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TEST REPORT
IEC 61558-2-16
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V
Part 2: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units

Report Number. .....:	200300046TWN-001
Date of issue .....:	August 28, 2020
Total number of pages.....	121 pages
Name of Testing Laboratory preparing the Report.....:	Intertek Testing Services Taiwan Ltd. 5 F, No. 423, Ruiguang Road, Neihu District, Taipei 114, Taiwan
Applicant's name.....:	GlobTek, Inc.
Address .....:	186 Veterans Dr. Northvale, NJ 07647, USA
Test specification:	
Standard .....:	EN 61558-2-16:2009/AMD1:2013 used in conjunction with EN 61558-1:2005/AMD1: 2009
Test procedure .....:	General Report
Non-standard test method .....:	N/A
Test Report Form No.....:	IEC 61558_2_16E_modified (See General Remarks)
Test Report Form(s) Originator ....:	Intertek
Master TRF.....:	Dated 2020-04

Test item description ..... :	Power supply Unit
Trade Mark ..... :	GlobTek, Inc.
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	GT*96600-*36-P3*, GTM96600-6036-P3 (See general product information on page 5)
Ratings ..... :	Input: 100-240 Vac, 50-60 Hz, 1.5 A Output: 36 Vdc, max. 1.5 A, max. 54 W Class I

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	Intertek Testing Services Taiwan Ltd.	
Testing location/ address.....:		5 F, No. 423, Ruiguang Rd., Neihu District, Taipei 114, Taiwan	
☐	**Associated Testing Laboratory:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:		Project Handler, Viper Lai	Viper Lai
Approved by (name, function, signature)...:		Reviewer, Dan Chen	

List of Attachments (including a total number of pages in each attachment):

Appendix 1, 1 page – National differences

Appendix 2, 1 page – Circuit diagram

Appendix 3, 1 page – PCB layout

Appendix 4, 2 pages – Physical construction of transformer (T1)

Appendix 5, 1 page – Dimension of heatsink

Photo, 3 pages

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
The sample(s) tested complies with the requirements of EN 61558-2-16:2009/AMD1:2013 used in conjunction with EN 61558-1:2005/AMD1:2009. 8.15 Marking test 9.1.1 User accessible voltage and current test 9.1.2 Finger test (live parts) 9.1.2 Pin test (live parts) 11.1 Output voltage test 12.101 No–load output voltage test 14.1 Heating test 15.3 Short-circuit & overload protection 16.2 Impact test 17.2 Humidity treatment test 18.2 Insulation resistance test 18.3 Dielectric strength test 18.5.1 Touch current test 18.101 Impulse test 26.101 Clearances and creepage distances 27.1 Ball pressure test 27.3 Glow wire test H.2 Short-circuit & overload protection test	Intertek Testing Services Taiwan Ltd.

Summary of compliance with National Differences:

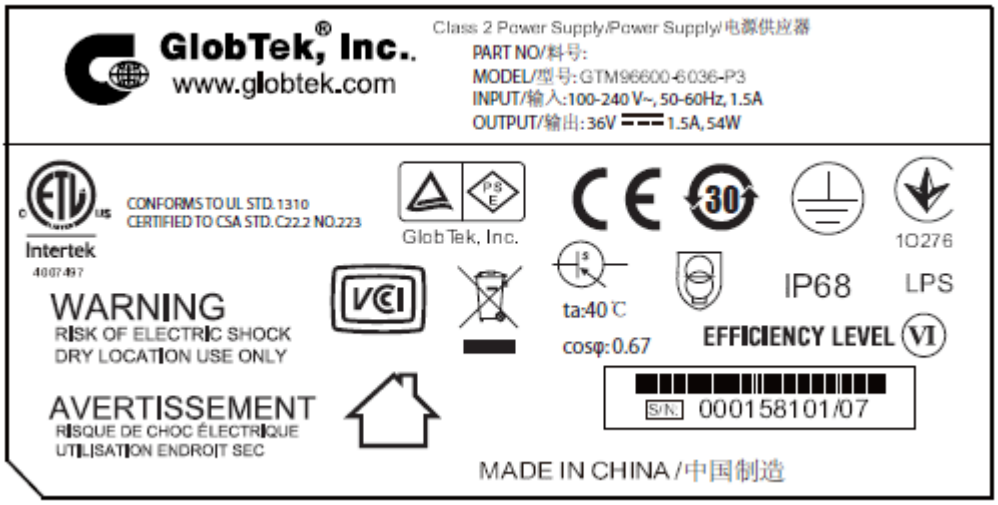
The national differences for Germany we checked.

☒ **The product fulfils the requirements of <u>EN 61558-2-16:2009/AMD1:2013 used in conjunction with EN 61558-1:2005/AMD1: 2009.</u>**

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

(Representative)



Note:

1. The above markings are the minimum requirements required by the safety. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.
2. When the equipment is vended to the European Economic Area (EEA), then name and address of the importer or authorized representative within the EEA shall be added on the equipment.

Test item particulars .....

Classification of installation and use ..... Indoor use only

Supply Connection..... The mains plug of supply cord

Possible test case verdicts:

- test case does not apply to the test object..... N/A

- test object does meet the requirement ..... P (Pass)

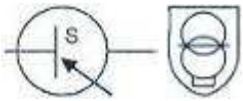
- test object does not meet the requirement..... F (Fail)

Testing .....

Date of receipt of test item ..... March 9, 2020

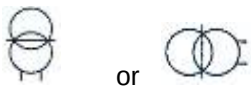
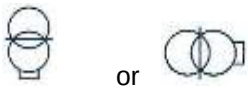
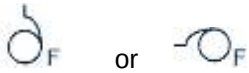
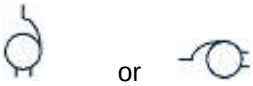
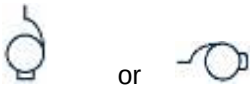
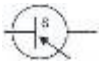
Date (s) of performance of tests..... March 16, 2020 - May 22, 2020

General remarks:
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.** National Differences which have not been evaluated are marked with verdict: "- "
Name and address of factory (ies).....: 1. GlobTek, Inc. 186 Veterans Dr. Northvale, NJ 07647 USA 2. GlobTek (Suzhou) Co., Ltd. Building 4, No. 76 JinLing East Road, Suzhou Industrial Park, Suzhou, JiangSu, 215021, China
General product information: The equipment is a power supply unit for used in a general household environment and for indoor use only. The equipment is considered as fixed and Class I equipment. The enclosure is fixed together by mechanical and glue. The equipment is filled with Epoxy Potting Compound. The equipment is submitted and evaluated for max. manufacturer's recommended ambient of 40 °C. Model GTM96600-6036-P3 is identical to Model GT*96600-*36-P3*, except for model designation for marketing purpose use only. **Explanation of model designation GT*96600-*36-P3*:** The 1st symbol "*" can be "M" or "-" or "H" for market identification and not related to safety. The 2nd symbol "*" denotes the rated output watt designation, which can be "01" to "54", with interval of 1. P3 means Encapsulated class I The last symbol "*" denotes any six characters = 0-9 or A-Z or ()[] or – or blank for marketing purposes. Or model will be GTM96600-6036-P3, Output: 36 V, 1.5 A, 54 W.

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
8	**MARKING AND OTHER INFORMATION**		P
8.1	Transformer marked with:	See below	P
	a) rated supply voltage or voltage range (V) .....:	100–240 Vac	P
	b) rated output voltage (V) .....:	36 Vdc	P
	c) rated output (VA, kVA or W) .....:		N/A
	d) rated output current (A) .....:	1.5 A	P
	e) rated frequency (Hz) .....:	50-60	P
	f) rated power factor (if not 1) .....:	cosφ 0.67	P
	g) symbol AC for alternating current, or DC for direct current-output	Symbol "∿" provided for input and symbol "⎓" provided for output	P
	h) symbol for electrical function (according to one or more part's 2) in addition with the symbol for SMPS (IEC 61558-2-16:09)		P
	i) manufacturer's name or trademark or name of the responsible vendor	GlobTek	P
	j) model or type reference	GT*96600-*36-P3* GTM96600-6036-P3	P
	k) vector group according to IEC 60076 for three-phase transformer		N/A
	l) symbol for Class II		N/A
	m) symbol for Class III		N/A
	n) index IPXX if other than IP00	The EUT is index IP68	P
	o) rated max. ambient temperature ta (if not 25 °C) .....:	ta = 40 °C	P
	p) rated minimum ambient temperature ta min, if <10° C and if a temperature sensitive device is used		N/A
	q) short-time duty cycle: operating time Intermittent duty cycle: operating and resting time (e.g. 5min/30min)	The EUT is continuous operating type	N/A
	r) for tw-marked transformers marked with the rated max. operating temperature, increased by multiples of 5 (e.g. tw 120; tw 125)		N/A
	s) transformers used with forced air cooling shall be marked with "AF" in m/s		N/A
	t) Information from the manufacturer to the purchaser (data sheet):		N/A
	– short-circuit voltage (% rated supply voltage) for stationary transformers > 1000 VA		N/A
	– electrical function of the transformer		N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets	IP68	N/A
8.3	Adjusted voltage easily and clearly discernible		N/A
8.4	For each tapping or winding: rated output voltage and rated output	The EUT is not provided with tapped mode or multiple output windings	N/A
	necessary connections clearly indicated		N/A
8.5	For short-circuit proof transformers or non-inherently short-circuit proof transformers:	The EUT is non-inherently short-circuit proof transformer	P
	Rated current (A or mA) and symbol for time current characteristics of the fuses for non-inherently short-circuit proof transformer with incorporated fuses and non-short-circuit proof transformer……:	The EUT is designed to be protected by a non-replaceable fuse link, need no additional marking regarding the protective device	N/A
	Manufacturer's model or type reference and rating of the device for non-inherently short-circuit proof transformers with incorporated replaceable protec-tive device (other than fuses)	The EUT has no replaceable protective device	N/A
	Construction sheet for transformers with replaceable protective device (other than fuses) information with information about the replacement.	The EUT has no replaceable protective device	N/A
8.6	Terminals for neutral: "N"	No such terminals	N/A
	Terminal for protective earth marked with earthing symbol		N/A
	Identification of input terminals: "PRI"		N/A
	Identification of output terminals: "SEC"		N/A
	Symbol for any point/terminal in connection with frame or core		N/A
8.7	Indication for correct connection	The design of the transformer is clearly indicating the manner where the transformer is to be connected	P
8.8	Instruction sheet for type X, Y, Z attachments		N/A
8.9	Transformer for indoor use shall be marked with the relevant symbol.		P
8.10	Symbol for Class II construction not confused with maker's name or trademark.	Class I power supply unit	N/A
	Class II transformer with parts to be mounted – delivered with all parts for class II after mounting.		N/A
	Symbol for class II transformer placed on the part which provides class II.		N/A
8.11	Correct symbols:	See copy of marking plate	P
	Volts	V	P
	Amperes	A (mA)	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	N/A
	Watts	W	P
	Hertz	Hz	P
	Input	PRI	N/A
	Output	SEC	N/A
	Direct current	d.c. (DC) or ⎓	P
	Neutral	N	N/A
	Single-phase a.c.	∼	P
	Three-phase a.c.	3 ∼	N/A
	Three-phase and neutral a.c.	3/N ∼	N/A
	Power factor		N/A
	Class II construction		N/A
	Class III construction		N/A
	Fuse (add symbol for time-current characteristics)		N/A
	Rated max. ambient temperature	t_a=40	P
	Frame or core terminal		N/A
	Protective earth		P
	IP number	The EUT is index IP68	P
	Earth (ground for functional earth)		N/A
	For indoor use only		P
	tw5 YYY		N/A
	tw10 YYY		N/A
	twx YYY		N/A
	Additional Symbols (IEC 61558-2-16:09)	See below	P
	SMPS incorporating a **Fail-safe separating transformer**	F or F	N/A
	SMPS incorporating a **Non-short-circuit-proof separating transformer**	or	N/A
	SMPS incorporating a **Short-circuit-proof separating transformer** (inherently or non-inherently)	or	N/A
	SMPS incorporating a **Fail-safe isolating transformer**	F or F	N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	SMPS incorporating a **Non-short-circuit-proof isolating transformer**		N/A
	SMPS incorporating a **Short-circuit-proof isolating transformer** (inherently or non-inherently)		N/A
	SMPS incorporating a **Fail-safe safety isolating transformer**		N/A
	SMPS incorporating a **Non-short-circuit-proof safety isolating transformer**		N/A
	SMPS incorporating a **Short-circuit-proof safety isolating transformer** (inherently or non-inherently)		P
	SMPS incorporating a Fail-safe **auto-transformer**		N/A
	SMPS incorporating a **Non-short-circuit proof auto-transformer**		N/A
	SMPS incorporating a **Short-circuit proof auto-transformer** (inherently or non-inherently)		N/A
	SMPS (Switch mode power supply unit)		P
8.12	Figures, letters or other visual means for different positions of regulating devices and switches	No such component within the EUT	N/A
	OFF position indicated by figure 0		N/A
	Greater output, input etc. indicated by higher figure		N/A
8.13	Marking not on screws or other easily removable parts	Marking plate is not placed on removable parts	P
	Marking clearly discernible (transformer ready for use)		P
	Marking for terminals clearly discernible if neces-sary after removal of the cover	No such terminals	N/A
	Marking for terminals: no confusion between input and output	No such terminals	N/A
	Marking for interchangeable protective devices positioned adjacent to the base	No interchangeable protective devices used	N/A
	Marking for interchangeable protective devices clearly discernible after removal of cover and protective device	No interchangeable protective devices used	N/A
8.14	Special information for installation (in the catalogue, data sheet, or instruction sheet) if necessary:	See below	P
	For non-inherently short-circuit proof transformers with non-self-resetting or non-replaceable devices (weak-point, thermal link): The device cannot be reset or replaced	The instruction sheet “The fuse is not replace” provided	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	For transformers generating a protective earth conductor current of 10 mA (see also cl. 18.5.2): The installation shall be made according to the wiring rules.		N/A
	For associated and IP00-transformers: At 10 % over or under voltage in the supply voltage, the rated output of the transformer shall be selected accordingly.		N/A
	For stationary transformers exceeding 1000 VA: The short circuit voltage in % of the rated voltage	The EUT is fixed transformers	N/A
	For all transformers the electrical function: An information about the electrical function of the transformer (e.g. inherently short circuit proof safety isolating transformer)	The instruction sheet “The EUT is non-inherently short-circuit proof transformer	P
	For associated and IP00-transformers: The max. abnormal winding temperature		N/A
	For t_w-transformers: The specific constant S is (e.g. S6 says S = 6000)	The EUT is not a t_w-transformer	N/A
	For transformers with more than one output winding, not for series or parallel connection	The EUT is not provided with multiple output windings	N/A
	– an information in the instruction sheet: the transformer is not intended for series/parallel connection	See above	N/A
	For IP00-transformers the test of 27.2 is not performed. The result may be affected by the enclosure in the final application.	IP68	N/A
8.15	Marking durable and easily legible	After rubbing test (water and petroleum spirit), the marking is still legible; it is not easy to remove and show no sign of curling	P

