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Welding and allied processes — Health and safety — Wordless precautionary labels for equipment and consumables used in arc welding and cutting

Soudage et techniques connexes — Hygiène et sécurité — Étiquettes de prévention muettes pour les produits de soudage à l'arc et de coupage

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Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 17846 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 9, *Health and safety*.

Introduction

This International Standard is intended to provide a basis of common understanding within the welding and cutting industry regarding precautionary labels for arc welding and plasma arc cutting products. To this end, this publication provides requirements and guidelines for precautionary labels in order to promote uniformity of manufacturers' labelling practices so that the intended message is more easily recognised and understood by the user. In welding and cutting, as in most industrial occupations, exposure to certain hazards occurs. Users must be alert to these hazards using their experience, training, education, and common sense. Precautionary labels are not intended for the training of users, but rather as a means to quickly remind them of the basic product hazards each time the product is used.

This International Standard covers the use of wordless (symbols-only) precautionary labels as a labelling method for arc welding and plasma arc cutting products. Precautionary labels, based on recognised hazard and safety symbols, have been developed in recognition of an increasingly diverse international audience of users. It cannot be assumed that this audience can read the language used on a label. Symbols are becoming more commonplace in everyday life, from computers to road signs to children's toys. Precautionary labels avoid the need to be able to read the words on the label. Language and literacy thus become non-factors in communication.

To validate the wordless precautionary labels shown in Annex A, a questionnaire was distributed worldwide to approximately 10 000 experienced and inexperienced welders, as well as to other individuals and organizations with an interest in arc welding and cutting products. Nearly all symbols achieved comprehension rates in the 95 % to 100 % range. Where comprehension rates were lower, the symbols were appropriately modified and the revised symbols were resurveyed and validated. More information on the methodology can be found in the EW 6 standard published by the (U.S.-based) National Electrical Manufacturers Association (*www.nema.org*).

NOTE The term "precautionary label" is equivalent to "product safety label" in ISO 3864-2. Other equivalences are so noted elsewhere in this International Standard.

Welding and allied processes — Health and safety — Wordless precautionary labels for equipment and consumables used in arc welding and cutting

1 Scope

This International Standard specifies the format and symbols for wordless precautionary labels placed by manufacturers on their equipment and consumables used in arc welding and plasma arc cutting processes.

This International Standard addresses neither workplace safety signs (as specified by ISO 3864-1) nor operator training. In addition, the wordless precautionary labels specified in this International Standard are not intended to replace other mandatory labels or signs (e.g. material safety data sheets) required by certain countries or regions.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3864-2, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels*[1)]

IEC 60974-1, *Arc welding equipment — Part 1: Welding power sources*

IEC 80416-3, *Basic principles for graphical symbols for use on equipment — Part 3: Guidelines for the application of graphical symbols*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
competent person
person qualified to perform a task based on adequate and relevant training and experience

3.2
precautionary label
informative marking placed by the manufacturer on a product that calls attention to significant hazards and their consequences to persons or property, indicates how such hazards can be avoided, and may list any other sources of information

NOTE Equivalent to "product safety label" in ISO 3864-2.

1) Under preparation.

4 Requirements for wordless precautionary labels

4.1 Use of precautionary labels on products

A precautionary label shall be applied to equipment and consumables used in welding and cutting if, during the course of their intended use, they generate a significant hazard to health or property. A precautionary label shall be placed on power sources, wire feeders, consumables packaging, and other products identified by the manufacturer's designated competent person.

The use of precautionary labels covered in this International Standard is not intended to replace user training.

4.2 Label elements

As a minimum, a precautionary label shall contain the following elements:

a) alert symbols, i.e. the general safety alert symbol or specific hazard type symbol(s) (see Table A.1 for examples);

NOTE The term “alert symbol” is equivalent to the ISO 3864-2 expression “warning sign”.

b) hazard source symbol(s) (see Table A.2 for examples);

c) any relevant hazard avoidance symbols (see Table A.3 for examples).

4.3 Design of precautionary labels

A precautionary label shall be designed by a competent person based on an analysis of the product, process, and hazards. The significant hazards associated with the use of the equipment or consumable dictate the selection of alert symbol(s), hazard source symbol(s), and hazard avoidance symbol(s), a selection of which is shown in Annex A. The competent person shall balance the benefit of depicting more hazards against the risk of cluttering the appearance of the label and obscuring its message. The order in which the hazards are presented on a precautionary label shall be defined by a ranking based upon the potential severity of the injury caused by the hazard and by the risk of it occurring.

