in terms of harmfulness and nuisance. Substances and chemical compounds that are formed in the welding process contribute to the emergence of a number of diseases and occupational diseases.

The most dangerous of them include: oxides (nitrogen, lead, iron, nickel, beryllium, thorium, carbon), chromium, manganese, ozone, carbonyl chloride, methanol, and hydrogen cyanide acid.

The only way the reduction of the impact of these harmful substances on the human body is the appropriate use of personal protective equipment (especially respiratory protection).