9	**PROTECTION AGAINST ELECTRIC SHOCK**		P
9.1	Protection against contact with hazardous live parts	All hazardous live parts are covered with enclosure	P
9.1.1	A live part is not a hazardous live part if:		P
	– it is separated from the supply by double or reinforced insulation	The output of the EUT is separated from the supply by double or reinforced insulation	P
	– the requirements of 9.1.1.1 or 9.1.1.2 are fulfilled	The requirements of 9.1.1.1 and 9.1.1.2 are fulfilled	P
9.1.1.1	The touch voltage is ≤ 35 V(peak) a.c. or ≤ 60 Vd.c	The max. touch voltage of output port: 36.2 Vdc	P
9.1.1.2	If the touch voltage is > 35 V (peak)a.c. or > 60 V d.c., the following requirements shall be fulfilled:	Between L/N and any poles of output measured Max. 492 Vpeak	P
	The touch current shall not exceed:	Test voltage: 240 Vac, 60 Hz	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	- for a.c. 0,7 mA (peak)	Measured: 0.066 mA (peak)	P
	- for d.c. 2,0 mA (see Annex J)		N/A
	In addition, when a capacitor is connected to live parts:		—
9.1.1.2.1	discharge: < 45 µC (between 60 V and 15 kV)		N/A
9.1.1.2.2	energy: ≤ 350 mJ (voltage >15 kV)		N/A
9.1.2	Transformers shall have an adequate protection against accessibility to hazardous live parts:	The input circuit is considered as hazardous live parts and protected by enclosure	P
	The enclosure of class I and class II transformers gives an adequate protection against accentual contact with hazardous live parts.	All accessible parts are not hazardous live	P
	Class I transformers: accessible parts are separated from hazardous live parts by at least basic insulation.	All accessible parts are separated from hazardous live parts by basic insulation and double or reinforced insulation	P
	Class II transformers: no accessibility to basic insulation, or conductive parts separated from hazardous live parts by basic insulation.		N/A
	Hazardous live parts are not accessible after removal of detachable parts	No detachable parts within the EUT	N/A
	Hazardous live parts are not accessible after removal of detachable parts except for:		N/A
	- lamps having caps larger B9 and E10		N/A
	- type D fuse holder		N/A
	Lacquers, enamel, paper, cotton, oxide film on metal parts not used for protection against accidental contact with hazardous live parts:	No such devices provided for protection against accidental contact with hazardous live parts	N/A
	Shafts, handles, operating levers, knops are not hazardous life parts.	No such devices	N/A
	Compliance is checked by inspection and by relevant tests according to IEC 60529	Considered	P
	Class II transformers and Class II parts of Class I construction are tested with the test pin (fig.3)	No openings	P
	Hazardous live parts shall not be touchable by test finger (fig. 2)	The test finger was not becoming hazardous live parts	P
	for Class II transformers: metal parts separated by basic insulation from hazardous live parts not touchable by test finger	No such metal parts	N/A
	hazardous live parts shall not be touchable with the test pin	No hazardous live parts are able to be touchable by test pin	P
9.1.3	Accessibility of non-hazardous live parts		P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Non-hazardous live parts of the output circuit may be accessible if they are isolated from the input circuit by double or reinforced insulation and if the following conditions are fulfilled:	The output circuit is isolated from the input circuit by double or reinforced insulation	P
	- The no load output voltage is ≤ 35 V peak a.c. or ≤ 60 V ripple free d.c., both poles are accessible	The no-load output circuit is measured max. 37.63 Vdc	P
	- The no load output voltage is > 35 V peak a.c. or > 60 V ripple free d.c. and ≤ 250 V a.c., only one pole may be accessible		N/A
9.2	Transformers with primary supply plug: 1 s after the interruption of the supply the voltage between the pins do not exceed 35 V (peak) a.c. or 60 V ripple free d.c.	The max. voltage is 12 V between primary supply plug at 1 s after interruption	P
	Transformers without a primary supply plug: 5 s after the interruption of the supply the voltage between the input terminals do not exceed 35 V (peak) a.c. or 60 V ripple free d.c.		N/A
	The following tests are required:		N/A
	If the nominal capacitance is ≤ 0,1 µF – no test is conducted.		—
	- 10 times switch the supply source on and off, or use a special equipment for to switch off at the most unfavourable electrical angle	The EUT is still complying with relevant requirements of this standard.	P
	If the measured voltage is > 60 V ripple free d.c., the discharge must be ≤ 45 µC.		N/A

10	**CHANGE OF INPUT VOLTAGE SETTING**		P
	Voltage setting not possible to change without a tool	No voltage setting device	N/A
	Different rated supply voltages:		N/A
	- indication of voltage for which the transformer is set, is discernible on the transformer.		N/A
10.101	A wide range of the input (120 V a. c, to 240 V a.c voltage is allowed (IEC 61558-2-16:09):	100-240 Vac	P
	– if the output voltages does not exceed the rated output voltage	The EUT does not exceed the rated output voltage	P
	– if the no-load voltage does not exceed the limits of output voltage deviation	The EUT does not exceed the limits of output voltage deviation	P

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
11	**OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD**		P
11.1	Difference from rated value (without rectifier; with rectifier):	The EUT incorporating rectifier	P
	a) inherently short-circuit proof transformers with one rated output voltage for output voltage: a.c. ≤ 10 %; d.c. ≤ 15 %		N/A
	b) inherently short-circuit proof transformers with one more than 1 rated output voltage for highest output voltage: a.c. ≤ 10 %; d.c. ≤ 15 %		N/A
	c) idem for other output voltages: a.c. ≤ 15 %; d.c. ≤ 20 %		N/A
	d) other transformers for output voltages: a.c. ≤ 5 %; d.c. ≤10 %	Limit ≤ 10% (see appended table 11 and 12)	P

12	**NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)**		P
	Remark: with rectifier measuring on both sides of the rectifier		N/A
12.101	The no load output voltage shall not exceed (IEC 61558-2-16:09):		P
	– For SMPS incorporating separating or auto-transformers: 1000 V a.c. or 1415 V ripple free d.c.	The EUT not incorporate separating or auto-transformers	N/A
	– For SMPS including isolating transformers: 500 V a.c. or 708 V ripple-free d.c.	No such transformer within the EUT	N/A
	– For SMPS including safety isolating transformers: 50 V a.c. or 120 V ripple-free d.c.	The EUT incorporate with safety isolating transformers and measured no-load output voltage max 37.63 Vdc	P
	For **independent transformers,** this output voltage limitation applies even when output windings, not for interconnection, are connected in series	The EUT has only one output winding	N/A
12.102	The difference between output voltage at no load and the output voltage measured in clause 11 does not exceed the values of table 101 (IEC 61558-2-16:2009), Rated output (VA) Rated value %	Ratio is 5 %, rated output is 10 VA (see appended table 12)	P
12.103	Unless otherwise specified by the manufacturer, SMPS with high frequency output rating shall be tested with 20 cm to 200 cm length of wire connected to the output terminals under the most unfavourable conditions. Two twisted wires or cables rated 60227 IEC 53 may be used. The cross-sectional area of the conductors shall be determined according to the rated output of the SMPS, and the current density shall not exceed 5 A/mm^2 in normal use. (IEC 61558-2-16:2009)	The equipment is DC output and no wiring terminals used	N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
13	**SHORT-CIRCUIT VOLTAGE**		N/A
	Difference from marking for short-circuit voltage ≤ 20%	No marking for short-circuit voltage	N/A

14	**HEATING**		P
	General requirements		P
	No excessive temperature in normal use	(See appended table 14)	P
	Room temperature: rated ambient temperature ta ± 5 °C	Rated ambient temperature: 40 °C	—
	Type X, Y, Z attachments: 1 pull (5 N) to the connection windings	5 N apply to input cord and output cord (Type Z attachment)	P
	Upri (V): 1,1 times rated supply voltage loaded with rated impedance – for independent transformers		—
	Upri (V): 1,1 times rated supply voltage: with I sec (A), measured with rated impedance and 1,0 times of the rated supply voltage for others than independent transformers	110 Vac (1.1 times of 100 Vac) and 264 Vac (1.1 times of 240 Vac)	—
	Max. temperature windings .....:	See below	P
	- Class A: ≤ 100 °C		N/A
	- Class E: ≤ 115 °C		N/A
	- Class B: ≤ 120 °C	(See appended table 14)	P
	- Class F: ≤ 140 °C		N/A
	- Class H: ≤ 165 °C		N/A
	- other classes		N/A
	Temperature of external enclosures of stationary transformers:	The EUT is fixed transformer	P
	- metal: ≤ 70 °C		N/A
	- other material: ≤ 80 °C	(See appended table 14)	P
	Temperature of external enclosure of stationary transformer ≤ 85 °C (not touchable with the IEC test finger)		N/A
	Temperature of external enclosures, handles, etc. of portable transformers:		N/A
	- continuously held parts of metal: ≤ 55 °C		N/A
	- continuously held parts of other material: ≤ 75 °C		N/A
	- not continuously held parts of metal: ≤ 60 °C		N/A
	- not continuously held parts of other material: ≤ 80 °C		N/A
	Temperature of terminals for external conductors ≤ 70 °C	No such terminals within EUT	N/A

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict
	Temperature of terminals of switches ≤ 70 °C	No such device within EUT	N/A
	Temperature of internal and external wiring:	(See appended table 14, UL recognized wiring used)	P
	- rubber: ≤ 65 °C		N/A
	- PVC: ≤ 70 °C		N/A
	Temperature of parts where safety can be affected:		N/A
	- rubber: ≤ 75 °C		N/A
	- phenol-formaldehyde: ≤ 105 °C		N/A
	- urea-formaldehyde: ≤ 85 °C		N/A
	- impregnated paper and fabric: ≤ 85 °C		N/A
	- impregnated wood: ≤ 85 °C		N/A
	- PVC, polystyrene and similar thermoplastic material: ≤ 65 °C		N/A
	- varnished cambric: ≤ 75 °C		N/A
	Temperature rise of supports ≤ 85 °C		N/A
	Temperature of printed boards:		N/A
	- bonded with phenol-formaldehyde: ≤ 105 °C		N/A
	- melamine-formaldehyde: ≤ 105 °C		N/A
	- phenol-furfural: ≤ 105 °C		N/A
	- polyester: ≤ 105 °C		N/A
	- bonded with epoxy: ≤ 140 °C		N/A
	Electric strength between input and output windings (18.3, 1 min); test voltage (V) .....:	4200 V between input and output windings	P
14.101	Winding temperature measured by thermocouples at the surface of the winding (IEC 61558-2-16:09)		P
	– if the internal frequencies is > 1 kHz	The temperature measured by thermocouples	P
	– the values of Table 1 for windings temperatures are reduced by 10 °C	Class B: 110° C	P
14.2	Application of 14.1 or 14.3 according to the insulation system	See below	P
14.2.1	Class of isolating system (classified materials according to IEC 60085 and IEC 60216)	Approved insulation system used, Class B	P
14.2.2	No classified material, or system but the measured temperature does not exceed the value of Class A		N/A
14.2.3	No classified material or system but the measured temperature exceeds the value for Class A, the live parts of the transformers are submitted to the test of 14.3		N/A
14.3	Accelerated ageing test for undeclared class of isolating system	Approved insulation system used	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Cycling test (10 cycles):		N/A
	- measuring of the no-load input current (mA)		N/A
14.3.1	- heat run (temperature in table 2)		N/A
14.3.2	- vibration test: 30 min; amplitude 0,35 mm; frequency range: 10 Hz, 55 Hz, 10 Hz		N/A
14.3.3	- moisture treatment (48 h, 17.2)		N/A
14.3.4	Measurements and tests at the beginning and after each test:		N/A
	- deviation of the no-load input current, measured at the beginning of the test is 30%		N/A
	- insulation resistance acc. cl.18.1 and 18.2		N/A
	- electric strength, no breakdown (18.3); 2 min; test voltage 35 % of specified value (table VI)		N/A
	- Transformers (50 or 60 Hz version) are tested after the dielectric strength test as follows: under no load; duration: 5 min; Upri(V):1,2 times rated supply voltage; frequency (Hz): 2 times rated frequency		N/A