The use of safety colours (e.g. yellow for caution, red for danger) and contrast colours (e.g. blue for mandatory action) in a precautionary label is optional. If colours are used, they shall conform with the relevant requirements of ISO 3864-2.

NOTE For symbols requiring a dot pattern, such as fumes, the use of a 45 % grey shade is recommended.

The use of shape (e.g. triangle to indicate warning, circle to indicate either prohibition or mandatory action, square to indicate information) for precautionary label symbols is optional. If shapes are used, they shall conform with the relevant requirements of ISO 3864-2.

4.4 Use of symbols

A precautionary label shall be composed of symbols, i.e. it shall contain no text. In this regard it is recommended that precautionary labels be equivalent to the examples shown in Annex B.

4.5 Uniformity of symbols

In order to improve user understanding, and therefore the effectiveness, of a precautionary label, the symbols shown in Annex A shall be used when appropriate. When symbols not included in Annex A are needed, the competent person is encouraged to refer to other relevant International Standards.

4.6 Label legibility, placement, visibility, and durability

Precautionary labels shall be applied to a conspicuous place on the equipment or consumable and, if practical, shall be visible to the operator during normal use. Precautionary labels shall be dimensioned for legibility according to IEC 80416-3. If insufficient space is available on the product to accommodate the minimum dimensions for a legible label, an abridged label referring the user to the location of the precautionary label shall be applied to a conspicuous place on the product.

Where possible, precautionary labels shall meet the durability requirements of IEC 60974-1.

4.7 The basic precautionary label

Figures B.1 and B.2 show examples of a precautionary label (in two possible formats: horizontal and vertical) that could be used on electrically powered welding and cutting equipment or on consumable containers. These labels are suitable for equipment and consumables used in many welding and cutting operations and it is recommended that the labels on such equipment or consumable containers carry the symbols shown in Figures B.1 and B.2.

4.8 The wordless label for plasma arc cutting equipment

Figure B.3 shows an example of a precautionary label for use specifically on plasma arc cutting equipment. It is recommended that all such equipment carry the symbols shown in Figure B.3, or equivalent symbols, as well as the applicable symbols of Figure B.4 if the equipment is engine-driven.

4.9 The precautionary label for engine-driven welding and cutting equipment

Figure B.4 shows an example of a precautionary label for use specifically on engine-driven welding and cutting equipment. It is recommended that all such equipment carry the applicable symbols in Figures B.1 (or B.2), B.3 and B.4, or equivalent symbols.

4.10 The precautionary label for wire feeding equipment

Figure B.5 shows an example of a precautionary label for use specifically on wire feeding equipment. It is recommended that all such equipment carry the symbols shown in Figure B.5, or equivalent symbols.

4.11 Precautionary labels for other hazards

When other hazards are present in the welding or cutting environment, it is recommended that the examples shown in Figures B.6 to B.9 be followed. The precautionary label shall be placed near the hazard.

Annex A
(informative)

Precautionary label symbols

A.1 Alert symbols

See Table A.1.

NOTE The term “alert symbol” is equivalent to the ISO 3864-2 expression “warning sign”.

Table A.1 — Common alert symbols in welding and cutting

No.	Type of hazard	Symbol
1	General safety alert symbol [a] (may be used in place of specific hazard alert symbols shown below)	
2	Electrical	
3	Explosion	
4	Fire	
5	Radiation (non-ionizing)	
6	Thermal	
7	Tipping gas cylinder	

[a] Equivalent in meaning and use to “general warning sign” in ISO 3864-2.

A.2 Hazard source symbols

See Table A.2.

Table A.2 — Common hazard source symbols in welding and cutting

No.	Source of hazard	Symbol
1	Welding electrode causing electric shock	
2	Wiring causing electric shock	
3	Welding electrode and wiring causing electric shock	
4	Plasma cutting torch causing electric shock	
5	Fumes and gases coming from any source	
6	Fumes and gases coming from welding process	
7	Fumes and gases coming from plasma cutting arc	
8	Fumes and gases coming from engine exhaust	
9	Fumes and gases coming from engine exhaust and welding process	
10	Gases coming from a shielding gas cylinder	
11	Fire from sources found in the welding and cutting environment (e.g. welding and cutting sparks, fuel)