SLOVENSKI STANDARD
SIST-V CLC Guide 29:2009

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Temperature vroļ ih povrġin, kjer lahko pride do dotika - Vodila za tehniļ ne odbore in proizvajalce

Temperatures of hot surfaces likely to be touched -- Guidance document for Technical Committees and manufacturers

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Temperatures of hot surfaces likely to be touched

Guidance document for Technical Committees and manufacturers

The present Guide has been developed in response to EC Standardisation Mandate M/346 in the field of the Low Voltage Directive 2006/95/EC addressing surface temperatures of accessible non-functional surfaces.

The CENELEC Technical Board approved this Guide in April 2007.

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Foreword

This Guide was prepared by CENELEC BTTF 120-1, Surface temperatures.

The text of the draft was submitted to the vote and was approved by the CENELEC Technical Board as CENELEC Guide 29 on 2007-04-11.

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1 Scope

This document provides guidance for assessing the risk of a burn from unintentional contact with readily accessible surfaces of electrical equipment under the scope of the Low Voltage Directive.

This document establishes surface temperature limits, where such limits are required, and describes the maximum contact periods with a hot surface that a person may be subjected to without being exposed to a risk of burn. Curves of maximum temperatures versus contact times are described for different types of material with different types of surfaces.

This document does not address temperature limits for hot functional surfaces.

This document applies to surfaces of products likely to be touched by any person.

The limit values may be taken into consideration by Technical Committees in determining surface temperature limits in product standards. Manufacturers may also use the limit values to assist in their risk assessment, if a product standard is not applied.

It is not within the scope of this document to set temperature limits for the following zones or surfaces:

- hot functional surfaces;
- adjacent surfaces;
- handles, control knobs including keypads, keyboards and the like;
- surfaces not likely to be touched.

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.

EN ISO 13732-1:2006, *Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot surfaces*

EN 61032:1998, *Protection of persons and equipment by enclosures - Probes for verification*

3 Definitions

For the purpose of this guide, the following definitions apply:

3.1
surface temperature (*Ts*)
temperature of a surface, measured in degrees Celsius, at an ambient temperature of 25°C -5°C/+0°C

3.2
contact period (*t*)
time during which contact with the surface occurs

NOTE In Figures A.2 to A.6 contact duration (D) is used to determine the contact period (t)

3.3
thermal inertia
product of the density, thermal conductivity and specific thermal capacity of material

3.4
material properties of the surface
chemical/physical composition of the material and the characteristics (rough, smooth) of the surface

3.5
burn threshold
surface temperature defining the boundary between no burn and a superficial partial thickness burn, caused by contact of the skin with a hot surface for a specified contact period

3.6
hot functional surface
surface which is intentionally heated by an internal heat source and which has to be hot to carry out the function for which the equipment is intended to be used. For example, the soleplate of an iron, or curling tongs.

Some equipment have hot surfaces as a consequence of how they generate their output, for example lamps within a luminaire, and are considered in terms of their treatment as equivalent to a hot functional surface

3.7
adjacent surface
a surface adjacent to a functional surface.

The adjacent surface and the functional surface normally consist of the same piece of material or are in direct thermal contact and have similar thermal properties. The adjacent surface is not heated intentionally during use of the product. However, as it is adjacent to the functional surface and may become hot through conduction, its temperature will be in the range between the functional and a touchable surface

3.8
handles or control knobs including keypads, keyboards and the like
part of the equipment that a user needs to touch to operate or adjust the equipment

3.9
touchable surfaces
all other surfaces that are likely to be touched when the equipment is operated during normal use and foreseeable misuse. The equipment has to be installed according to the manufacturer's instructions.

NOTE This means an oven intended for build in should be installed according to the manufacturer's instructions before identification of the touchable surfaces

