



# SLOVENSKI STANDARD

## SIST HD 407 S1:2000

01-februar-2000

---

### Safety rules for the use of equipment for electric arc welding and allied processes

Safety rules for the use of equipment for electric arc welding and allied processes

Sicherheitsregeln für die Verwendung von Ausrüstungen für elektrisches Bogenschweißen und verwandte Verfahren

Règles de sécurité pour l'utilisation de l'équipement électrique de soudage à l'arc et de procédés assimilés

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **HD 407 S1:1980**

SIST HD 407 S1:2000  
<https://standards.iteh.ai/catalog/standards/sist/eed3cd69-7549-421a-b8fb-64a3e7046e95/sist-hd-407-s1-2000>

---

#### **ICS:**

25.160.30      Varilna oprema      Welding equipment

**SIST HD 407 S1:2000**      en

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST HD 407 S1:2000](#)

<https://standards.iteh.ai/catalog/standards/sist/eed3cdb9-7349-421a-b8fb-64a3e7046e95/sist-hd-407-s1-2000>

HARMONIZATION DOCUMENT  
DOCUMENT D'HARMONISATION  
HARMONISIERUNGSDOKUMENT

HD 407  
JANUARY 1980  
Date of approval : 1979-11-28

UDC 621.791.75.03.004 : 614.8

Key words - welding equipment  
- electric welding  
- arc welding  
- manual welding  
- automatic welding  
- semi-automatic welding  
- use of welding equipment

English Version

SAFETY RULES FOR THE USE OF EQUIPMENT FOR ELECTRIC ARC WELDING  
AND ALLIED PROCESSES

REGLES DE SECURITE CONCERNANT L'UTILISATION DES EQUIPEMENTS POUR  
SOUDAGE ELECTRIQUE A L'ARC ET TECHNIQUES CONNEXES

SICHERHEITSBESTIMMUNGEN FÜR DEN BETRIEB VON GERÄTEN UND  
EINRICHTUNGEN FÜR LICHTBOGENSCHWEISSEN UND VERWANDTE VERFAHREN

This document was prepared by CENELEC Technical Committee  
TC 26A the final draft of which bore the reference  
CENELEC/TC 26A(SEC)28, January 1979.

=====  
C E N E L E C  
=====

EUROPEAN COMMITTEE FOR ELECTROTECHNICAL STANDARDIZATION  
COMITE EUROPEEN DE NORMALISATION ELECTROTECHNIQUE  
EUROPÄISCHES KOMITEE FÜR ELEKTROTECHNISCHE NORMUNG  
GENERAL SECRETARIAT : 2, Rue Bréderode, Boîte no 5  
1000 BRUSSELS

Copyright © reserved to national member Organizations

HD 407  
January 1980

## PREFACE

In order to achieve the highest possible degree of safety and the most satisfactory operation of electrical equipment and installations, different harmonization documents regulating design and construction have already been drawn up. In general, the rules contained in those documents apply to equipment for electric arc welding. However, due to the special nature of electric arc welding, deviations from the rules are sometimes necessary. The purpose of this document is to specify these deviations and the corresponding compensatory measures to be applied.

The present document is of a general nature. It forms one of a proposed group of harmonization documents which also include the following :

- a) HD 24 : no load voltage of arc-welding equipment.
- b) HD 362 : Safety rules for the construction of equipment for electric arc welding and allied processes.
- c) HD... : Safety rules for the installation of equipment for electric arc welding and allied processes (in preparation).

It is planned that eventually the above documents will form a group covering the entire field of electrical safety in electric arc welding and allied processes.

(standards.iteh.ai)

-----SIST HD 407 S1:2000-----

<https://standards.iteh.ai/catalog/standards/sist/eed3cdb9-7349-421a-b8fb-64a3e7046e95/sist-hd-407-s1-2000>

## I. SCOPE

This harmonization document specifies the electrical safety rules applying to industrial/professional use of equipment for electric arc welding and allied processes.

Additional or complementary rules governing specific processes (e.g. : plasma welding and cutting) and specific fields of application (e.g. : underwater welding, use of electric arc-welding equipment by laymen) are under consideration.

This document does not cover safety aspects concerning eye protection, protection against radiations, fumes, etc...

## 2. DEFINITIONS

### 2.1. Protective clothing and accessories.

Protective clothing and accessories, such as gloves, insulating shoes,

hand shields, head masks and filter lenses, etc, with which the operators are provided in order to diminish electrical shock risks and to protect the skin and eyes against radiation and spatter.

## 2.2. Environments with increased risk of electrical shocks.

Environments where the risk of electrical shock is greater than in normal applications of the process, for example :

- a) in locations in which freedom of movement is restricted, so that the welder is forced to perform the welding in a cramped (kneeling, sitting, lying...) position in physical contact with conductive parts.
- b) in locations which are fully or partially limited by conductive elements and in which there is a high risk of unavoidable or accidental contact by the welder.
- c) in wet, damp or hot conditions where humidity or perspiration may considerably reduce the resistance of the skin of the human body and/or the resistance of the protective clothing or accessories.

NOTES : 1. The term environment with increased risk of electric shocks does not include places where electrically conductive parts in the immediate vicinity of the welder have been insulated.

2. In view of the wide diversity of factors which constitute an environment with increased risk of electrical shock, it is not possible to quantify any particular parameters. The degree of risk should be assessed by an expert prior to welding operation taking place.

## 2.3. Equipment for industrial and professional use.

Equipment intended only for use by experts or instructed persons.

### 2.3.1. Expert (quoted from CENELEC Memorandum n° 2 of 20 th March, 1974).

A person who can judge the work assigned to him and recognize possible dangers on the basis of his professional training, knowledge and experience and of his knowledge of the relevant equipment.