15	**SHORT-CIRCUIT AND OVERLOAD PROTECTION**		P
15.1	General	The EUT is non-inherently short-circuit proof transformer consider to sub-clause 15.3	P
	Tests direct after 14.1 at the same ta and without changing position		P
	Supply voltage between 0,9 times and 1,1 times of the rated supply voltage	90 Vac (0.9 times of 100 Vac) and 264 Vac (1.1 times of 240 Vac)	—
	Transformer with rectifier tests of 15.2 and 15.3 at the input and the output terminals of the rectifier.	Considered	P
	Transformers with more than one output winding or tapping, all windings tested with normal load, the winding with the highest temperature is short circuited.	Transformers has only one output winding	N/A
	Wining protected inherently (15.2)		N/A
	- Max. temperature of winding protected inherently (insulation class): ≤ 150 °C (A); ≤ 165 °C (E); ≤ 175 °C (B); ≤ 190 °C (F) ≤ 210 °C (H)		N/A
	Winding protected by protective device:	(See appended table 15)	P
	– Test according 15.3.2 - 15.3.3 – 15.3.4: max. temperature of winding during the time required or the time T given in table 4 (a) (insulation class): ≤ 200 °C (A); ≤ 215 °C ;(E); ≤ 225 °C (B); ≤ 240 °C (F); ≤ 260 °C (H)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– Test according 15.3.1: max. temperature of winding **during the first hour, peak value** (insulation class): ≤ 200 °C (A); ≤ 215 °C (E); ≤ 225 °C (B); ≤ 240 °C (F); ≤ 260 °C (H)	≤ 225 °C (B) (See appended table 15)	P
	– Test according 15.3.1: max. temperature of winding **after first hour, peak value** (insulation class): ≤ 175 °C (A); ≤ 190 °C (E); ≤ 200 °C (B); ≤ 215 °C (F); ≤ 235 °C (H)		N/A
	– Test according 15.3.1: max. temperature of winding **after first hour, arithmetic mean value** (insulation class): ≤ 150 °C (A); ≤ 165 °C (E); ≤ 175 °C (B); ≤ 190 °C (F); ≤ 210 °C (H)		N/A
	Max. temperature of external enclosures (accessible by test finger) ≤ 105 °C	(See appended table 15)	P
	Max. temperature of insulation of wiring (rubber and PVC) ≤ 85 °C	(See appended table 15)	P
	Temperature rise of supports ≤ 105 °C	(See appended table 15)	P
15.2	For inherently short-circuit proof transformers and for transformers with rectifiers test by short circuit of the output winding at rated supply voltage x 1,1: temperature rises ≤ values in table 3		N/A
15.3	For non-inherently short-circuit proof transformers and for transformers with rectifiers: temperature rises ≤ values in table 3	(See appended table 15)	P
15.3.1	Output terminals short-circuited: protection device operates, test at 0,9. 1,1 of the rated supply voltage	90 Vac (0.9 times of 100 Vac) and 264 Vac (1.1 times of 240 Vac) (See appended table 15)	P
15.3.2	If protected by a fuse accordance with either IEC 60269-2 or IEC 60269-3, or a technical equivalent fuse, the transformer is loaded as in table 4.		N/A
15.3.3	If protected by a fuse accordance with either IEC 60127 or ISO 8820, or a technical equivalent fuse, the transformer is loaded with the current as specified for the longest pre-arcing time. *If protected by a miniature fuse in accordance to IEC 60127, 1,5 times of the rated fuse, until steady state condition (in addition)*		N/A
15.3.4	If protected by a circuit-breaker according to IEC 60898 the transformer is loaded with a current equal to 1,45 times the value of the circuit-breaker rated current		N/A
15.3.5	If other overload protection than a fuse (IEC 60127) or a circuit-breaker (IEC 60898) test with 0,95 times of operating current		N/A
	If an internal week point is used, the test must be repeated with two new samples. The two additional samples works similar to the first sample. Temperatures in the limit of table 3		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
15.4	For non-short-circuit proof transformers: temperature rises ≤ values in table 3, tests as indicated in 15.3		N/A
15.5	For fail-safe transformers:		N/A
15.5.1	Three additional new specimens are used		—
	- Upri (V): 1,1 times rated supply voltage .....:		—
	- Isec (A): 1,5 times rated output current .....:		—
	- time until steady-state conditions t1 (h) .....:		—
	- time until failure t2 (h): ≤ t1; ≤ 5 h .....:		N/A
15.5.2	During the test:		N/A
	- no flames, molten material, etc.		N/A
	- temperature of enclosure ≤ 175 °C		N/A
	- temperature of plywood support ≤ 125 °C		N/A
	After the test:		N/A
	- electric strength (Cl. 18, 1 min, test voltage: 35 % of specified value); no flashover or break-down for primary-to-secondary only for safety isolating, isolating and separating transformer and for primary-to-body for all kinds of transformer		N/A
	- bare hazardous live parts not accessible by test finger through holes of enclosure		N/A
15.101	Electronic circuits of the SMPS fulfil the requirements of **Annex H of part 1**. After a fault: no electric shock, no fire hazard and no unintentional operation	(See table Annex H.2)	P

16	**MECHANICAL STRENGTH**		P
16.1	General	EUT is fixed transformer (With integrated pins)	N/A
	After tests of 16.2, 16.3 and 16.4		N/A
	- no damage		N/A
	- hazardous live parts not accessible by test pin according to 9.2		N/A
	- no damage for insulating barriers	No insulating barriers	N/A
	- handles, levers, etc. have not moved on shafts		N/A
16.2	Transformers (stationary and portable s. 16.1)	See below	P
	For stationary and portable transformers: 3 blows, impact energy 0,5 Nm	The EUT is still complying with relevant requirements of this standard	P
16.3	Portable transformers (except of plug in transformers)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For portable transformers: 100 falls, 25 mm		N/A
16.4	Transformers with integrated pins (plug in transformers), the following tests are carried out:		N/A
	a) plug-in transformers: tumbling barrel test: 50 x ≤ 250 g; 25 x ≥ 250 g		N/A
	b) torque test of the plug pins with 0,4 Nm		N/A
	c) pull force according to table 5 for each pin		N/A

17	**PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE**		P
17.1	Degree of protection (IP code marked on the transformer)	The EUT is index IP68	P
	Test according to 17.1.1 and for others IP ratings test according to IEC 60529:	(Refer to report no.WTX20F03010384S)	P
	– stable operating temperature before starting the test for < IPX8		P
	– transformer mounted and wired as in normal use		P
	– fixed transformer mounted as in normal use by the tests according to 17.1.1 A to L		P
	– portable transformers placed in the most unfa-vourable position and wired as in normal use		N/A
	– glands tightened with a torque equal to two-thirds of 25.6		N/A
	After the tests:		P
	- dielectric strength test according to 18.3		P
	Inspection:	See below	P
	a) in dust-proof transformers no deposit of talcum powder		N/A
	b) no deposit of talcum powder inside dust-tight transformers		N/A
	c) no trace of water on live parts except SELV parts below 15 V ac or 25 V dc or insulation if hazard for the user or surroundings no reduction of creepage distances		N/A
	d) no accumulation of water in transformers ≥ IPX1 so as to impair safety		N/A
	e) no trace of water entered in any part of water-tight transformer		N/A
	f) no entry into the transformer by the relevant test probe	Complied	P
17.1.1	Tests on transformers with enclosure:		P
	A) Solid-object-proof transformers:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- IP2X test finger (IEC 60529) and test pin (fig. 3)		P
	B) Solid-object-proof transformers:		N/A
	- wire 2,5 mm; force 3 N		N/A
	- IP4X, wire 1 mm; force 1 N		N/A
	C) Dust-proof transformers, IP5X; dust chamber according to IEC 60529, fig. 2:		N/A
	a) transformer has operating temperature		N/A
	b) transformer, still operating, is placed in the dust chamber		N/A
	c) the door of the dust chamber is closed		N/A
	d) fan/blower is switched on		N/A
	e) after 1 min transformer is switched off for cooling time of 3 h		N/A
	A) Dust-tight transformers (IP6X) test according to C)		P
	B) Drip-proof transformers (IPX1) test according to fig. 3 of IEC 60529 for 10 min		N/A
	C) Rain-proof transformers (IPX2) test according to fig. 3 of IEC 60529 for 10 min in operation, any angle up to 15°		N/A
	D) Spray proofed transformers (IPX3) test according to fig. 4 of IEC 60529 for 10 min in operation and 10 min switched off, time for complete oscillation (2 x 120°) is 4 sec.		N/A
	E) Splash-proof transformers (IPX4) test according to fig. 4 of IEC 60529 (see F) for 10 min in operation and 10 min switched off (the tube shall oscillate ≈360)		N/A
	F) Jet-proof transformer (IPX5) test according to fig. 6 of IEC 60529 (nozzle 6,3mm)		N/A
	G) Powerful Jet-proof transformer (IPX6) test according to fig. 6 of IEC 60529 (nozzle 12 mm)		N/A
	H) Watertight transformers (IPX7)		N/A
	I) Pressure watertight transformers (IPX8)		P
17.2	After moisture test (48 h for ≤ IP20, 168 h for other transformers):	93 % R.H., 25 °C, 168 hr.	P
	- insulation resistance and electric strength (Cl. 18)	Compliance checked and see subclauses 18.2 and 18.3	P

