SLOVENSKI STANDARD
SIST EN 60742:1995

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Isolating transformers and safety isolating transformers - Requirements (IEC 742:1983, modified)

Isolating transformers and safety isolating transformers - Requirements

Trenntransformatoren und Sichereitstransformatoren - Anforderungen

Transformateurs de séparation des circuits et transformateurs de sécurité - Règles

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ENGLISH VERSION

ISOLATING TRANSFORMERS AND SAFETY ISOLATING TRANSFORMERS - REQUIREMENTS
(IEC 742 (1983) ed 1, modified)

Transformateurs de séparation des circuits et transformateurs de sécurité - Règles
(CEI 742 (1983) ed 1, modifiée)

Trenntransformatoren und Sicherheitstransformatoren - Anforderungen
(IEC 742 (1983) Ausg. 1, modifiziert)

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CENELEC

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

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BRIEF HISTORY

The CENELEC Questionnaire Procedure performed for finding out whether or not IEC 742 (1st edition - 1983) could be accepted without textual changes, has shown that some common modifications were necessary for the acceptance as European Standard (EN). The Reference Document was submitted to the CENELEC members for formal vote and acceptance by CENELEC.

TECHNICAL TEXT

The text of the International Standard IEC 742 (1st edition - 1983) modified, was approved by CENELEC on 28 June 1988 as a European Standard.

Annexes designated "normative" are part of the body of the standard. Annexes designated "informative" are given only for information.

In this standard, annex ZA is informative.
annex ZB is normative.
annex ZC is informative.

The following dates were fixed:

- date of announcement (doa) : 1989-04-01
- date of publication (dop) : 1989-10-01
- date of withdrawal of conflicting national standard (dow) : 1989-10-01

ENDORSEMENT NOTICE

IEC 742 (1st edition - 1983) applies taking into account the following common modifications.

Clause	Common Modification	Justification
CHAPTER 1		
1.1	Delete in the third line the words: "and 1000 V2 V unsmoothed direct current"	Editorial mistake in P.742.
2.3	Replace this sub-clause by the following: "Isolating transformer denotes a transformer, the input and output windings of which are electrically separated by double or reinforced insulation to limit, in the circuit supplied by the output winding, hazards due to accidental simultaneous contact with earth and with live parts or parts of the body which may become live in the event of an insulation fault."	1. To make clear in which way the separation is obtained. 2. To make clear that the protection refers to the output circuit only
2.6	Replace the first paragraph by the following: "Associated transformer denotes a transformer designed to supply specific appliances or equipment and either incorporated in or not incorporated in, but specially designed to be used only with the specific appliance(s) or equipment."	To make clear that transformers for specific use are not incorporated in the appliance(s) or equipment.
2.7	Replace this sub-clause by the following: " Incorporated transformer denotes an associated transformer which is designed to be built into a specific appliance or equipment, the enclosure of which provides protection against electric shock".	To make clear that the transformer as such will not meet all requirements of this standard (See also sub-clause 4.12)

Clause	Modification	Justification
2.8	Replace this sub-clause by the following: "Transformer for specific use denotes an associated transformer which, without being incorporated in an appliance or equipment, is fixed to or delivered with the appliance or equipment."	To be consistent with new definition 2.6.
2.31	Replace the last line by the following: "continues to meet all requirements of this standard after that the overload or short-circuit is removed."	Clarification
2.32	Replace the first paragraph by the following: "Non-inherently short-circuit proof transformer denotes a short-circuit proof transformer which is equipped with a protective device, which opens the input circuit or the output circuit or reduce the current in the input or output circuit when the transformer is overloaded or short circuited, and which continues to meet all requirements of this standard after that the overload or short circuit is removed".	Clarification (clear in CEE 15)
2.33	Replace in the last line but one and the last line the words "continues to function ..... is removed" by: "Continues to meet all requirements of this standard after that the overload or short-circuit is removed."	Clarification
2.35	Replace in the last line but one the words "not incorporated in" by: "not provided with"	Clarification