NOTE : Several years of practice in the relevant technical field may be allowed for in the assessment of professional training.

### 2.3.2. Instructed person (quoted from CENELEC Memorandum n° 2 of 20 th March 1974)

A person informed about the tasks assigned to him and about the possible dangers involved in neglectful behaviour and who, if necessary, has been given a degree of training.

## 2.4. Equipment for non industrial use.

Equipment intended for use also by layman.

2.4.I. Layman (see CENELEC Memorandum n° 2 of 20 th March, 1974).

Any person who can be defined neither as "expert" nor as "instructed person".

### 3. GENERAL REQUIREMENTS.

3.I. Requirements concerning installation, inspection and maintenance of the material.

#### 3.I.I. Installation

For metal arc welding work, only equipment designed, manufactured and installed for the purpose shall be used. Relevant standards and regulations and manufacturers instructions shall be followed and particularly the harmonized documents HD... : "Safety rules for the installation of equipment for electric arc welding and allied processes" (in preparation) and HD 362 : "Safety rules for the construction of equipment for electric arc welding and allied processes".

#### 3.I.2. Inspection and maintenance.

In order to keep welding equipment in a condition as specified, regular inspection and maintenance is necessary. The user of the welding equipment or another instructed person shall particularly verify that :

- <https://standards.iteh.ai/catalog/standards/sist/7149-131-188/64a3e7046e95/sist-hd-407-s1-2000>
- SIST HD 407 S1:2000
- a) The welding circuit installation is in accordance with subclause 3.I.I.
  - b) The insulation of cables, electrode-holders, torches and plugs and sockets is not damaged and the current carrying capacity of the conductor is adequate for the current used.
  - c) The clamps for current conductors are securely connected and all connections are correctly made. Particular care shall be taken that the welding return current cable is correctly and directly connected as close as possible to the welding point, from the appropriate terminal of the welding equipment to the work piece, the work bench or the work piece holder.

#### 3.I.3. Power sources connected together.

3.I.3.I. Connection : Several welding power sources shall only be connected together by an expert and be approved for electric arc welding operations only after a check has been carried out to ensure that the permissible no-load voltage cannot be exceeded.

3.I.3.2. Disconnection : Where one power source or several which are connected together, is taken of service, that power source shall be disconnected from the mains supply,

and from the joint welding circuit so as to preclude any hazards that might be caused by feed-back voltages.

#### 3.I.4. Several operators welding on the same workpiece.

When using separate power sources or multi-operator power sources for welding on the same piece or interconnected workpieces, the resulting no load voltage between two electrode holders or torches may be twice the value of the permissible no-load voltage. The operators shall be warned of the danger, (see also 3.2.4.).

NOTE : When using alternating current from two or more single operator power source the danger can, in certain circumstances, be avoided by using a suitable connection arrangement.

#### 3.I.5. Disconnection of power sources.

If the welder interrupts his work or leaves his working place, e.g. for lunch, change of shift, etc., the power source or the welding circuit shall be disconnected in such a way that it cannot unintentionally be operated from the electrode holder or torch.

Should the supply cable be liable to damage when the power source is moved to another location, that power source, including its supply cable, shall be isolated from the mains supply before it is moved.

When maintenance or repair work is carried out, the equipment shall be disconnected on the output and input sides. Exception to this rule shall be made only by a responsible expert.

#### 3.I.6. Enclosures and guards.

Enclosures and guards, where provided, shall be in position when the equipment is live.

### 3.2. Requirements concerning operators.

#### 3.2.1. Information

Operators and their assistants shall be trained in the safe use of the equipment. Operators and persons working in the vicinity of the welding operation shall be warned of risks and informed about protective measures concerning electric arc welding.

#### 3.2.2. Clothing and accessories.

The operator and their assistants shall wear suitable protective clothing and accessories during work. The protective clothing and accessories shall be kept in good condition. When manual arc welding is performed, gloves shall also be worn when changing electrodes.

### 3.2.3. Isolation of electrode holders and torches when not in use.

When not in use, electrode holders and torches shall be kept isolated and/or insulated. It is recommended that the electrode is withdrawn from the electrode holder when it is not in use.

### 3.2.4. Voltage between electrode holders or torches.

In order to avoid the risk of electric shock at an increased open-circuit voltage when a three phase multi-operator power source or several power sources are used on a single workpiece or on inter-connected workpieces, operators shall work at a reasonable distance from each other and shall be warned never to touch two electrode holders or torches at the same time.

## 4. WELDING IN AN ENVIRONMENT WITH INCREASED RISK OF ELECTRICAL SHOCK.

When welding is carried out in an environment with increased risk of electrical shock (see clause 2.2.), special precautions shall be taken :

4.1. Only power sources and welding equipment designed for this purpose shall be used. See special construction rules (in preparation).

4.2. Only electrode holders complying with HD 362 shall be used.

4.3. As an additional precaution insulating stands or mats shall be used wherever possible.

4.4. It is recommended that the power source is not taken into the area with increased risk of electrical shocks. Should it be necessary for a power-source to be taken into the area with increased risk of electrical shock, it is recommended that the primary feeder of the power-source is equipped with a sensitive earth leakage circuit breaker (30 mA max-rated fault current operating within 30 ms).

NOTE : In some countries, it is mandatory that the power source shall not be taken into the area with increased risks of electrical shocks.

4.5. Operators shall only work where other persons, who will be able to help should danger arise, are in the immediate vicinity. Means for electrically disconnecting the power source or the welding circuit quickly shall be provided within easy access of these persons.