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Clause	Requirement + Test	Result - Remark	Verdict
18	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
18.2	Insulation resistance between:		P
	- live parts and body for basic insulation ≥ 2 M	See below	P
	- live parts and body for reinforced insulation ≥ 7 MΩ	Between input circuit and enclosure (plastic) with foil: > 100 MΩ	P
	- input circuits and output circuits for basic insulation ≥ 2 MΩ		N/A
	- input circuits and output circuits for double or reinforced insulation ≥ 5 MΩ	Between input circuit and output circuit: > 100 MΩ; Between input circuit and output circuit of transformer (T1): > 100 MΩ	P
	- each input circuit and all other input circuits connected together ≥ 2 MΩ	The EUT has only one input circuit	N/A
	- each output circuit and all other output circuits connected together ≥ 2 MΩ	The EUT has only one output circuit	N/A
	- hazardous live parts and metal parts with basic insulation (Class II transformers) ≥ 2 MΩ		N/A
	- body and metal parts with basic insulation (Class II transformers) ≥ 5 MΩ		N/A
	- metal foil in contact with inner and outer surfaces of enclosures ≥ 7 MΩ	Between inner and outer surfaces of enclosures: > 100 MΩ	P
18.3	Electric strength test (1 min): no flashover or breakdown:	See below	P
	1) basic insulation between input circuits and output circuits; working voltage (V); test voltage (V).....:		N/A
	2) double or reinforced insulation between input circuits and output circuits; working voltage (V); test voltage (V) .....:	Between input circuit and output circuit: Max. working voltage: 274 Vac Test voltage: 3958 Vac	P
	3) basic or supplementary insulation between:	See below	P
	a) live parts of different polarity; working voltage (V); test voltage (V) .....:	Between Line and Neutral trace before fuse: Max. working voltage: 240 Vac, Test voltage: 1820 Vac (by interpolation)	P
	b) live parts and the body if intended to be connected to protective earth.....:	No accessible conductive part	N/A
	c) inlet bushings and cord guards and anchorages .....:	No accessible conductive part	N/A
	d) live parts and an intermediate conductive part .....:		N/A
	e) intermediate conductive parts and body .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	4) Reinforced insulation between the body and live parts; working voltage (V); test voltage (V) :	Between input circuit and enclosure (plastic): Working voltage: 274 Vac; Test voltage: 3958 Vac (by interpolation) Between output circuit and enclosure (plastic): Test voltage: 1979 Vac	P
	5) Functional insulation for windings intended to be connected in series or parallel (test voltage = working voltage + 500 V) (IEC 61558-2-16:09)		N/A
18.4	Does not apply (IEC 61558-2-16:09)	Not applicable	N/A
18.101	Impulse test according Table F5 of IEC 60664-1 with 1,2/50 µs (IEC 61558-2-16)	The Impulse test, insulation resistance test and dielectric strength test are conducted	P
	– After the test of 18.3, 10 impulses of each polarity between input and output terminals		P
	– During the tests no breakdown of the insulation between turns of a winding, between input and output circuits, or between windings and any conductive core	During tests no breakdown of the insulation between turns of a winding, between input and output circuits, or between windings and any conductive core	P
18.102 (A1)	Partial discharge tests according to IEC 60664-1, if the working voltage is > 750 V peak	The working voltage < 750 V	N/A
	Partial discharge is ≤ 10 pC at time P2 See Fig. 104		N/A
18.5	Touch current and protective earth current		P
18.5.1	Touch current	See below	P
	Touch current measured after the clause 14 test (hot) for class I and class II transformers (class II transformers with metal foil at the plastic surface). The test circuit according figure 8. Measuring network according Figure J1 (Annex J). If the frequency is >30 kHz, measuring across the 500 Ohm resistor of J1 (burn effects).	Measurement on: 1) Output +/- 2) Enclosure with metal foil	P
	Measurement of the touch current with switch p of picture 8 in both positions and in combination with switches e and n. The measured values are less than the required values of table 8b.	The EUT is Class I construction, the max. limit is 0.5 mA (r.m.s)	P
	- switches n and e in on position	See below	P
	- switch n: off and switch e: on	Normal: 1) 0.17 mA; 2) 0.01 mA CY1 short: 1) 0.22 mA; 2) 0.01 mA	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- switch n: on and switch e: off	Normal: 1) 0.18 mA; 2) 0.01 mA CY1 short: 1) 0.23 mA; 2) 0.01 mA	P
18.5.2	Protective earth conductor current	See below	P
	The transformer is connected as in clause 14 Impedance of the ammeter < 0,5 Ohm, connected between earth terminal of the transformer and protective earth conductor	The EUT is Class I construction, the max. limit is 2 mA (r.m.s)	P
	The measured values are less than the required values of table 8b	The EUT is still complying with relevant requirements of this standard	P

19	**CONSTRUCTION**		P
19.1	Separation of input and output circuits		P
19.1.1	SMPS incorporating auto-transformers (IEC 61558-2-16:2009)	The EUT not incorporating auto-transformer	N/A
19.1.1.1	For plug connected auto-transformers with rated input voltage > rated output voltage the potential to earth shall not exceed the rated output voltage. (IEC 61558-2-16:2009)		N/A
19.1.1.2	SMPS with polarised input and output plug and socket-outlet system: an instruction is given with the information, that the transformer shall not be used with non-polarised plug and socket outlet system. (IEC 61558-2-16:2009)		N/A
19.1.1.3	A polarity detecting device only energises the output in the case: output potential to earth ≤ rated output voltage, also with reversed input plug. (IEC 61558-2-16:2009)		N/A
	– The contact separation of the device is ≥ 3 mm		N/A
	– A current to earth does not exceed 0,75 mA.		N/A
	– All tests are repeated under fault conditions of H.2.3 of annex H of part 1. The potential to earth does not exceed the max output voltage for more than 5 s.		N/A
19.1.2	SMPS incorporating separating transformers (IEC 61558-2-16:09)	The EUT not incorporating separating transformer	N/A
19.1.2.1	Input and output circuits electrically separated (IEC 61558-2-16:09)		N/A
19.1.2.2	The insulation between input and output winding(s) consist of basic insulation (IEC 61558-2-16:09)		N/A
	Class I SMPS		N/A
	– Insulation between input windings and body consist of basic insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– Insulation between output windings and body consist of basic insulation		N/A
	Class II SMPS (IEC 61558-2-16:2009)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation		N/A
	– Insulation between output windings and body consist of double or reinforced insulation		N/A
19.1.2.3	The insulation between input windings and intermediate conductive parts and the output windings and intermediate part consist of basic insulation (IEC 61558-2-16:09)		N/A
	For class I SMPS the insulation between input and output windings via the intermediate conductive parts consist of basic insulation (IEC 61558-2-16:2009)		N/A
	For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (IEC 61558-2-16:2009)		N/A
19.1.2.4	Parts of output circuits may be connected to protective earth (IEC 61558-2-16:09)		N/A
19.1.2.5	No direct contact between output circuits and the body, unless: (IEC 61558-2-16:2009)		N/A
	– Allowed for associated transformers by the equipment standard		N/A
	– Clause 19.8 of part 1 is fulfilled		N/A
19.1.3	SMPS incorporating isolating transformers and safety isolating transformers (IEC 61558-2-16:09)	The EUT incorporating isolating transformer	P
19.1.3.1	Input and output circuits electrically separated (IEC 61558-2-16:09)	Primary and secondary windings are isolated by reinforced insulation	P
	No possibility of any connection between these circuits	There is impossible to connect Input and output circuits	P
19.1.3.2	The insulation between input and output winding(s) consist of double or reinforced insulation (exception see 19.1.3.4) (IEC 61558-2-16:09)	Primary and secondary windings are isolated by reinforced insulation	P
	Class I SMPS **not** intended for connection to the mains by a plug:		--
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the input voltage		N/A
	– Insulation between output windings and body, connected to earth consist of basic insulation rated for the output voltage		N/A
	Class I SMPS intended for connection to the mains by a plug (EN 61558-2-16:09):	The EUT is Class I construction	P

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Clause	Requirement + Test	Result - Remark	Verdict
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the working voltage	Primary and body are isolated by basic insulation	P
	– Insulation between output windings and body, connected to earth consist of supplementary insulation rated for the working voltage	Between output windings and body: Working voltage: 274 Vdc; Test voltage: 1979 Vac	P
	Class II SMPS (IEC 61558-2-16:2009)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation rated to the input voltage		N/A
	– Insulation between output windings and body consist of double or reinforced insulation, rated to the output voltage		N/A
19.1.3.3	SMPS with intermediate conductive parts not connected to the body (between input/output) (EN 61558-2-16:09):	Primary and secondary windings are isolated by reinforced insulation and the T1 core is considered as primary	N/A
19.1.3.3.1	For class I and class II SMPS the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage (EN 61558-2-16:09).		N/A
	– For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (rated to the input voltage, for SELV circuits only basic insulation to the body)		N/A
	– For transformers, different from independent, the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
19.1.3.3.2	Class I transformers with earthed core, and not allowed for class II equipment (EN 61558-2-16:09)	No earthed core used in the EUT	N/A
	– Insulation from the input to the earthed core: basic insulation rated for the input voltage		N/A
	– Insulation from the output voltage to the earthed core: basic insulation rated for the output voltage		N/A
19.1.3.3.3	Insulation between: input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation (EN 61558-2-16:09)		N/A
	– If the insulation from input or output to the intermediate metal part is less than basic insulation, the part is considered to be connected to input or output.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.1.3.4	For class I SMPS, with protective screen, not connected to the mains by a plug the following conditions comply (EN 61558-2-16:09):	No such device within the EUT	N/A
	– The insulation between input winding and protective screen consist of basic insulation (rated input voltage)		N/A
	– The insulation between output winding and protective screen consist of basic insulation (rated output voltage)		N/A
	– The protective screen consists of metal foil or a wire wound screen extending the full width of the windings and has no gaps or holes		N/A
	– Where the protective screen does not cover the entire width of the input winding, additional insulation to ensure double insulation in this area, is used.		N/A
	– If the screen is made by a foil, the turns are isolated, overlap at least 3 mm		N/A
	– The cross-section of the screen and the lead out wire is at least corresponding to the rated current of the overload device		N/A
	– The lead out wire is soldered or fixed to the protective screen.		N/A
	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
19.1.3.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled (EN 61558-2-16:09).	The EUT is fixed transformers	N/A
19.1.3.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)	No connection between output circuit and body	P
19.1.3.7	The distance between input and output terminals for the connection of external wiring is > 25 mm	No such terminals within the EUT	N/A
19.1.3.8	Portable SMPS having a rated output ≤ 630 VA shall be Class II. (EN 61558-2-16:09)	The EUT is fixed transformers	N/A
19.1.3.9	No connection between output circuit and body except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)	No connection between output circuit and body	P
19.1.3.10	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
19.2	Fiercely burning material not used	No fiercely burning material used	P
	Unimpregnated cotton, silk, paper and fibrous material not used as insulation	No such material used as insulation	P
	Wax-impregnated, etc. not used	No such material used	P
19.3	Portable transformer: short-circuit proof or fail-safe	The EUT is fixed transformers	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.4	Class II transformers: contact between accessible metal parts and conduits or metal sheaths of supply wiring impossible		N/A
19.5	Class II transformers: part of supplementary or reinforced insulation, during reassembly after routine servicing not omitted		N/A
19.6	Class I and II transformers: creepage distances and clearances over supplementary or reinforced insulation if wire, screw, nut, etc. become loose or fall out of position not ≤ 50 % specified values (Cl. 26)	All internal wirings are suitable fixed. No loosening of parts impairing creepage distances or clearances is likely to occur	P
19.7	Conductive parts connected to accessible metal parts by resistors or capacitors shall be separated from hazardous live parts by double or reinforced insulation	No such resistors, capacitors and accessible metal parts within the EUT	N/A
19.8	Resistors or capacitors connected between hazardous live parts and the body (accessible metal parts) consist of:	See below	P
	- Resistor according to IEC 60065,14.1 or capacitor Y1 according to IEC 60384-14	Approved capacitors (CY1 and CY2) are used	P
	- at least two separate components	Max. working voltage: 274 Vac, two briding capacitors (CY1 and CY2) are connected in series between primary and secondary	P
	- if one component is short-circuited or opened, values specified in Clause 9 shall not be exceeded	The Clause 9 limits were not exceeded under normal operating conditions and single fault conditions	P
	- if the working voltage is ≤ 250 V, one Y1 capacitor according 60384-14 is allowed		N/A
19.9	Insulation material input/output and supplementary insulation of rubber resistant to ageing	No such rubber used as supplementary insulation	N/A
	Creepage distances (if cracks) specified values (Clause 26)		N/A
19.10	Protection against accidental contact by insulating coating:	No insulating coating used	N/A
	a) ageing test (section I, IEC 60068-2-2), test Ba: 168 h; 70 °C		N/A
	b) impact test (spring-operated impact hammer according to IEC 60068-2-63; 0,5 ± 0,05 J)		N/A
	c) scratch test (hardened steel pin) electric strength test according to Clause 18		N/A
19.11	Handles, levers, knobs, etc.:	No such device	N/A
	- insulating material		N/A
	- supplementary insulation covering		N/A
	- separated from shafts or fixing by supplementary insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.12	Windings construction		P
19.12.1	Undue displacement in all types of transformers not allowed:	See below	P
	- of input or output windings or turns thereof	The first turn and end turn of the windings are wrapped around conductor before soldering, and fixed by adhesive tapes	P
	- of internal wiring or wires for external connection		N/A
	- of parts of windings or of internal wiring in case of rupture or loosening	See above	P
19.12.2	Serrated tape:	No serrated tape used	N/A
	- distance through insulation according to table 13		N/A
	- one additional layer of serrated tape, and		N/A
	- one additional layer without serration		N/A
	- in case of cheekless bobbins the end turns of each layer shall be prevented from being displaced		N/A
19.12.3 (A1)	Insulated windings wires providing basic, supplementary or reinforced insulation, meet the following requirements:	See below	P
	• Multi-layer extruded or spirally wrapped insulation, passed the tests of annex K	Multi-layer extruded type used and passed the tests of IEC 61558-2-16 Annex K	P
	• Basic insulation: two wrapped or one extruded wire		N/A
	• Supplementary insulation: two layers, wrapped or extruded		N/A
	• Reinforced insulation: three layers wrapped or extruded	Reinforced insulation, 3 layers extruded type	P
	Spirally wrapped insulation:		N/A
	• creepage distances between wrapped layers > cl. 26 _ P1 values		N/A
	• path between wrapped layers sealed, the test voltage of K2 is multiplied with 1,35		N/A
	• test 26.2.3 – Test A, passed for wrapped layers		N/A
	• the finished component passes the electric strength test according to cl. 18.3		N/A
a)	Insulated winding wire used for basic or supplementary insulation in a wound part:		N/A
	• comply with annex K		N/A
	• two layers for supplementary insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• one layer for basic insulation		N/A
	• one layer for mechanical separation between the insulated wires of primary and secondary. This layer fulfils the requirement of basic insulation.		N/A
b)	Insulated winding wire used for reinforced insulation in a wound part:	Approved triple insulated wire used in secondary windings of transformer (T1) is considered as reinforced insulation	P
	• comply with annex K	Approved triple insulated wire complied with IEC 61558-2-16 Annex K	P
	• three layers	Complied	P
	• relevant dielectric strength test of 18.3	Compliance checked. Test voltage 3958 Vac for all sources (see appended table 18.3)	P
	Where the insulated winding wire is wound:	See below	P
	• upon metal or ferrite cores		N/A
	• upon enamelled wire	Wound over insulation tape	P
	• under enamelled wire	Wound under insulation tape	P
	• one layer for mechanical separation between the insulated wires and the core or the enamelled wires is required. This layer fulfils the requirement of basic insulation		P
	• both windings shall not touch each other and also not the core		P
	100 % routine test of Annex K3 of part 1 is fulfilled	Complied	P
	no creepage distances and clearances for insulated winding wirers	Complied	P
	for TIW wires values of box 2) c) of table 13, table C.1 and table D.1 of part 1 and of clause 26.106 are not required	Complied	P
FIW	Transformers which use FIW wire	No such wires used	N/A
19.12.101 (A1)	Max. class F for transformers which use FIW-wire		N/A
19.12.102 (A1)	FIW wires comply with IEC 60851-5, Ed.4.1; IEC 60317-0-7 and IEC 60317-56, Ed.1.		N/A
	• other nominal diameter as mentioned in table 19.101 can be calculated with the formula after table 19.111		N/A
	FIW wire used for basic or supplementary insulation for transformers according 19.1.2 (separating-transformers) of IEC 61558-2-16:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	• one layer for mechanical separation is located between the insulated wires of primary and secondary. This layer fulfils the requirement of basic insulation		N/A
	• between FIW and enamelled wire, no requirements of creepage distances and clearances		N/A
	• no touch of FIW and enamelled wires (grad 1, or grad 2 …)		N/A
	FIW wire used for double or reinforced insulation for transformers according 19.1.3 (isolating and safety isolating transformers) of IEC 61558-2-16 (PRI and SEC basic insulated FIW-wire):		N/A
	• the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	• for primary and secondary winding FIW-wire for basic insulation is used		N/A
	• one layer for mechanical separation is located between the insulated wires of primary and secondary. This layer fulfilshe requirement of basic insulation		N/A
	• no touch between the basic insulated PRI and SEC FIW-wires		N/A
	• between PRI- and SEC-FIW wires, no requirements of creepage distances and clearances		N/A
	Alternative construction used for reinforced insulation (reinforced insulated FIW wire and enamelled wire)		N/A
	• the test voltage of table 8a – part 1, based on the working voltage reinforced insulation, comply with the min. voltage strength of table 19.111		N/A
	• one layer for mechanical separation is located between the reinforced insulated FIW wire and the enamelled wire. This layer fulfils the requirement of basic insulation		N/A
	• no touch between the FIW wire and the enamelled wire		N/A
	• between the reinforced FIW wire and any other parts, no requirements of creepage distances and clearances exist		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Alternative construction with FIW wires, basic or supplementary insulated for transformers with double or reinforced insulation according to 19.1.3 (basic/supplementary insulated FIW wire + enamelled wire + creepage distance and clearances for basic insulation)		N/A
	• the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	• PRI or SEC basic insulated FIW wire and to the other winding (enamelled wire) requirements of supplementary insulation		N/A
	• creepage distances and clearances between the basic insulated FIW wire and the enamelled wire for basic or supplementary insulation are required.		N/A
	Where the FIW wire is wound		N/A
	• upon metal or ferrite cores		N/A
	• one layer for mechanical separation between the insulated wires and the core or the enamelled wires is required. This layer fulfils the requirement of basic insulation.		N/A
	• both windings shall not touch each other and also not the core.		N/A
19.13	Handles, operating levers and the like shall be fixed	No such device	N/A
19.14	Protection against electric shock: covers securely fixed, 2 independent fixing means, one with tool	The enclosures secured together by mech and glue	P
19.15	Transformer with pins for fixed socket-outlets: no strain on socket-outlet		N/A
	Additional torque < 0,25 Nm		N/A
19.16	Protection index for portable transformers:		N/A
	≤ 200 VA ≥ IP20 and instructions for use		N/A
	> 200 VA ≤ 2,5 kVA ≥ IPX4 (single-phase)		N/A
	> 200 VA ≤ 6,3 kVA ≥ IPX4 (polyphase)		N/A
	> 2,5 VA (single-phase) ≥ IP21		N/A
	> 6,3 VA (polyphase) ≥ IP21		N/A
19.17	Transformers IPX1-IPX6 totally enclosed, except for drain hole (diameter ≥ 5 mm or 20 mm² with width ≥ 3 mm); drain hole not required for trans-former completely filled with insulating materials	The EUT is index IP68	N/A
19.18	Transformers ≥ IPX1 with a moulded, if any	The EUT is index IP68	N/A
19.19	Class I transformers with a non-detachable flexible cable or cord with earth conductor and a plug with earth contact	The EUT is Class I construction	P

