THE SOCIALIST REPUBLIC OF VIETNAM

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NATIONAL TECHNICAL REGULATION ON OCCUPATIONAL SAFETY FOR ELECTRIC WELDING MACHINE AND ELECTRIC WELDING JOBS

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FOREWORD

QCVN 3: 2001/BLDTBXH – National technical regulations on occupational safety for electric welding machines and electric welding jobs compiled by the Department of Occupational Safety, promulgated by the Ministry of Labour, War Invalids and Social Affairs under the Circular No. 20/2011/TT-BLDTBXH of July 29, 2011 after obtaining the appraising opinions from the Ministry of Science and Technology.

NATIONAL TECHNICAL REGULATION

ON OCCUPATIONAL SAFETY FOR ELECTRIC WELDING MACHINE AND ELECTRIC WELDING JOBS

1. General provisions

1.1. Scope of regulation

This technical regulation prescribes the general requirements on safety for electric welding machines, electric welding and electric welding in special conditions and for electric welding jobs; it is required to observe the other relevant provisions apart from these.

1.2. Subjects of application

This Regulation is applicable to:

1.2.1. Organizations and individuals manufacturing, exporting, importing, circulating and using electric welding machines.

1.2.2. State management agencies and other relevant organizations and individuals.

2. Provisions on techniques

2.1. General provisions

2.1.1. Electric welding may be organized stationarily outdoors or in workshops, or temporarily in constructions.

2.1.2. For the selection of welding technology process, apart from ensuring the safety against electric shock, it must anticipate the possibility of dangerous and hazardous factors (mechanic injuries, toxic gases and dust, heat radiation, infrared rays, noise, vibration…) and concurrently take labour hygiene and safety measures to eliminate such possibility.

2.1.3. The metal cover of welders must be safety-connected (ground connected or “air” connected) under TCVN 7447 (IEC 60364). In case that TCVN is changed or supplemented, it is required to apply the latest provisions.

2.1.4. When carrying out electric welding at the places with risks of fire or explosion, it is required to observe the safety regulation on prevention and fighting of fire and explosion.

2.1.5. When carrying out electric welding in chambers, tanks, boxes and reservoirs, it is required to provide ventilation, appoint supervisors, take particular safety measures and obtain permission and approval from responsible persons.

It is forbidden to perform welding in cellars, chambers, tanks, and reservoirs under pressure or containing inflammable or explosive substances.

2.2. Requirements for technology process

2.2.1. When making the welding technology process, it is necessary to estimate the options of mechanization and automation, concurrently take measures for suppressing and preventing dangerous and hazardous factors for workers.

2.2.2. When performing electric welding, it is necessary to use solders, welding wires, solder stick coasting… that do not produce toxic substances, or the concentration of toxic substances does not exceed the allowed limit.

2.2.3. It is only allowed to supply electricity to arc welding from welding electricity generators, welding transformers and welding rectifiers. It is forbidden to directly supply electricity to arc welders from the dynamic, lighting and tram electric network.

2.2.4. The connection diagram of welding electricity sources being supplied to arc welding must ensure that the voltage between the electrodes and the welded parts of no load does not exceed the no load voltage of one of the welding power supply.

2.2.5. The independent welding machines as well as welding machine clusters must be protected with fuses or circuit-breakers in the supply. The welding machine clusters, apart from the protection in the supply, must also be protected by circuit-breakers on general wires of the welding circuit and fuses on each wire that leads to the welding machine.

2.2.6. It is allowed to use soft wires, metal bars with any cross section shape but must ensure the required sectional-area, the welded plate or the welded structure itself as the inverse wire that connects the welded part with the welding power supply. It is forbidden to use pipes not being welded objects as inverse wires.

It is forbidden to use air, ground connection networks, structures made of metal or technological equipment not being welded objects as inverse wires.

Inverse wires must be firmly connected to the electrodes of the power supply.

2.2.7. When moving welding machines, it is necessary to cut off their power supply. It is forbidden to repair welding machines when the power is on active.

2.2.8. When the electric welding is stopped, it is required to disconnect the welding machine from the electric network. When the electric welding is done, apart from disconnecting the welding machine from the electric network, the wire connected with the welding clip must also be disconnected from the power supply and put into the rack made of heat-insulated material.

For welding power supply being DC generator, it is required to cut the DC first, then, cut the AC being supplied to the welding generator engine.

2.2.9. When performing arc welding by hand, it is required to use the welding clips made of electric-insulated and heat-resistant material with wire holders ensuring that the wire would not come off.

Must not use welding clips with under-passing wires for the welding current over 600A. In this case, the welding machines must be equipped with no load current suppressors.

2.2.10. On the control mechanism of the welder must contain notes, numbers or notations specify its functions. All the control mechanisms of a welder must be carefully located and covered to avoid accidental connection and disconnection.

2.2.11. In the electric panel or the contact welding machine clusters equipped with exposed conductive parts of primary voltage network, it is required to install the interlocking system to ensure the electric disconnection when opening the panel doors. In case the interlocking system is not available, the electric panel can be locked with usual locks, but the welding current adjustment must be performed by electricians.