Clause	Modification	Justification
2.39	Add the following explanations: "National wiring rules may or may not require the interruption of the neutral conductor."	Different practice in different countries.
2.50	Replace this sub-clause by the following: "Pollution denotes any addition of foreign matter, solid, liquid or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity."	Complete alignment with IEC Publication 664, sub-clause 3.12.
4.2	Delete the third and fourth lines and replace by: "- one for all rated outputs"	No reason to require different number of specimens for different rated outputs.
4.9	Replace this sub-clause by the following: "If Class I transformers have accessible metal parts which are not connected to an earthing terminal or earthing contact, and are not separated from live parts by an intermediate metal part which is connected to an earthing terminal or earthing contact, such parts are checked for compliance with the appropriate requirements specified for Class II tranformers in this standard."	Agreed in IEC SC 14D, see document 14D (Centra Office) 26.
6.2	Replace the first line by the following: "According to short-circuit protection or abnormal use :..."	Clarification

Clause	Modification	Justification
7.1	Page 31, the first explanation to be included in the requirements. Replace "should"by "shall" two times. Replace the eighth indent by the following: " - symbol indicating the electrical function of the transformer, i.e. isolating transformer or safety isolating transformer." Page 33, delete the last explanation .	This symbol should always be marked on the transform for safety reasons.
7.2	Add the following requirement : "The information shall be such that a replacement transformer can be supplied which will be fully interchangeable with the original transformer, electrically, mechanically, dimensionally and functionally".	safety
7.12	Delete the explanation.	It serves no useful purpos
8.1	Replace the first paragraph on page 39 by the following : "Enclosures of transformers shall have no openings other than openings which are necessary for the correct functioning of the transformers. Such openings shall meet the requirements of this clause."	Original wording ambiguous
8.1 c	Delete the last sentence of the fourth paragraph on page 41 : "The more stringent tests ... under consideration."	It serves no useful purpos
	Transfer the fifth paragraph on page 41, including the explanation, to the bottom of page 39. Write the fifth paragraph as a requirement.	Editorial mistake in P. 742

Clause	Modification	Justification
8.6.3	Replace the first indent by the following: " - either the winding(s) shall be impregnated with hard-baking or cold-setting material, substantially filling the intervening spaces and effectively sealing off the end turns." Replace the second indent by the following: " - or the winding(s) shall be held together by means of insulating material."	Editorial mistake in P.742
10.1	Replace the eleventh line by the following: "For transformers with rectifiers, the above percentage values are raised by 5."	Clarification
	Replace the last paragraph by the following: "For transformers with tapped output winding (s) the load is applied to individual tapped sections, unless it is declared that all sections shall be loaded simultaneously".	Clarification
13.1.3	Replace the last paragraph by the following: "However, if the measured temperature rise exceeds the value given in Table I, the transformer is deemed not to meet the requirements of this Clause."	To be consistent wi e.g. sub-clause 2.3
13.1.4	Replace the last paragraph by the following: "However, if the measured temperature rise, taking the value of t_a into account, exceeds the value given in Table I, the transformer is deemed not to meet the requirements of this Clause."	See sub-clause 13.1.3

Clause	Modification	Justification
13.2	Replace the first sentence of the seventh paragraph by the following: "Transformers are connected to rated supply voltage and loaded with an impedance which would give rated output at rated output voltage and for a.c. current at rated power factor, then the supply voltage is increased by 6 %."	To be in line with sub-clause 10.1
14.3.2	Replace the first part of the first paragraph by the following: "If protected by a fuse in accordance with IEC Publication 269-2: Low voltage fuses, Part 2: Supplementary requirements for fuses for industrial applications or with IEC Publication 269-3: Low voltage fuses, Part 3: Supplementary requirements for fuses for domestic and similar applications, or a technically equivalent fuse, ..."	No reason not to refer to fuses for industrial application.
17.3	Replace Table VI by the following:	