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Clause	Requirement + Test	Result - Remark	Verdict
19.20	Live parts of SELV and PELV-circuits: separation not less than PRI/SEC of a safety isolating transformer	Only one PELV circuit on secondary side	P
	- SELV output circuits separated by double or reinforced insulation from all other than SELV or PELV circuits		N/A
	- SELV output circuits separated by basic insulation from other SELV or PELV circuits		N/A
19.20.1	SELV circuits and parts not connected to protective earth, to live parts, or protective conductors forming part of other circuits		N/A
	Nominal voltage (V) > 25 V a.c. or 60 V d.c., the required insulation fulfils the high voltage test according to table 8a		N/A
19.20.2	PELV-circuits double or reinforced insulation is necessary	The output circuit is a PELV circuit	P
19.21	FELV-circuits: protection against contact fulfils the min. test voltage required for the primary circuit		N/A
19.22	Class II transformers shall not be provided with means for protective earth	The EUT is Class I construction	N/A
	For fixed transformers an earth conductor with double or reinforced insulation to accessible metal parts is allowed		N/A
19.23	Class III transformers shall not be provided with means for protective earth	The EUT is Class I construction	N/A

20	**COMPONENTS**		P
	Components such as switches, plugs, fuses, lamp holders, flexible cables and cords, comply with relevant IEC standard	Components comply with relevant IEC standard (see appended table 20)	P
	Components inside the transformer pass all tests of this standard together with the transformer tests	Components incorporated in the transformers are subjected to all the tests of this standard as part of the transformer	P
	Testing of components separately to the transformer according the relevant standard:		N/A
	- Ratings of the component in line with the transformer ratings, including inrush current. Component test according the component standard, based on the component marking (rating).		N/A
	- Components without markings tested under transformer conditions including inrush current.		N/A
	- If no IEC standard exists, the component is tested under transformer conditions.		N/A
20.1	Appliance couplers for main supply shall comply with:	No such devices provided	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- IEC 60320 for IPX0		N/A
	- IEC 60309 for other		N/A
20.2	Automatic controls shall comply with IEC 60730-1	No such devices provided	N/A
20.3	Thermal-links comply with IEC 60691	No such devices provided	N/A
20.4	Switches shall comply with annex F	No such devices provided	N/A
	Disconnection from the supply:		N/A
	- by a switch, disconnecting all poles of the supply (full disconnection under the relevant overvoltage category		N/A
	- or a flexible supply cable and cord with plug		N/A
	- or an instruction sheet: disconnection by all-poles switches incorporated in fixed wiring		N/A
20.5	Socket-outlets of the output circuit shall be such that there is no unsafe compatibility to plugs complying with input circuit.		N/A
	Plugs and socket-outlets for SELV systems with both a rated current = 3 A and a rated voltage = 24 V shall comply with following:		N/A
	SELV plug and socket-outlets shall comply with IEC 60884-2-4 and IEC 60906-3		N/A
	- It is not possible for plugs to enter socket-outlets of other standardised voltage system		N/A
	- Socket outlets do not accommodate plugs of other standardised voltage systems		N/A
	- Socket outlets do not have a protective earth contact		N/A
	PELV plug and socket-outlets shall comply with following:		N/A
	- It is not possible for plugs to enter socket-outlets of other standardised voltage system		N/A
	- Socket outlets do not accommodate plugs of other standardised voltage systems		N/A
	- Socket outlets do not have a protective earth contact		N/A
	FELV plug and socket-outlets shall comply with following:	Only PELV circuit on secondary side	N/A
	- It is not possible for plugs to enter socket-outlets of other standardised voltage system		N/A
	- Socket outlets do not accommodate plugs of other standardised voltage systems		N/A
20.6	Thermal cut-outs, overload releases etc. have adequate breaking capacity	No such devices provided	N/A
	- Thermal cut outs fulfil the relevant requirements of 20.7 and 20.8		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- Thermal links fulfil the relevant requirements of 20.8		N/A
	- The breaking capacity is in accordance with the relevant fuse standard		N/A
20.6.1	For Fuses According IEC 60127 and IEC 60269, the fuse current does not exceed 1,1 times of the rated value		N/A
20.7	Thermal cut outs shall meet the requirements of 20.7.1.1 and 20.7.2, or 20.7.1.2 and 20.7.2.	No such devices provided	N/A
20.7.1	Requirements according to IEC 60730-1		N/A
20.7.1.1	Thermal cut-out tested as component shall comply with IEC 60730-1		N/A
20.7.1.2	Thermal cut-out tested as a part of the transformer		N/A
	a) Thermal cut outs type 1 or type 2 (IEC 60730-1)		N/A
	b) Thermal cut outs fulfil the requirements of micro-interruption (type 1C or 2 C) or micro-disconnection, (type 1B or 2B) (see IEC 60730-1)		N/A
	c) Thermal cut outs with manual rest have a trip free mechanism (type 1E and 2E) (see IEC 60730-1)		N/A
	d) The number of cycles of automatic action shall be:		N/A
	– 3000 cycles for self-resetting thermal cut-outs		N/A
	– 300 cycles for non-self-resetting thermal cut-outs resetting by hand		N/A
	– 300 cycles for non-self-resetting thermal cut-outs resetting disconnecting		N/A
	– 30 cycles for non-self-resetting thermal cut-outs which are only resettable by a tool		N/A
	e) Thermal cut outs fulfil the electrical stress according IEC 60730-1, 6.14.2		N/A
	f) Characteristic of thermal cut-outs:		N/A
	– ratings according IEC 60730-1, cl. 5		N/A
	– classification according to:		N/A
	1) nature of supply to IEC 60730-1, cl. 6.1		N/A
	2) type of load controlled to IEC 60730-1, cl. 6.2		N/A
	3) degree of protection IPX0 to IEC 60730-1, cl. 6.5.1		N/A
	4) degree of protection IP0X to IEC 60730-1, cl. 6.5.2		N/A
	5) pollution degree to IEC 60730-1, cl. 6.5.3		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	6) comparative tracking index to IEC 60730-1, cl. 6.13		N/A
	7) max. ambient temperature to IEC 60730-1, cl. 6.7		N/A
20.7.1.2	Thermal cut-out tested as a part of the transformer, test with 3 samples:		N/A
	- at least micro-interruption or micro-disconnection (IEC 60730-1)		N/A
	- 300 h aged at ta (transformer) + 10°C		N/A
	- subjected to a number of cycles for automatic operating according 20.7.1.1		N/A
	During the test no sustaining arcing shall occur, during and after the test no damage at the thermal cut out and the transformer in the sense of this standard		N/A
20.7.2	Thermal cut-outs shall have adequate breaking capacity		N/A
20.7.2.1	The output of the transformer with a non-self-resetting thermal cut out is short circuited at a supply voltage 1, 1 of rated supply voltage. After opening of the cut off, the supply voltage is switched of, until the transformer is cooling down.		N/A
	- 3 cycles at 25° C for transformers without ta min		N/A
	- 3 cycles at ta min for transformers with ta min		N/A
	- after the 3 cycles short circuit of the output at 1,1 of rated supply voltage for 48 h.		N/A
	During the tests no sustaining arcing shall occur After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		N/A
20.7.2.2	The output of the transformer with a self-resetting thermal cut out is short circuited at a supply voltage 1, 1 of rated supply voltage.		N/A
	- 48 h at 25° C for transformers without ta min		N/A
	- 24 h at ta and 24 h at ta min for transformers with ta min		N/A
	During the tests no sustaining arcing shall occur After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		N/A
20.7.3	Test of a PTC resistor:		N/A
	5 cycles: transformer short-circuited for 48 h by 1,1 times of the input voltage and max. ta		N/A
	5 cycles: transformer short-circuited for 48 h by 0,9 times of the input voltage and min. ta (if declared)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		N/A
20.8	Thermal links shall be tested in one of the following two ways.		N/A
20.8.1	Thermal-links shall comply with IEC 60691 as a separate component		N/A
	- electrical conditions to IEC 60691, cl. 6.1		N/A
	- thermal conditions to IEC 60691, cl. 6.2		N/A
	- ratings to IEC 60691, cl. 8 b		N/A
	- suitability of sealing components, impregnating fluids or cleaning solvents IEC 60691, cl. 8 c		N/A
20.8.2	Thermal-links tested as a part of the transformer:		N/A
	- ageing test 300 h by 35 °C or ta + 10 °C		N/A
	- After transformer fault condition the thermal link operate without sustaining arcing		N/A
	- after opening the thermal-link shall have an insulation resistance of at least 0,2 M		N/A
	- 3 cycles for replaceable thermal-links		N/A
	- 3 new specimens for not replaceable thermal-links		N/A
20.9	Self-resetting devices not used if mechanical, electrical, etc. hazards	No such devices provided	N/A
20.10	Thermal cut-outs which can be reset by soldering operation are not allowed	No such devices provided	N/A
20.11	Overload protection devices do not operate during test (20 times switched on and off, at no load); Upri (V): 1,1 times rated supply voltage	No such devices provided	N/A