2.2.12. Contact welders with metal melting process must be equipped with the shield that blocks molten metal stream and ensure the safe observation of the welding process.

2.2.13. The workshops where regularly assemble and weld large metal structures need to be equipped with assembling and lifting racks.

2.2.14. When performing welding that produces dust and gases, as well as welding in chambers, tanks and reservoirs, or welding large parts from the outside, it is necessary to use mobile partial sucking spout and firmly, rapid assembling devices to ensure supplying fresh air and removing toxic gases from the working area of welders.

2.2.15. When welding inside the cellars, tanks, chambers and reservoirs, the welding machine must be put outside and supervised by the qualified person in safety techniques. The welder must wear insulated shoes and gloves or lifeline and the lifeline must be connected to the supervisor's place. It is required to conduct the ventilation at speed of 0.3 – 1.5 m/s. It is required to ensure that the cellar, tanks, chambers and reservoirs are free from toxic or inflammable gases before sending welders in.

When welding using AC in particularly dangerous work conditions (in metal containers, in chambers with high risk of dangers), it is required to use no load current suppressors in order to ensure the workers' safety when replacing solder sticks. If such equipment is not available, other safety measures must be taken.

2.2.16. When welding heated products in a welding chamber, only one person is allowed to work. For some technological requirements, two persons shall be allowed to weld on the same part.

2.2.17. The electric welding must not be carried out at welding positions without fire prevention measures.

2.2.18. When welding from a height, the platform must be made of non-flammable (or hardly-flammable) material. The welders must wear lifelines, toolbags and spare solder sticks.

2.2.19. It is required to take safety measures when welding from different heights and not letting heated metal drops, spare solder sticks and other material fall to people working below.

2.2.20. When performing welding outdoors, above the welding machine and the welding position must be equipped with hoods made of non-flammable material.

If the hood is not available, the work must be stopped when raining.

2.2.21. The submerged welding must comply with the following requirements:

2.2.21.1. Only welders who are granted the diver certificates and grasp thoroughly the work characteristics may perform.

2.2.21.2. It must have the working plan approved by competent persons.

2.2.21.3. It must be supervised by persons who grasp thoroughly the work from above and may keep in touch with the submerged welder.

2.2.21.4. The device of connecting and disconnecting and for welding must be well prepared and ready to eliminate and rectify problems.

2.2.21.5. The welder must not work underwater if there is oil slick on the water surface.

2.3. Requirements for section of production, arranging equipment and organizing the workplace

2.3.1. In production sections where the opened arc welding is performed, it is required to put partitions made of non-flammable material.

2.3.2. In places where the electric welding that produces toxic substances (toxic gases and hazardous radiation…) is performed, it is required to equip such places with appropriate safety facilities, provide supplying and sucking ventilation.

2.3.3. The walls and equipment in the welding workshop must be painted grey, yellow or blue in order to absorb light and decrease the reflection of arc. It is recommended to use paints able to absorb ultraviolet rays.

2.3.4. In welding workshops, the welded parts and assembling welded parts must satisfy the conditions for microclimate under the current provisions. The sections of the assembling welding workshop must have supplying and sucking ventilation.

It is required to provide partial ventilation when welding in chambers. The sucked air must be emitted outside the supplied air area.

2.3.5. It is required to identify the concentration of toxic substances in the breathing and working area of welders under the current provisions.

2.3.6. The quantitative inspection of X-ray in weld inspection must comply with the current provisions on labour hygiene and safety.

2.3.7. The welding and assembling workshops must be equipped with general lighting or mixed lighting system that ensure adequate brightness as prescribed.

The lighting when welding in tanks, chambers and reservoirs may be set up using portable lights fed by safe power supplies of which the voltage does not exceed 36V for AC and 48V for DC with protective screen attached, or using direction lights illuminating from outside. The transformers used for portable lights must be put outside the working place. The secondary coil of the transformer must be safety-connected. It is forbidden to use auto-connected transformers to feed portable lights.

2.3.8. It is forbidden to use or preserve fuel, inflammable and explosive material in places where electric welding is performed.

2.3.9. The distance between the welding machines must not be closer than 1.5 meters. The distance between automatic welding machines must not be closer than 2 meters.

2.3.10. When arranging argon arc welding machines and performing welding in carbon dioxide environment, the possibility of gas permeability and leakage to adjacent chambers must be eliminated.

2.3.11. The wire length from primary power supply to the portable welding equipment must not longer than 10 meters.

2.3.12. Regular arc welding of small and medium products must be performed in welding chambers. The chamber wall must be made of inflammable material, the minimum gap between the wall and the floor is 50mm. When welding in environment with protective gases, this gap must be at least 300mm. The area for each welding position in the chamber must not be lower than 3 m^2. The welding positions must be separated by inflammable partitions.