TABLE VI

Table of test voltages

Application of test voltage	*Working voltage (V)**				
	≤ 50	200	*> 200 ≤ 450*	700	*1 000*
1) Between live parts of input circuits and live parts of output circuits (Note. – These requirements do not apply to circuits separated by an earthed metal screen as described in Sub-clause 8.6.1)	*500*	2 000	3 750	*5 000*	*5 500*
2) Over basic or supplementary insulation between: *a) live parts which are or may become of different polarity (for example by the action of a fuse)* *b) live parts and the body if intended to be connected to protective earth* *c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord (or metallic foil wrapped round the cable or cord) inserted inside inlet bushings, cord guards and anchorages and the like*	*250*	1 000	1 875	*2 500*	*2 750*
3) Over reinforced insulation between the body and live parts	*500*	2 000	3 750	*5 000*	*5 500*

* *Values of test voltage for intermediate values of working voltage are found by interpolation between tabulated values, except in the column > 200 ≤ 450.*

Clauses	Modification	Justification
19.1	Add after the first paragraph : "In some countries other requirements may be valid for components for which no Harmonization Document of European Standard exists"	Clarification : IEC standards may not be harmonized. Identical to pr EN 60335-I.
	Add before the explanation : " - where no IEC standard exists for the relevant component or where the component is used not in accordance with its marking, the component is tested under the conditions occurring in the transformer, the number of samples being "in general" that required by a similar specification"	Clarification : Components not marked or covered by the IEC text.
	Replace the last paragraph but one by the following : "Components incorporated in or supplied with the transformer are in addition subject to all tests of this standard as part of the transformer".	Clarification : A component such as a switch can not be tested sufficiently according to the transformer specification.
19.2	Modify the end of first paragraph : "Switches intended to disconnect the transformer from the supply, shall disconnect all poles and shall have a contact separation of at least 3mm on each pole".	
20.1	Add the following requirement : "Wireways shall be smooth and free from sharp edges, burrs, flashes, etc., which may cause damage to the insulation of wires"	Safety
21.4	Add the following explanation : "IEC code designations for cables and cords are replaced by the relevant designations according to HD21 PVC insulated cables and 22 Rubber insulated cables".	CENELEC
21.7.5	Replace the first line of the first paragraph by the following : "Stationary transformers intended for use with a power supply cord and portable transformers shall have cord anchorages such that the ..."	Clarification
22.2	Replace the explanation by the following : "Resilent connecting means and other terminals without screwed clamping means are equally acceptable, provided they comply with the requirements in IEC Publication 685-2-1. Particular requirements - Screwless terminals for connecting copper conductors whitout special preparation". Note : Table 1 of clause 10.1 of IEC 685.1 does not apply as one conductor only is sufficient	To be in line with current IEC thinking. To be in line with requirements for screw terminal

Clause	Modification	Justification
22.3a)) 22.10) 22.11) 22.12) 22.13) 22.15) (new))	Add the following explanation : "Terminals in accordance with Appendix A are equally acceptable."	To be in line with current IEC thinking
25	Add to note 5 in table XV the words: "provided that all insulating materials are classified according to IEC Publication 85".	Clarification
26.1	Replace the temperature value in the second line of the fourth paragraph by the following :. "(40 + θ) ± 2 C"	Editorial mistake in P. 742
26.2	Replace the first paragraph by the following : "External parts of insulating material shall have an appropriate level of resistance to fires originating inside the enclosure of the transformer	To make clear that resistance to external fires is not considered.
Appendix I E	In example 2 (page 146), "Pri II" shall be replaced by "Sec I" and "Sec I by "Pri II".	Editorial mistake in P. 742
CHAPTER II Section 1		
7.1	Replace the text by the following : "Shaver supply units shall be marked with the symbol according to sub-clause 7.9 of this section, as a replacement of the symbol for isolating transformers according to sub-clause 7.1 of chapter 1".	Consequence of modification in sub-clause 7.1 in chapter

