



2600SEG112 STANDARD FOR THE SAFETY OF WELDING AND CUTTING OPERATIONS

1.0 PURPOSE

Establish instructions to follow, in addition to duties and responsibilities of Panama Canal Authority (ACP) employees, contractors and third parties when performing welding and cutting jobs.

2.0 BACKGROUND

General established guidelines exist in the Panama Canal Authority Safety and Occupational Health Manual, Chapter 6, Welding and Cutting.

3.0 SCOPE

This standard applies to all ACP employees, contractors and third parties within the installations, or onboard floating equipment, or in areas under ACP responsibility and that are performing welding and cutting jobs.

4.0 LEGAL FOUNDATION

This Standard is established pursuant to Agreement No. 12 of the Board of Directors of the Panama Canal Authority, Risk Control and Occupational Health Regulations, Chapter I, Article 3.

5.0 DEFINITIONS

At the time this Standard was written, all words and terms were common knowledge to the users.

6.0 GENERAL

6.1 Only qualified personnel certified by the Industrial and Safety Training Unit (RHSI) may perform welding operations. In the case of contractors, only personnel with equivalent qualifications that must be evaluated and adapted by RHSI will be accepted.

6.2 For welding jobs on pressure equipment onboard floating equipment, the qualification of the welder known in English as *welder performance qualification*, and the qualification of the specification of the procedure known in English as *welding procedure specification*, will be in accordance with ASME Code, Section IX.

6.3 In reference to the above paragraph, the following paragraphs pertinent to ASME Code Section IX have been modified: QW-101, QW-103, QW-201 to QW-202, QW-210 to QW-211, QW-253 to QW-255, QW-305, QW-451, QB-101, QB-103, QB-201 to QB-202, and QB-305. For information on the modified paragraphs, see section 11.0 of this Standard.

6.4 The welding area must be identified, protected from traffic, and separated by barricades to avoid unauthorized entry

6.5 All welding equipment must be carefully inspected prior to each use.

6.5.1 Welding equipment: Must be inspected for leaks or broken parts, manometers and defective hoses, missing or damaged backup valves and any other unsafe condition.

6.5.2 Arc welding equipment: All cables, electrode holders and defective clamps must be inspected, loose or defective clamps, and defective ground connection and any other unsafe condition.

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6.6 During the welding operation, a satisfactory number of ready to use extinguishers, of the adequate type, must be kept on hand,

6.7 Welding personnel must be trained in fire prevention methods, and must understand all procedures to be followed in case of fire.

6.8 All flammable material must be kept at a minimum of 50 feet from the place of a welding operation. If this is not possible, the material must be protected with fireproof screens and with a duly trained and equipped watchman.

6.9 All the cables and hoses must be located in such a manner as to not constitute danger to other employees in the area and that are not exposed to physical damage.

6.10 Hoses and cables must never be rolled around the body.

6.11 Joints are not allowed between hoses, hose-regulators, hose torches, different from those used by the manufacturers; such as "little wires", clamps, etc.

7.0 RESPONSIBILITIES

7.1 Of the supervisors.

7.1.1 Ensure all safety measures are taken prior to initiating the work.

7.1.2 Stop all welding operations if the work environment conditions deteriorate to unsafe levels.

7.1.3 Ensure that the welders and their helpers have and use the adequate equipment for personal protection, including the filter with the proper dye protection for the eyes according to APPENDIX A.

7.1.4 Ensure that the welders are aware of and follow safety procedures, equipment operation and manufacturer instructions.

7.1.5 Prepare safe working procedures for all welding operations under his responsibility

7.2 Of the employees.

7.2.1 Be familiar with and fully comply with all fire prevention measures, personal protection, respiratory protection, sight protection and ventilation.

7.2.2 Be familiar with and follow welding equipment manufacturer's instructions.

7.2.3 Inform of any defect of the equipment or danger to safety.

7.2.4 Carefully inspect the welding equipment prior to each use.

7.2.5 Leave the equipment in a secure condition (purged lines, closed valves and manometers, equipment turned off and disconnected) when not in use.