21	**INTERNAL WIRING**		P
21.1	Internal wiring and electrical connections protected or enclosed	See below	P
	Wire-ways smooth and free from sharp edges	All internal wirings are fixed away from sharp edges; the wiring path is smooth and free from sharp edges	P
21.2	Openings in sheet metal: edges rounded (radius <1,5 mm) or bushings of insulating material	No opening	P
21.3	Bare conductors: distances adequately maintained	Complied	P
21.4	When external wires are connected to terminal, internal wiring shall not work loose	No terminal provided	N/A
21.5	Insulation of heat-resistant and non-hygroscopic material for insulated conductors subject to temperature rise > limiting values given in 14.1	No such material provided	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
22	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS**		P
22.1	All cables, flexible cords etc. shall have appropriate current and voltage ratings	Considered	P
22.2	Input and output wiring inlet and outlet openings for external wiring: separate entries without damage to protective covering of cable or cord	Input and output openings provided for wiring	P
	Input and output wiring inlet and outlet openings for flexible cables or cords: insulating material or bushing of insulating material	inlet and outlet openings are provided on the enclosure	P
	Bushings for external wiring: reliably fixed, not of rubber unless part of cord guard	The bushing is forming part of the input and output cord	P
22.3	Fixed transformer:		P
	- possible to connect after fixing		P
	- inside space for wires allow easy introduction and connection of conductors	Wih a non-detachable power cord	P
	- fitting of cover without damage to conductors		P
	- contact between insulation of external supply wires and live parts of different polarity not allowed		P
22.4	Length of power supply cord for portable transformers between 2 m and 4 m; without 0,5 mm^2		N/A
22.5	Power supply cords for transformers IPX0 and transformers for indoor use only" ≥ IPX0:		N/A
	- for transformers with a mass ≤ 3 kg: 60227 IEC 52 (H03VV-.) (60245 IEC 53)		N/A
	- for transformers with a mass > 3 kg: 60227 IEC 53 (H05VV-.) or 60245 IEC 53		N/A
	Power supply cords for transformers for outdoor use: ≥ IPX0: 60245 IEC57 (H05RN-.)		N/A
22.6	Power supply cords for single-phase portable transformers with input current ≤ 16A:		N/A
	- cord set fitted with an appliance coupler in accordance with IEC 60320		N/A
22.7	Nominal cross-sectional area (mm^2); input current (A) at rated output not less than shown in table 9	Rating current: 1.5 A, corss sectional area: Min. 0.5 mm^2	P
22.8	Class I transformer with power supply flexible cable: green/yellow core connected to earth terminal	No such terminal used in the EUT	P
	Plug for single-phase transformer with input current at rated output ≤ 16 A according to IEC 60083, IEC 60906-1 or IEC 60309		N/A
22.9	Type X, Y or Z attachments: see relevant part 2	Type Z attachment for input cord and output cord	P

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Clause	Requirement + Test	Result - Remark	Verdict
22.9.1	For type Z attachment: moulding enclosure and power supply cable do not affect insulation of cable	The bushing is forming part of input cord and output cord	P
22.9.2	Inlet openings or inlet bushing: Without risk of damage to protective covering of power supply cord	No openings	N/A
	Insulation between conductor and enclosure:		N/A
	- for Class I transformer: insulation of conductor plus separate basic insulation		N/A
	- for Class II transformer: insulation of conductor plus double or reinforced insulation		N/A
22.9.3	Inlet bushings:		P
	- no damage to power supply cord	Complied	P
	- reliably fixed	Complied	P
	- not removable without tool	Complied	P
	- not integral with power supply cord (for type X attachment)		N/A
	- not of natural rubber except for Class I transformer with type X, Y and Z attachments		P
22.9.4	For portable transformers which are moved while operating:		N/A
	- cord guards, if any, of insulating material and fixed		N/A
	Compliance is tested by the oscillating test according to fig. 7:		N/A
	- loaded force during the test according to fig. 7		N/A
	- 10 N for a cross-sectional area > 0,75		N/A
	- 5 N for a cross-sectional area ≤ 0,75		N/A
	After the test according to fig. 7:		N/A
	- no short-circuit between the conductors		N/A
	- no breakage of more than 10% of stands of any conductor		N/A
	- no separation of the conductor from the terminal		N/A
	- no loosening of any cord guards		N/A
	- no damage of the cord or cord guard		N/A
	- no broken strands piercing the insulation and not becoming accessible		N/A
22.9.5	Cord anchorages for type X attachment:	Fixed transformer	N/A
	- glands in portable transformers not used unless possibility for clamping all types and sizes of cable		N/A
	- moulded-on designs, tying the cable into a knot and tying the end with string not allowed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- labyrinths, if clearly how, permitted		N/A
	- replacement of cable easily possible		N/A
	- protection against strain and twisting clearly how		N/A
	- suitable for different types of cable unless only one type of cable for transformer		N/A
	- the entire flexible cable or cord with covering can be mounted into the cord anchorage		N/A
	- if tightened or loosened no damage		N/A
	- no contact between cable or cord and accessible or electrically connected clamping screws		N/A
	- cord clamped by metal screw not allowed		N/A
	- one part securely fixed to transformer		N/A
	- for Class I transformer: insulating material or insulated from metal parts		N/A
	- for Class II transformers: insulating material or supplementary insulation from metal parts		N/A
	Cord anchorages for type X, Y, Z attachments: cores of power external flexible cable or cord insulated from accessible metal parts by:	No such metal parts	N/A
	- basic insulation (Class I transformers), separate insulating barrier/cord anchorage		N/A
	- supplementary insulation (Class II transformers), special lining/cable or cord sheath of cable sheath of cable		N/A
	Cord anchorages for type X and Y attachments:	See below	P
	- replacement of external flexible cable or cord does not impair compliance with standard		P
	- the entire flexible cable or cord with covering can be mounted into the cord anchorage		P
	- if tightened or loosened no damage		P
	- no contact between cable or cord and accessible or electrically connected clamping screws		P
	- cord clamped by metal screws not allowed		P
	- knots in cord not used		P
	- labyrinths, if clearly how, permitted		P
	Tests for type X with special cords, type Y, type Z	Type Z attachment for input and output cord	P
	Test for type X attachments one test with a cord with smallest and one test with a cord with the largest cross-sectional area:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- for the test with clamping screws or tightened with torque 2/3 of that specified in table 11		N/A
	- not possible to push cable into transformer	Complied	P
	- 25 pulls of 1 s	Complied	P
	- 1 min torque according to table 10	Complied	P
	- mass (kg); pull (N); torque (Nm) .....:	Max. 0.70 kg, 30 N; 0.1 Nm	—
	- during test: cable not damaged	Complied	P
	- after test: longitudinal displacement ≤ 2 mm for cable or cord and ≤ 1 mm for conductors in terminals	Input cord displacement measured 0.01 mm (≤ 2 mm); conductors in terminals displacement measured 0.01 mm (≤ 1 mm) Output cord displacement measured 0.01 mm (≤ 2 mm); conductors in terminals displacement measured 0.01 mm (≤ 1 mm)	P
	- creepage distances and clearances ≥ values specified in Clause 26	Complied	P
22.9.6	Space for external cords or cable for fixed wiring and for type X and Y attachments:		N/A
	- before fitting cover, possibility to check correct connection and position of conductors		N/A
	- cover fitted without damage to supply cords		N/A
	- for portable transformers: contact with accessible metal parts if conductor becomes loose not allowed unless for type X and Y attachments terminations of cords do not slip free of conductor		N/A
	Space for external cords or cable for type X attachment and for connection to fixed wiring, in addition:		N/A
	- conductor easily introduced and connected		N/A
	- possibility of access to terminal for external conductor after removal of covers without special purpose tool		N/A

23	**TERMINALS FOR EXTERNAL CONDUCTORS**		N/A
23.1	Transformer for connection to fixed wiring and transformer without power supply cords with type Y and Z attachments: only connections by screws, nuts, terminals		N/A
	Terminals are integral part of the transformer:		N/A
	- comply with IEC 60999-1 under transformer conditions		N/A
	Other terminals:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- separately checked according to IEC 60998-2-1, IEC 60998-2-2 or IEC 60947-7-1		N/A
	- used in accordance with their marking		N/A
	- checked according to IEC 60999-1 under transformer conditions		N/A
	Transformer with type X attachments: soldered connection permitted if reliance not placed upon soldering, crimping or welding alone unless by barriers, creepage distances and clearances between hazardous live parts and metal parts should conductor break away 50 % of specified value (Cl. 26)		N/A
	Transformer with type Y and Z attachments for external conductors: soldered, welded, crimped, etc. connections allowed		N/A
	For Class II transformer: reliance not placed upon soldering, crimping or welding alone unless by barriers, creepage distances and clearances between hazardous live parts and metal parts should conductor break away 50 % of specified value (Cl. 26)		N/A
23.2	Terminals for type X with special cords Y and Z attachments shall be suitable for their purpose:		N/A
	- test by inspection according to 23.1 and 23.2		N/A
	- pull of 5 N to the connection before test according to 14.1		N/A
23.3	Other terminals than Y and Z attachments shall be so fixed that when the clamping means is tightened or loosened:		N/A
	- terminal does not work loose		N/A
	- internal wiring is not subjected to stress		N/A
	- creepage distances and clearance are not reduced below the values specified in Cl. 26		N/A
23.4	Other terminals than Y and Z attachments shall be so designed that:		N/A
	- they clamp the conductor between metallic surfaces with sufficient contact pressure		N/A
	- without damage to the conductor		N/A
	- test by inspection according to 23.3 and 23.4		N/A
	- 10 times fastening and loosening a conductor with the largest cross-sectional area with 2/3 of the torque specified in Clause 25		N/A
23.5	Terminals for fixed wiring and for type X: located near their associated terminals of different polarities and the earth terminal if any		N/A
23.6	Terminal blocks not accessible without the aid of a tool		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
23.7	Transformer with type X attachments: stranded conductor test (8 mm removed):		N/A
	- Class I transformers: no connection between live parts and accessible metal parts		N/A
	- free wire of earth terminal: no touching of live parts		N/A
	- Class II transformers: no connection between live parts and accessible metal parts, no connection between live parts and metal parts separated from accessible metal parts by supplementary insulation		N/A
23.8	Terminals for a current > 25 A:		N/A
	- pressure plate, or		N/A
	- two clamping screws		N/A
23.9	When terminal, other than protective earth conductor, screws loosened as far as possible, no contact:		N/A
	- between terminal screws and accessible metal parts		N/A
	- between terminal screws and inaccessible metal parts for Class II transformers		N/A