Clause	Modification	Justification
7.9	Replace the text by the following: "The following symbol shall be used. Symbol for shaver supply units".	See sub-clause 7.1
7.11	Delete in the second line the words: "and shaver transformer units"	Mistake in P.742.
15.101.1 15.101.2 15	Replace everywhere the word : "Transformers" by "shaver supply units". These sub-clauses are a "modification" and not an "addition".	Mistake in P.742
18.12	Replace the text by the following : "Delete the text and the designation as a modification".	Mistake in P·742.
18.104	Add the following text: "It shall not be possible for any of the plugs listed in Appendix II-1-A to be inserted so as to bridge two socket-outlets."	Safety
19.2	Replace the first paragraph on page 159 by the following : "It is not necessary for switches incorporated in transformers or shaver supply units to be switches for frequent operation". Delete in the first line on page 161 the words: "Shaver transformers and"	Mistake in P.742
Appendix II-1-A	Replace in the second line: "IEC Publication YYY" by IEC Publication 884-1. Replace the text at the bottom of the page by the following: "While awaiting the result of the work of IEC SC23B on Publication 884-1, national standards for socket-outlets are applicable.	Clarification

Clause	Modification	Justification
CHAPTER III	Delete the words "Section Five ; Medical safety isolating transformers (under consideration)"	
Section 1		
5.1	Add 48V to the list of preferred values	Additional value
7.1	Delete this sub-clause	Consequence of modification in sub-clause 7.1 in Chapte
Section 2		
7.1	Replace the text by the following : "Transformers for toys shall be marked with the symbol according to sub-clause 7.9 of this section, as a replacement of the symbol for safety isolating transformers according to sub-clause 7.1 of Chapter I.	Consequence of modification in sub-clause 7.1 in Chapte
	If transformers for toys are not intended for outdoor use, this shall be stated in the instructions for use."	Safety
13.2 Table I	Replace the eighth line in table I the following : "External enclosures (which may be touched with the standard test finger) of stationary transformers, if : of metal ----------45 of other material -----55"	Safety
	Replace the last line on page 55 by the following : "of other material-------55"	
14.1 Table III	Replace the eighth line in table III by the following : External enclosures (which may be touched with the standard test finger), if : of metal ----------45 of other material -----55"	Safety
14.5.2	Replace the text by the following : "Modification For fail safe transformers for toys the temperature rise of any part of the enclosure of the transformer which can be touched by the standard test finger shall not exceed 45K for metal parts or 55K for parts of other material."	Safety

Clause	Modification	Justification
19.3	Add the following new sub-clause : "Modification : It shall not be possible to make permanent contact, not even with one pin, between plugs accepted by socket-outlets in the output circuit of the transformer and connectors of appliance couplers according to IEC Publication 320. Appliance couplers for household and similar general purposes. Compliance is checked by inspection and by manual test."	Agreed in IEC SC 14D, see document 14D (Central Office) 24
Section 3 4.10	Replace the text by the following : "Bell transformers are tested in open air for the heating test of Clause 13, taking into account the relevant method of mounting as specified in sub-clause 18.1".	Clarification
7.1	Replace the text by the following : "Bell transformers shall be marked with the symbol according to sub-clause 7.9 of this section, as a replacement of the symbol for safety isolating transformers according to sub-clause 7.1 of Chapter I."	Consequence of modification in sub-clause 7.1 in Chapte
11.2	Replace the text by the following : "The difference between the output voltage at no-load and at rated output (measured..."	To be consistent with sub-clause 10.1 of Chapter
13.2	Replace the text on page 183 and the first two paragraph in page 185 by the following : "Replace the first paragraph by : temperature rises are determined under the conditions specified in sub-claude 4.10. The fourth and fifth paragraphs do not apply. Modify the seventh paragraph to read : With the transformer at ambient temperature, it is connected to rated supply voltage and loaded with an impedance which would give rated output at rated output voltage at rated power factor and also (by a switch or a similar means) to five times the impedance to carry out the cyclic test. No further adjustments are made except that the rated supply voltage is increased by 6 %. Bell transformers are tested for a series of 20 load cycles, each cycle consisting of 1 min at the rated output current setting and 5 min at 20 % of the rated output current setting. Temperature rises are measured at the end of the final period under full load conditions. The impedance is then increased to five times the original value and when steady-state conditions are reached, temperature rises are again measured."	
18.1	Add the following explanation to 1) : "The words "for certain types" denote transformers used in certain countries."	Clarification