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8.0 PERSONNEL PROTECTIVE EQUIPMENT

8.1 The welders and their helpers must use goggles, glasses or safety helmets with the proper dye filter. The helpers must not use eye protection of a lesser level than that of the welders.

8.2 The welders and helpers that have to chisel, polish, or do dangerous work for the eyes must use shields and safety glasses.

8.3 The welders must use appropriate safety boots with laces or zipper following the specifications drawn by the Safety and Industrial Hygiene Unit (RSHH).

8.4 Leggings for foot protection must be used when utilizing boots of a height of less than 8 inches, following the specifications drawn by the Safety and Industrial Hygiene Unit (RSHH).

8.5 Respiratory protection equipment that is adequate for the job being performed must be utilized.

8.6 Adequate protective clothing, gloves and aprons for the job being performed must be utilized.

8.7 Pants and coveralls used must not have rolled cuffs.

8.8 Clothing and gloves must not have grease, oil or solvent stains.

9.0 STORAGE OF COMPRESSED GAS CYLINDERS

9.1 Gas cylinders must be kept far from excessive heat, ignition sources and highly flammable materials.

9.2 Flammable gas cylinders must be handled and stored in a vertical position, with their safety caps secure when applicable.

9.3 Gas cylinders must be kept in vented and dry areas, far from staircases and alleys, and must be securely kept to prevent falling.

9.4 Stored oxygen cylinders must be separated from flammable gas or flammable material cylinders (especially greases and oils) by at least 20 feet or by a non-flammable barrier. This barrier must be at least 5 feet high and be fire-resistant for 30 minutes.

10.0 RESPONSIBILITIES

The responsibilities to ensure compliance with this Standard are described in the ACP Safety and Occupational Health Management Standard (2600SEG101).

11.0 INQUIRIES

11.1 All information or explanations on the contents or application of the present Standard must be requested in writing to the Safety and Industrial Hygiene Unit (RSHH)



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11.2 All information or technical explanations on the contents or application of the present Standard on board floating equipment, or modifications to ASME Code Section IX, must be requested in writing to the Maritime Safety Unit of the Board of Local Inspectors (OPXI-S).

12.0 DURATION

This Standard shall remain in force until amended or revised.

13.0 REFERENCES

- 13.1** ANSI Z49.1, Safety in Welding and Cutting.
- 13.2** NFPA 51, Welding and Cutting Systems with Gas, Fuel, Oxygen.
- 13.3** NFPA 51B, Welding and Cutting Processes.
- 13.4** ANSI C33.2, Safety Standards for Transformer Type Arc Welding Machines.
- 13.5** ANSI A6.1, Recommended Safe Practices for Arc Welding and inactive gas covers.
- 13.6** ANSI Z87.1, Eye and Face Learning and Occupational Protection Practice.
- 13.7** 2600SEG106, Safety Standard for Working with Atmospheric Electrical Activity (Electrical Storms)
- 13.8** 2600SEG113, Safety Standard for the Protection of Machinery and Equipment.
- 13.9** 2600SEG116, Safety Standard for the Handling and Storage of Compressed Gas Cylinders.
- 13.10** 2600SEG117 Safety Standard for the Inspection of Boilers and Pressure Vessels.
- 13.11** 2600SEG201 HAZARDOUS MATERIAL INFORMATION STANDARD.
- 13.12** 2600SEG205 RESPIRATORY PROTECTION STANDARD.
- 13.13** 2600SEG210 BREATHABLE COMPRESSED AIR STANDARD.
- 13.14** 2600SEG215 HEARING PROTECTION STANDARD.
- 13.15** 2600SEG230 LEAD EXPOSURE STANDARD.
- 13.16** 2600SEG290 Manual of Safe Practices in Confined Spaces.
- 13.17** American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section IX.