24	**PROVISION FOR PROTECTIVE EARTHING**		P
24.1	Class I transformers: accessible conductive parts connected to earth terminal	The EUT is a Class I construction	P
	Class II transformers: no provision for earth	Considered	P
24.2	Protective earth terminal for connection to fixed wiring and for type X attachment transformers: comply with Cl. 23, adequately locked, not possible to loosen without a tool		N/A
24.3	No risk of corrosion from contact between metal of earth terminal and other terminal		N/A
	In case of earth terminal body of Al, no risk of corrosion from contact between Cu and Al		N/A
	Body of earth terminal or screws/nuts of brass or other metal resistant to corrosion		N/A
24.4	Resistance of connection between earth terminal and metal parts 0,1 with a min. 25 A or 1,5 rated input currents at 1 min	No such metal parts	N/A
24.5	Class I transformers with external flexible cables or cords:		N/A
	- current-carrying conductors becoming touch before the earth conductor		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
25	**SCREWS AND CONNECTIONS**		N/A
25.1	Screwed connections withstand mechanical stresses	No screw connection	N/A
	Screws transmitting contact pressure or likely to be tightened by the user or having a diameter < 2,8 mm, shall screw into metal		N/A
	Screws not of metal which is soft or liable to creep (Zn, Al)		N/A
	Screws of insulating material: not used for electrical connection		N/A
	Screws not of insulating material if their replacement by metal screws can impair supplementary or reinforced insulation		N/A
	Screws to be removed (replacement etc. of power supply cord) not of insulating material if their replacement by metal screws can impair basic insulation		N/A
	No damage after torque test: diameter (mm); torque (Nm); ten times		N/A
	No damage after torque test: diameter (mm); torque (Nm); five times		N/A
25.2	Screws in engagement with thread of insulating material:		N/A
	- length of engagement ≥ 3 mm + 1/2 screw diameter or 8 mm		N/A
	- correct introduction into screw hole		N/A
25.3	Electrical connections: contact pressure not transmitted through insulating material		N/A
25.4	In case of use of thread-forming (sheet metal) screws for connection of current-carrying parts: clamping and locking means provided		N/A
	Thread-cutting (self-tapping) screws used for the connection of current-carrying parts allowed if they generate a full form machine screw thread and if not operated by the user		N/A
	Thread-cutting screws and thread-forming screws used for earth continuity allowed if at least 2 screws for each connection are used and it is not necessary to disturb the connection in normal use		N/A
25.5	Screws for current-carrying mechanical connections locked against loosening		N/A
	Rivets for current-carrying connections subject to torsion locked against loosening		N/A
25.6	Test of screwed glands with a torque according table 12. After the test no damage at the transformer and the gland.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
26	**CREEPAGE DISTANCES AND CLEARANCES**		P
26.1	See 26.101	Table 13 is applicable	P
26.2	Creepage distances (cr) and clearances (cr)	Table 13 is applicable	P
26.2.1	Windings covered with adhesive tape	No such tape provided	N/A
	- the values of pollution degree 1 are fulfilled		N/A
	- all isolating material are classified acc. to IEC 60085 and IEC 60216		N/A
	- test A of 26.2.3 is fulfilled		N/A
26.2.2	Uncemented insulating parts pollution degree P2 or P3	The EUT is considered as pollution degree P2	P
	- all isolating material are classified acc. to IEC 60085 and IEC 60216		P
	- values of pollution degree 1 are not applicable	See above	P
26.2.3	Cemented insulating parts	No such parts provided	N/A
	- all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	- values of distance through insulation (dti) are fulfilled		N/A
	- creepage distances and clearances are not required		N/A
	- test A of this sub clause is fulfilled		N/A
	Test A		N/A
	- thermal class		N/A
	- working voltage		N/A
	- Test with three specially specimens, with uninsulated wires, without impregnation or potting		N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	Impulse dielectric test according to 4.1.1.2.1 of IEC 60664-1 (1,2 / 50 µs waveform) – see Annex R of IEC 61558-1		N/A
26.2.4	Enclosed parts, by impregnation or potting	No such parts provided	N/A
26.2.4.1	- The requirements of reduced values as stated for pollution degree 1 (P1) are fulfilled		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test B		N/A
	- thermal class		N/A
	- working voltage		N/A
	- Test with three specially specimens, potted or impregnated. The dielectric strength test is applied directly to the joint.		N/A
	Two of the three specimens are subjected to:		N/A
	- the relevant humidity treatment according to 17.2 (48 h)		N/A
	- the relevant dielectric strength test of 18.3 multiplied with factor 1,25		N/A
	- One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,25 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60664-1 (1,2/50 µs waveform) – see Annex R of IEC 61558-1		N/A
26.2.4.2	- The requirements of distance through insulation (dti) are fulfilled. (P1 values are not required)		N/A
	- all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test C		N/A
	- thermal class		N/A
	- working voltage		N/A
	- Test with three specimens, potted or impregnated. (finished components)		N/A
	- Neither cracks, nor voids in the insulating compounds		N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60664-1 (1,2/50 µs waveform) – see Annex R of IEC 61558-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
26.3	Distance through insulation	See below	P
	For double or reinforced insulation, the required values of Tables 13, C1, and D1 – boxes 2b, 2c and 7 are fulfilled	Dti of enclosure is min. 2.0 mm Dti of tubing of HS2 is min. 0.6 mm	P
	The insulation fulfils the material classification according IEC 60085 or 60216 or the test of 14.3	Approved insulation system used, Class B	P
26.3.1	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:	No such material provided	N/A
	- the isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	- the test of 14.3 is fulfilled		N/A
	- If both requirements are fulfilled, the required values for solid insulation can be multiplied by 0,4		N/A
	- Minimum thickness of reinforced insulation ≥ 0,2 mm		N/A
	- Minimum thickness of supplementary insulation ≥ 0,1 mm		N/A
26.3.2	Insulation in thin sheet form		N/A
	- If the layers are non-separable (glued together):		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– The mandrel test according 26.3.3 is fulfilled with 150 N		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is fulfilled.		N/A
	- If the layers are separated:		N/A
	– The requirement of 2 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.3 is fulfilled on each layer with 50 N		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is fulfilled.		N/A
	- If the layers are separated (alternative):		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– The mandrel test according 26.3.3 is fulfilled on 2/3 of the layers with 100 N		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is fulfilled.		N/A
	Test according to 14.3 and if the isolating materials are classified acc. to IEC 60085 and IEC 60216 no distances through insulation are required for insulation in thin sheet form		N/A
	The figures within square brackets in box 2 and 7 of table 13 (C.1/D.1) are used for insulation in thin sheet form as follows:		N/A
	- rated output > 100 VA values in square brackets apply		N/A
	- rated output ≥ 25 VA ≤100 VA 2/3 of the value in square brackets apply		N/A
	- rated output ≤ 25 VA 1/3 of the value in square brackets apply		N/A
26.3.3	Mandrel test of insulation in thin sheet form (specimen of 70 mm width is necessary):		N/A
	- If the layers are non-separable – at least 3 layers glued together fulfil the test:		N/A
	– pull force of 150 N		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
	- If the layers are separable and 2/3 of at least 3 layers fulfil the test		N/A
	– pull force of 100 N		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdowns.		N/A
	- If the layers are separable 1 of at least 2 layers fulfil the test:	No such insulation sheet used	N/A
	– pull force of 50 N		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
26.101	Creepage distances, clearances and distances through insulation, specified values according to (EN 61558-2-16:09):		P
	- table 13, material group IIIa (part 1)	Considered as material group IIIa	P
	- table C, material group II (part 1)		N/A
	- table D, material group I (part 1)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- working voltage	(See appended table 26.101)	P
	- rated supply frequency 50/60 Hz		P
	- rated internal frequency	Measured frequency max. 87.7 kHz	P
	1. Insulation between input and output circuits (basic insulation):		N/A
	a) measured values ≥ specified values (mm).....:		N/A
	2. Insulation between input and output circuits (double or reinforced insulation):	See below	P
	a) measured values ≥ specified values (mm).....:	See appended table 26 for details	P
	b) measured values ≥ specified values (mm).....:		N/A
	c) measured values ≥ specified values (mm).....:		N/A
	3. Insulation between adjacent input circuits: measured values ≥ specified values (mm):		N/A
	Insulation between adjacent output circuits: measured values ≥ specified values (mm) ..:		N/A
	4. Insulation between terminals for external connection:		N/A
	a) measured values ≥ specified values (mm).....:		N/A
	b) measured values ≥ specified values (mm).....:		N/A
	c) measured values ≥ specified values (mm).....:		N/A
	5. Basic or supplementary insulation:	See below	P
	a) measured values ≥ specified values (mm).....:	Between Line and Neutral before fuse link (See appended table 26.101)	P
	b) measured values ≥ specified values (mm).....:		N/A
	c) measured values ≥ specified values (mm).....:		N/A
	d) measured values ≥ specified values (mm).....:		N/A
	e) measured values ≥ specified values (mm).....:		N/A
	6. Reinforced or double insulation: measured values ≥ specified values (mm).....:	(See appended table 26)	P
	7. Distance through insulation:	See below	P

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Clause	Requirement + Test	Result - Remark	Verdict
	a) measured values ≥ specified values (mm).....:		N/A
	b) measured values ≥ specified values (mm).....:		N/A
	c) measured values ≥ specified values (mm).....:	(Reinforced insulation, see appended table 26)	P
26.102	Values of IEC 61558-2-16 applicable for frequency up to 3 MHz (EN 61558-2-16:09)	Measured frequency max. 87.7 kHz	P
	For frequency above 3 MHz clause 7 of IEC 60664-4 is applicable (high frequency testing)		N/A
26.103	Clearance (EN 61558-2-16:09)	See below	N/A
	a) Clearance for frequency ≥ 30 kHz according figure 101 two determinations are necessary:	Measured frequency max. 87.7 kHz	P
	– determination based on peak working voltage according Table 104:	See below	P
	Peak working voltage	Measured working voltage max. 512 Vpk for T1	P
	Basic insulation: required/measured	The EUT is Class I construction	P
	Double or reinforced insulation: required/ measured value	Specified: 0.10 mm	P
	– and alternative if applicable for approximately homogeneous field according to Table 102		N/A
	Peak working voltage		N/A
	Basic insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)	Table 13 is applicable, measured working voltage max. 274 Vrms for T1 (see appended table 26)	P
	The minimum clearance is the greater of the two values.	Table 13 considered due to it is the greater of the two values. See above	P
	b) Clearance for frequency ≤ 30 kHz according figure 101 two determinations are necessary:		N/A
	– determination based on peak working voltage with recurring peak voltages according Table 103:		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	The minimum clearance is the greater of the two values.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
26.104	The working voltages of Table 102, 103 and 104 are peak voltages including µsec peaks EN 61558-2-16:09)	See below	P
	The working voltage according to Table 13 of part 1 are r.m.s. voltages	Considered	P
26.105	Creepage distances		P
	Two determinations of creepage distances are necessary (see Figure 102)	Considered	P
	– determination based on measured peak working voltage according Tables 105 to 110	See below	N/A
	Peak working voltage	Measured working voltage max. 512 Vpk for T1	P
	Pollution degree	2	P
	Basic or supplementary insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		P
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)	Table 13 is applicable, measured working voltage max. 274 Vrms for T1 (see appended table 26)	P
	If the values based on table 105 to 110 are lower than the relevant values in Tables 13, C.1 or D.1, the higher values shall be applicable	Table 13 considered due to it is the greater of the two values. See above	P
26.106	Distance through insulation (EN 61558-2-16:09)		N/A
	Instead of partial discharge with high frequency voltage the test of the distance and the calculation of the electric field is applicable under the following conditions:		N/A
	– the max. frequency is < 10 MHz		N/A
	– the field strength approximately complies with Figure 103		N/A
	– no voids or gaps are present in between the solid insulation		N/A
	For thick layers d1 ≥ 0,75 the peak value of the field strength is ≤ 2 kV/mm		N/A
	For thin layers d2 ≤ 30 µm the peak value of the field strength is ≤ 10 kV/mm		N/A
	For d1 > d > d2 equation (1) is used for calculation the field strength		N/A
26.107 (A1)	For transformers with FIW wires the following test is required	No such component provided	N/A
	• 10 cycles are required		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• 68 h test at max heating temperature + 10°C or test at max. allowed winding temperature based on the insulation class (required in table 1) + 10°C		N/A
	• 1 h at 25° C		N/A
	• 2 h at 0° C		N/A
	• 1 h at 25° C – (next cycle start again with 68 h max winding temp + 10)		N/A
	• during the 10 cycles test 2 x working voltage is connected between PRI and SEC		N/A
	• after 10 cycle tests 2 transformers are subjected to the 17.2 test for 48 h and direct after the 48 h the dielectric strength test of 18.3 (100 % test voltage) is done		N/A
	• after the 10 cycles test the third sample is tested at the end of the last cycle in the hot position with the dielectric strength test of 18.3 (100 % test voltage)		N/A
	• the partial discharge test according to 18.101 is done after the cycling test and after the high voltage test, if the peak working voltage is >750 V		N/A

27	**RESISTANCE TO HEAT, FIRE AND TRACKING**		P
27.1	Resistance to heat		P
	All insulating parts are resistant to heat	Considered	P
	For parts of rubber, which passed the test of 19.9, no additional test is required.	No such materials provided	N/A
	The tests are not required for cables and small connectors with a rated current ≤ 3 A, a rated voltage ≤ 24 V a.c. or 60 V d.c. and a power ≤ 72 W	Considered	P
27.1.1	External accessible parts	See below	P
	The Ball-pressure test: diameter of impression ≤ 2 mm; heating cabinet temperature (°C) at 70 °C or the temperature T of 14.1 (T + 15) - is fulfilled.	Tested for the enclosure material (see appended table 27)	P
27.1.2	Internal parts	See below	P
	For insulating material retaining current carrying parts in position, the ball-pressure test -: diameter of impression ≤ 2 mm; heating cabinet temperature (°C) at 125 ° C or the temperature T of 14.1 (T + 15) - is fulfilled	Tested for bobbin of transformer (T1) and PCB (see appended table 27)	P
27.2	Resistance to abnormal heat under fault conditions		P
27.3	Resistance to fire		P

