



**SLOVENSKI STANDARD**  
**SIST EN 50060:1996/A1:2002**  
**01-maj-2002**

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Power sources for manual metal arc welding with limited duty

Schweißstromquellen zum Lichtbogenhandschweißen für begrenzten Betrieb

Source de courant pour soudage manuel à l'arc, à service limité

**Ta slovenski standard je istoveten z: EN 50060:1989/A1:1994**

[SIST EN 50060:1996/A1:2002](https://standards.iteh.ai/catalog/standards/sist/07bc8cca-c41a-4737-8de2-45fc01bd58d5/sist-en-50060-1996-a1-2002)

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**ICS:**

25.160.30      Varilna oprema      Welding equipment

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EUROPEAN STANDARD  
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**EN 50060/A1**

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Descriptors: Welding equipment, safety requirements, manual arc welding, power source, construction, test methods

Amendment A1 to the English version of EN 50060

## Power sources for manual arc welding with limited duty

Source de courant pour soudage  
manuel à l'arc à service limité

Schweißstromquellen zum  
Lichtbogenhandschweißen für  
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This amendment A1 modifies the European Standard EN 50060:1989. It was approved by CENELEC on 8 March 1994. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

# CENELEC

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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## FOREWORD

This amendment to EN 50060:1989 was prepared by CENELEC Technical Committee TC 26A "Electric arc welding equipment".

It was submitted to the CENELEC members for formal vote in september 1993 and was approved by CENELEC as amendment A1 to EN 50060:1989 on 1994-03-08.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1995-03-15
- latest date of withdrawal of conflicting national standards (dow) 1995-03-15

For products which have complied with EN 50060:1989 before 1995-03-15, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2000-03-15.

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#### 4 Definitions

Delete sub-clause 4.23 Admissible temperature

Add the following new definitions:

##### 4.30a) Number of reference electrodes $n_{c1}$

The number of reference electrodes capable of being melted within the first hour with the welding power source starting from the cold state ( $20 \pm 2$ ) °C; this number is calculated by the formula given in 7.1.

##### 4.31a) Number of reference electrodes $n_{h1}$

The number of reference electrodes capable of being melted during one hour with the welding power source at the hot state starting from resetting; this number is calculated by the formula given in 7.1.

#### 5 Test conditions

Item b):

replace ' $\pm 0,5$  K' by ' $\pm 2$  K'.

#### 7.1 Heating test

Replace the sub-clause by the following:

For each rated welding current according to table III, given on the rating plate, the welding power source shall be operated at conventional welding conditions from the cold state ( $20 \pm 2$ ) °C and with a duty cycle (duty factor) taking into account:

- the melting time  $t_f$  of the electrode corresponding to the rated welding current  $I_2$  and
- a no-load time of 20 s corresponding to the time necessary to place a new electrode, to chip the slag and to brush the weld. The no-load shall be obtained by breaking the output circuit.

**Table III**  
**Conventional values based on the reference electrode**

Diameter	$\phi$	mm	1.6	2.0	2.5	3.2	4.0
Usable length		mm	200	250	300	300	300
Welding current	$I_2$	A	40	55	80	115	160
Melting time	$t_f$	s	38	52	56	60	76

This test shall be continued for one hour after the first reset of the thermal cut-out device (see figure 1).

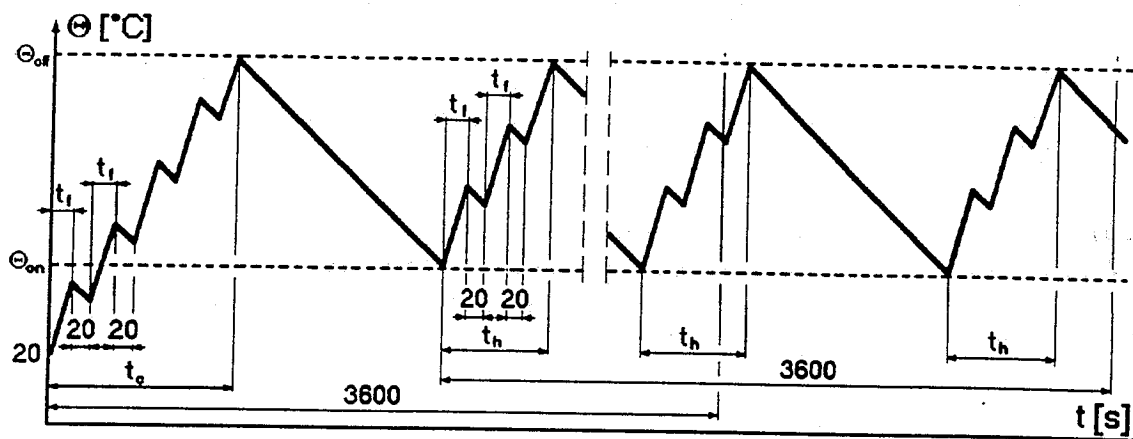


Figure 1 - Temperature curve of windings

During the heating test the output current  $I_2$  shall be maintained by  $\pm 5\%$  by adjustment of the conventional load or of the mains voltage within a  $\pm 10\%$  margin.