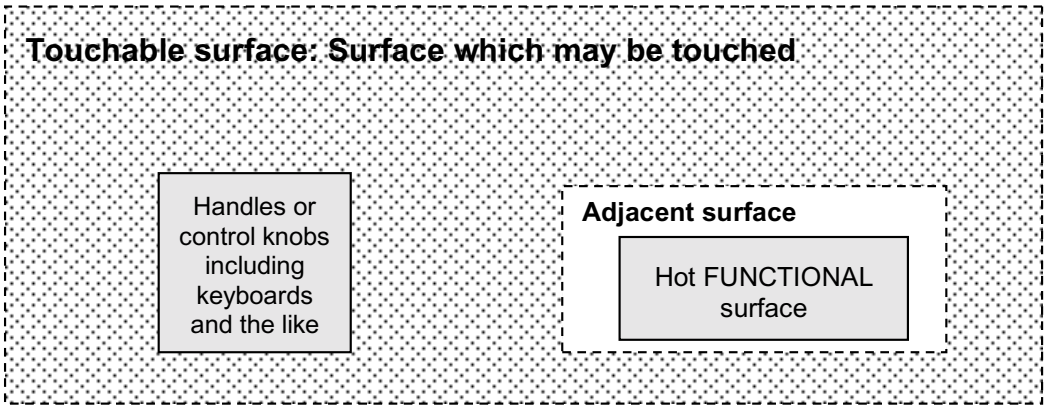

Figure 1 – Definition of the different touchable parts of an equipment

3.10
arms reach
the distance measured from the floor to the fingertips of a person. As shown in Figure 2, it has to be taken into account that a person can reach not only in a vertical direction as shown in Figure 2 (a), but also in a circle defined approximately in Figure 2 (b).

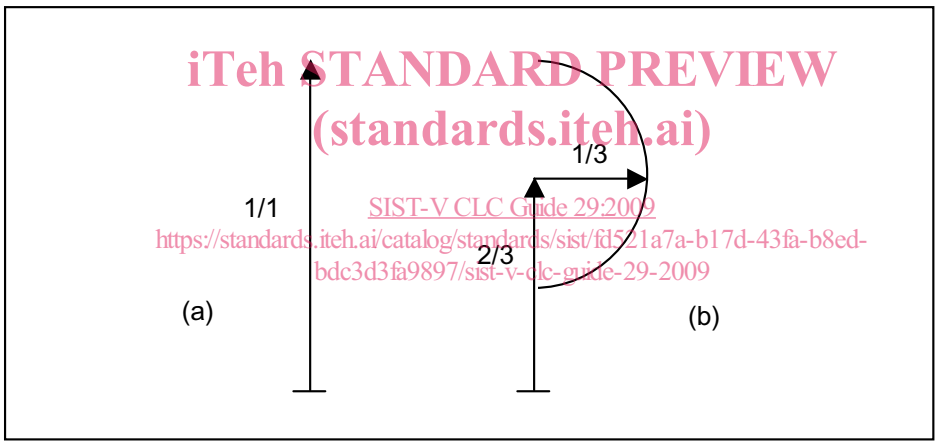

Figure 2 – Arms reach - the distance is interpreted as either a fully stretched person (a) or a person reaching for an item (b). Worst case of either (a) or (b) to be used

Table 1 gives guidance on arms reach for different age groups.

Table 1 – Arms reach

Age years	**Arms reach [see Figure 2(a)], calculated from the floor** metre
Children less than 2 years	1,00
Children from 2 years to less than 6 years	1,50
Children from 6 years to less than 14 years	1,80
Adult	2,30

NOTE The values in Table 1 are average values

3.11
skin temperature (T_C)
temperature at a depth of 80 µm below the surface of the skin, measured in degrees Celsius

4 Assessment of the risk of burning

Normally it is sufficient to follow the product standard. The manufacturer only needs to carry out a risk assessment, if the product standard does not take account of the foreseeable use in relation to the temperatures of surfaces likely to be touched, or if no relevant product standard exists.

4.1 Procedure

The different types of surfaces or zones shall be identified according to 4.2.

To assess the risk of a cutaneous burn from surfaces likely to be touched, the steps described in 4.3 to 4.7 shall be carried out for surfaces identified in 4.2.4.

4.2 Identification of surfaces

All necessary information concerning the surfaces of a product shall be gathered to classify the surfaces according to 4.2.1 to 4.2.4.

4.2.1 Identification of hot functional surfaces

Hot functional surfaces shall be identified when the equipment is installed as for normal use. See 3.6.

4.2.2 Identification of adjacent surfaces

Adjacent surfaces to hot functional surfaces shall be identified. See 3.7.

4.2.3 Identification of handles or control knobs including keypads, keyboards and the like

Relevant parts shall be identified. See 3.8.

4.2.4 Identification of non-functional touchable surfaces

All necessary information concerning the touchable surfaces of the equipment, including the following, shall be gathered:

- accessibility of the surfaces, see 4.2.4.1;
- approximate estimation of surface temperatures (hot, moderate, cold);
- material and texture of the surfaces;
- all normal operating conditions of the equipment including the worst case, i.e the setting which results in maximum temperatures of the surfaces;
- the probability of contact.

4.2.4.1 Touchable surfaces

A surface is considered touchable if parts of the appropriate test probe (EN 61032) can touch the surface. It is the responsibility of the technical committees to decide which test probe shall be used.

If the equipment is installed out of reach it is not considered touchable.