2.3.13. The electric welding area must be isolated from other area. For some technology process requirements, it shall be allowed locating welding positions alongside other areas, the positions must be separated by inflammable partitions.

2.4. Requirements for material, blanks, preservation and transportation.

2.4.1. The blank surface must be dried and cleaned off paint, rust, oil and dust. The edges of blanks and parts before welding must be ground.

2.4.2. It is required to use non-explosive, non-flammable and non-toxic substances when eradicating grease on the surface of the welded item.

2.4.3. The preservation, transportation and loading of welding blanks, welding material and finished products must not affect the equipment safety operation or block natural lighting, ventilation, pathways, or obstruct the use of fire and explosion prevention equipment and personal safety equipment.

3. Provisions on occupational safety management in manufacturing, importing, exporting, circulating and using electric welding machines.

3.1. Provisions on ensuring welding machine safety in manufacturing and importing before selling.

Welder manufacturers must fulfill the requirements for quality control as follows:

3.1.1. Applying the management system in order to ensure that the manufactured and imported welding machine quality is consistent with the applied regulation.

3.1.2. Publication of the applied regulation

Manufacturers, importers shall self-announce the basic features, warning information, standard codes on the welding machine or one of the following media:

3.1.2.1. The welding machine package;

3.1.2.2. The welding machine label;

3.1.2.3. The document attached with the welding machine.

3.2. Provisions on ensuring safety for exported welding machine

3.2.1. The welding machine exporter must ensure that the exported welding machines are in accordance with the importing countries' provisions, international treaties, contracts or international agreement on mutual recognition for the compatibility assessment results with the relevant countries or territories.

3.2.2. Self-building and applying the management systems in order to ensure the quality of the manufactured welding machines.

3.3. Provisions on ensuring safety for welding machines circulated on the market

3.3.1. Observing the corresponding technical standards during the welding machine circulation.

3.3.2. Self-applying measures for quality control in order to sustain the sold welding machine quality.

3.4. Provisions on ensuring safety for welding machines in use

3.4.1. The welding machine must be used, transported, stored and maintained under the manufacturers' instructions.

3.4.2. Requirements for electric welding workers.

3.4.2.1. Only persons that possess certificates of electric welding, being trained in occupational safety and issued with safety cards are allowed to perform electric welding.

The periodic training on occupational safety for electric welders must be provided at least once a year.

3.4.2.2. Female workers are forbidden from electric welding in cellars, tanks, chambers and reservoirs.

3.4.3. Requirements for personal safety equipment.

3.4.3.1. Electric welders must be equipped with personal safety equipment, welding glasses, apron, boots, gloves and other safety equipment as prescribed.

3.4.3.2. The personal safety equipment used for welders must ensure the resistance to spark, physical impact, hot metal dust and hazardous radiations.

3.4.3.3. When performing welding in environments with chemicals (acid, alkali, grease…), electromagnetic field as well as welding preliminarily heated parts, welding workers must be equipped with protective clothing made of material that can resist such impacts.

3.4.3.4. When performing welding in environments with high risk of electric accidents (welding in closed reservoirs, cellars, tanks, chambers, damp places), apart from protective clothing, welders must also be equipped with insulated shoes and gloves. The welding position must be provided with insulated platforms or carpets.

3.4.3.5. Welder's gloves must be made of hardly-flammable material and resistant to mechanical impacts.

3.4.3.6. Welder's shoes must be made of hardly-flammable material and resistant to mechanical impacts.

3.4.3.7. Welder's hats must be made of hardly-flammable and electric-insulated material. In work conditions with risks of mechanical injuries, workers must be equipped with hats that resist mechanical impacts.

3.4.3.8. When performing welding in environments that produce toxic gases without partial sucking devices, welders must be equipped with appropriate respiratory-protective equipment.

4. Inspecting, examining and handling violations.

4.1. The inspection and handling of violations of the provisions in this Regulation shall be carried out by State inspectors of labour.

4.2. The inspection of the quality of the manufacture, import, export, circulation and use of electric welding machines must comply with the Law on Product and goods quality and National technical regulations on occupational safety for electric welding machines and electric welding jobs.

5. Responsibilities of organizations and individuals

5.1. Organizations and individuals manufacturing, exporting, importing, circulating and using electric welding machines are responsible for observing the provisions in this Regulation.

5.2. This Regulation is a basis for inspecting agencies of welding machines quality to carry out inspection, and also a basis for organizations giving compatibility assessment to certify the regulation conformity.

6. Organizing the implementation

6.1. The Department of Occupational Safety and Health, the Ministry of Labour, War Invalids and Social Affairs are responsible for guiding and inspecting the implementation of this Regulation.

6.2. Local State management agencies on labour are responsible for guiding and inspecting the implementation of the provisions in this Regulation.

6.3.This Regulation takes effect after 6 months as from the date of signing.

6.4. During the course of implementation, the relevant agencies, organizations and individuals are responsible for making prompt feedbacks on the difficulties to the Ministry of Labour, War Invalids and Social Affairs for study and settlement./.