The following measurements shall be made:

- $t_c$  the heating time from the cold state and
- $t_h$  the heating time from the hot state.

From these measurements shall be calculated:

- $n_c$  the number of reference electrodes, which can be melted from the cold state, by the formula:

$$n_c = \frac{t_c}{t_f + 20}$$

- $n_h$  the mean value of the number of reference electrodes which can be melted between resetting and operation of the thermal cut-out device, by the formula:

$$n_h = \frac{\bar{t}_h}{t_f + 20}$$

where  $\bar{t}_h$  is the mean value of the values of  $t_h$ , measured during the heating test.

$n_h$  shall be not less than 1 (see 10.3)

- e)  $n_{c1}$  the number of reference electrodes which can be melted within the first hour from the cold state, by the formula:

$$n_{c1} = \frac{t_c + \sum_A t_h}{t_f + 20}$$

where  $\sum_A t_h$  is the sum of heating times during the first hour with the welding power source starting from the cold state (see figure 1).

- f)  $n_{h1}$  the number of reference electrodes which can be melted within one hour from the hot state, by the formula:

$$n_{h1} = \frac{\sum_B t_h}{t_f + 20}$$

where  $\sum_B t_h$  is the sum of heating times during one hour with the welding power source at the hot state starting from resetting (see figure 1).

If the welding power source can only be adjusted in steps, the test shall be done with the setting immediately above the rated output current  $I_2$  for the corresponding electrode diameter.

If the thermal cut-out device does not operate,  $n_c$  and  $n_{c1}$  are equal and are calculated by:

$$n_c = n_{c1} = \frac{3600}{t_f + 20}$$

On the rating plate the number of electrodes shall be given as the nearest whole number.

### 7.3.1 Windings

Replace the first paragraph, the note and table IV by the following:

The operating temperature ( $\Theta_{on}$ ) shall not exceed the values of  $\Theta_{max}$  given in table IV.

**Table IV**  
**Limits of temperature for windings ( $\Theta_{max}$ )**

Insulation class	$\Theta_{max}$ in °C	
	determined on the surface	determined by resistance
A (105 °C)	114	120
E (120 °C)	132	138
B (130 °C)	138	144
F (155 °C)	162	174
H (180 °C)	190	200
200 (200 °C)	210	220
220 (220 °C)	230	240

### 7.3.2 External surfaces

Replace by the following:

The temperature rises for external surfaces in the following cases shall not exceed:

- a) Metal enclosures, bare 25 K
- b) Metal enclosures, painted 35 K
- c) Non-metallic enclosures 45 K
- d) Metal handles 10 K
- e) Non-metallic handles 30 K

### 8.5 Operating capacity

Replace the first paragraph by the following:

The thermal cut-out device shall be capable of breaking either the supply current or the welding current 200 times consecutively without failure whilst the welding power source delivers the maximum rated welding current.

### 8.6 Indication

- 1st line: replace 'a yellow indicator (e.g. yellow signal lamp)' by "an indicator, preferably yellow (e.g. a yellow signal light)"
- 2nd line: replace 'has operated' by "is operating"

### 9.3 Supply cable

- 1st line: replace 'not less than 2,5 m of' by "a"
- 3rd line: delete 'e.g. HO7RN'
- add new line:

"d) have a length of at least 2 m as measured from the exit point of the enclosure."



## 12.2 Contents

Figure 3: replace by the following:

1)		4)				
3)		5)				
8)	6)		7)			
	10)		11)		12)	
	13)	13a)	13b)	13c)	13d)	13e)
9)	14)	14a)	14b)	14c)	14d)	14e)
	15)	15a)	15b)	15c)	15d)	15e)
	16)	16a)	16b)	16c)	16d)	16e)
17)	18)		19)			
	20)		21)		22)	
					23)	
				24)		

**Figure 3 - Principle of the rating plate**  
(standards.iteh.ai)

Box 2: delete 'Country of assembly'

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Box 15: replace by the following:

 $n_c/n_{c1}$ 

the symbols for the number of reference electrodes capable of being melted with the welding power source

- a) starting from the cold state without operation of the thermal cut-out device ( $n_c$ ).
- and
- b) within the first hour starting from the cold state ( $n_{c1}$ ).

Box 15a to 15e: add the symbol " $n_{c1}$ ".

Box 16: replace by the following:

 $n_h/n_{h1}$ 

the symbols for the number of reference electrodes capable of being melted with the welding power source

- a) at the hot state without operation of the thermal cut-out device ( $n_h$ )
- and
- b) during one hour at the hot state starting from resetting ( $n_{h1}$ ).

Box 16a to 16e: add the symbol " $n_{h1}$ ".