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Clause	Requirement + Test	Result - Remark	Verdict
	All isolating parts of the transformer shall be resistant to ignition and spread of fire. The test according to IEC 60696-2-10 is required	Considered	P
27.3.1	External accessible parts (glow wire tests)	See below	P
	- 650° C for enclosures	Tested for the enclosure material (See appended table 27)	P
	- 650 ° C for parts retaining current carrying parts in position and terminals for external conductors Current ≤ 0,2 A		N/A
	- 750° C for parts retaining current carrying parts in position and terminals for external conductors with fixed wiring. Current > 0,2 A		N/A
	- 850° C for parts retaining current carrying parts in position and terminals for external conductors with non-fixed wiring. Current > 0,2 A		N/A
27.3.2	Internal parts	See below	P
	- 550 °C for internal insulating material – not retaining current carrying parts in position		N/A
	- 650 °C for coil formers (bobbins)	Tested for bobbin of transformer (T1) (see appended table 27)	P
	- 650 °C for parts retaining current carrying parts in position and terminals for external conductors. Current ≤ 0,2 A		N/A
	- 750 °C for parts retaining current carrying parts in position and terminals for external conductors with fixed wiring. Current > 0,2 A		N/A
	- 850 °C for parts retaining current carrying parts in position and terminals for external conductors with non-fixed wiring. Current > 0,2 A	Tested for PCB (see appended table 27)	P
27.4	For IP other than IPX0: If insulating parts retaining current carrying parts in position and under P3 conditions, the material resistance to tracking is at least material of group IIIa	The EUT is index IP68 and under P2 conditions	N/A
	Test (175 V): no flashover or breakdown before 50 drops		N/A

28	**RESISTANCE TO RUSTING**		N/A
	Ferrous parts protected against rusting		N/A

E	**ANNEX E, GLOW WIRE TEST**		P
	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:	See below	P

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Clause	Requirement + Test	Result - Remark	Verdict
E.1	Clause 6," Severities" of IEC 6095-2-11, apply with the temperature stated in 27.3 of IEC 61558-1		P
E2	Clause 8," Conditioning", of IEC 60695-2-11 apply, preconditioning is required		P
E3	Clause 10," Test Procedure", of IEC 60695-2-11apply, the tip of the glow wire is applied to the flat side of the surface.		P
F	**ANNEX F, REQUIREMENTS FOR MANUALLY OPERATED SWITCHES WHICH ARE PARTS OF THE TRANSFORMER**		N/A
F.2	Manually operated mechanical switches, tested as separate component, shall comply with IEC 61058 under the conditions of F2.		N/A
F.§	Manually operated mechanical switches tested as part of the transformer shall comply with the conditions specified under F.3		N/A

H	**ANNEX H, ELECTRONIC CIRCUITS (IEC 61558-1)**		P
H1	General notes on tests (addition to clause 5)	Complied	P
H.2	SHORT-CIRCUIT AND OVERLOAD PROTECTION (ADDITION TO CLAUSE 15)		P
H.2.1	Circuits designed and applied so that fault conditions do not render the appliance unsafe		P
	During and after each test:	See below	P
	- temperatures do not exceed values specified in table 3 of sub-clause 15.1	The EUT is still complying with relevant requirements of this standard	P
	- transformer complies with conditions specified in sub-clause 15.1	The EUT is still complying with relevant requirements of this standard	P
	If a conductor of a PCB becomes open circuited, the transformer is considered to have withstood the particular test, provided that all six conditions as specified are met		N/A
H.2.2	Fault conditions a) to f) of sub-clause H.2.3 are not tested if the following conditions are met:	See below	P
	- electronic circuit is a low-power circuit as speci fied		N/A
	- safety of the appliance as specified does not rely on correct functioning of the electronic circuit	The fuse (F1) is considered as protective device of equipment	P
H.2.3	Fault conditions tested as specified when relevant:	See below	P
	a) short-circuit of creepage distances and clearances, if less than specified in Cl. 26	The distances are all enough	N/A
	b) open circuit at the terminals of any component	(See appended table H.2)	P
	c) short-circuit of capacitors, unless they comply with IEC 60384-14	(See appended table H.2)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	d) short-circuit of any two terminals of an electronic component as specified	(See appended table H.2)	P
	e) any failure of an integrated circuit as specified	(See appended table H.2)	P
	f) low-power circuit: low-power points are connected to the supply source		N/A
	Clause 15 is repeated with a simulated fault as indicated in a) to e), if the transformer incorporates an electronic circuit to ensure compliance with Clause 15	(See appended table H.2)	P
	Fault condition e) is applied for encapsulated and similar components	No such components provided	N/A
	PTC's and NTC's are not short-circuited if they are used as specified	No such components provided	N/A
H.2.4	If for a fuse-link complying with IEC 60127-3 rated fuse current I1 is used, current I2 is measured as specified:		N/A
	- if I2 < 2,1 x I1 test of 15.8 is repeated with fuse-link short-circuited		N/A
	- if I2 > 2,75 x I1, no other tests are necessary		N/A
	If I2 > 2,1 x I1 and I2 < 2,75 x I1 test of 15.8 is repeated as specified		N/A
	For fuses other than those complying with IEC 60127-3, the test is carried out as specified 15.3.2 to 15.3.5		N/A
H.3	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION		P
H.3.1	For live parts separated by basic insulation smaller cr and cl as in 26 are allowed, if H2 is fulfilled.	The distances are all enough	N/A
	In optocouplers no requirements of cr and cl	Not such device provided	N/A
	For coatings annex W applies. Smaller distances as required in IEC 60664-3, clause 4 are applicable,	No coatings used	N/A
	For potted transformers cycling tests acc, 26.2. are applicable	Not such transformers provided	N/A
H.3.2	The max. surface temperature of optocouplers is 50 K	Not such device provided	N/A

K (A1)	**ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION**		P
K.1	Wire construction:	See below	P
	• insulated winding wire for basic or supplementary insulation (see 19.12.3)		N/A
	• insulated winding wire for reinforced insulation (see 19.12.3)	Approval triple insulated wire is used for secondary winding of transformer (T1)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	• splid circular winding wires and stranded winding wires with 0,05 to 5 mm diameter		N/A
	• spirally wrapped insulation – overlapping	Modified polyester, thermal resistant resin and polyamide resin	P
K.2	Type tests	Approval triple insulated wire is compliance with Annex K of IEC/EN 61558-2-16, no need to perform type tests	P
K.2.1	General Tests between ambient temperature between 15° C and 35° C and at a humidity between 45% and 75 %		N/A
K.2.2	Electric strength test		N/A
K.2.2.1	Solid circular winding wires and stranded winding wires		N/A
	Test samples prepared according to clause 4.4.1 of IEC 60851-5:2008 (twisted pair)		N/A
	Dielectric strength test: 6 kV for reinforced insulation		N/A
	Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
K.2.2.2	Square or rectangular wires		N/A
	Test samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
K.2.3	Flexibility and adherence		N/A
	Claus 5.1 in Test 8 of IEC 60851-3:2009 shall be used		N/A
	Test samples prepared according to clause 5.1.1.4 of IEC 60851-3:2009		N/A
	Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
	Mandrel diameter according table K.1		N/A
	The tension to the wire during winding on mandrel is 118 N/mm² (118 MPa)		N/A
K.2.4	Heat shock		N/A
	Test samples prepared according to 3.1.1 (in Test 9) of IEC 60851-6:1996		N/A
	• high voltage test immediately after this test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
K.2.5	Retention of dielectric strength after bending (test as specified under test 13 of 4.6.1 c) of IEC 60851-5)		N/A
			N/A
	• high voltage test immediately after this test • Dielectric strength test: 5,5 kV for reinforced insulation • Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
K.3.1	General Tests as subjected in K.3.2 and K.3.3		N/A
K.3.2	Routine test		N/A
	• Dielectric strength test: 4,2 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,1 kV for basic or supplementary insulation		N/A
K.3.3	Sampling test		N/A
K.3.3.1	Solid circular winding wires and stranded winding wires		N/A
	Test with a twisted pair, prepared according clause 4.4.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 6 kV for reinforced insulation		N/A
	• Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
K.3.3.2	Square rectangular wire		N/A
	Samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 3 kV for basic or supplementary insulation		N/A

U	**ANNEX U – INFORMATIVE – OPTIONAL T_W – MARKING FOR TRANSFORMERS**		N/A
	The tests of Annex U are based on constant S = 4500. Other constants are possible, if the test of U.5.2 is done with positive result.		N/A
U1	General notes and tests		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	8 transformers of one type are necessary for the test. Tests according U5.		N/A
U.2	Heating (addition to clause 14)		N/A
14.4	Thermal endurance test		N/A
	Test according U5 and measurements according 11.1		N/A
	Transformers tested as an integral part of the equipment (option), assigned with tw		N/A
	The thermal conditions are so adjusted, that the duration of test is as indicated by the manufacturer.		N/A
	If no indications are given, the test period is 30 days		N/A
	After the test, when the transformers have returned to room temperature, they fulfil the following requirements:		N/A
	a) The output voltage has not changed from the measured value at the beginning by more than allowed value of clause 11.1		N/A
	b) The insulation resistance between input and output winding and between windings and body is, measured with 500 V d.c, not less than 1 MOhm		N/A
	c) The transformer fulfils the dielectric strength test with 35% of the values in Clause 18, Table 8.a.		N/A
	The test result is positive, is min. 6 of the 7 samples have passed the test.		N/A
	The test result is negative, if 2 or more samples fail the test		N/A
	If the result is negative, the test can be repeated with 7 new samples		N/A
U.3	Short circuit and overload protection (addition to clause 15)		N/A
	At short circuit and overload tests the winding temperature if less than the required value of table U.1		N/A
U.5	General requirements and information about thermal endurance test on windings		N/A
U.5.1	Thermal endurance test		N/A
	Transformers tested at rated output		N/A
	Loads outside of the oven		N/A
	7 transformers are placed in the oven		N/A
	The temperature of the hottest winding of each of the 7 transformers is-together with the oven temperature, at the applicable temperature of table U.2		N/A

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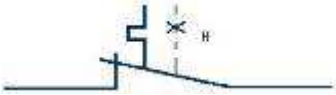
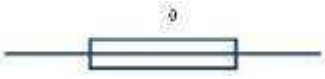
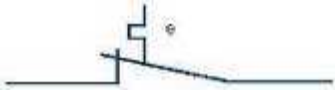
Clause	Requirement + Test	Result - Remark	Verdict
	After 4 hours measuring of the actual winding temperatures. Regulation of the oven temperature if necessary		N/A
	After 24 hours again measuring of the winding temperature. The temperatures of the 7 samples are very near to the required temperature of the values of table U.2. The test time of the coldest winding is not longer than twice the theoretical test time based on table U.2		N/A
U.5.2	The use of constant S other than 4500 in tw tests		N/A
U.5.2.1	Procedure a)		N/A
	The manufacturer prepares test results with a minimum of samples of 30.		N/A
	T and log L are calculated from the dates		N/A
	The diagram according to Figure U.2 will be founded.		N/A
U.5.2.3	Procedure b)		N/A
	The testing authority shall test 14 new transformers		N/A
	Test 1, based on clause U.5.1 but at the calculated test room temperature for 10 days. The test is continued until all transformer fail.		N/A
	Calculation of the mean life L_2 at temperature T_2 according to U4		N/A
	Test 2, based on clause U.5.1 but at a calculated room temperature T_2 (for 120 days).The test time with T_2 exceeds L_2.		N/A
	If all transformers fail before L_2, the result is negative.		N/A

V	**ANNEX V, SYMBOLS TO BE USED FOR THERMAL CUT-OUTS**		N/A
V.2.1.1	Restored by manual operation  IEC 489/98		N/A
V.2.1.2	Restored by disconnection of the supply  IEC 490/98		N/A
V.2.1.3	Thermal link  IEC 491/98		N/A
V.2.2	Self-resetting thermal cut-out  IEC 492/98		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

11 AND 12	TABLE: OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD; NO-LOAD OUTPUT VOLTAGE					P
Clause		11		12		--
type/rated output/	rated voltage (V)	sec. voltage (V)	delta Usec (%)	Usec V no-load output	delta Usec no-load output %	further information
36 Vdc, 1.5 A	100 V/50 Hz	35.99	-0.027	37.63	+4.52	For clause 11: Limit:10% Max. For clause 12: Limit:15% Max.
36 Vdc, 1.5 A	100 V/60 Hz	35.99	-0.027	37.63	+4.52	For clause 11: Limit:10% Max. For clause 12: Limit:15% Max.
36 Vdc, 1.5 A	240 V/50 Hz	35.99	-0.027	37.63	+4.52	For clause 11: Limit:10% Max. For clause 12: Limit:15% Max.
36 Vdc, 1.5 A	240 V/60 Hz	35.99	-0.027	37.63	+4.52	For clause 11: Limit:10% Max. For clause 12: Limit:15% Max.

14	TABLE: ELECTRICAL DATA (IN NORMAL CONDITIONS)					P
U (Vac)/ F (Hz)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
90 / 50	1.066	--	62.4	F1	1.066	Maximum rated output load
90 / 60	1.036	--	62.4	F1	1.036	Maximum rated output load
100 / 50	0.951	1.5	61.1	F1	0.951	Maximum rated output load
100 / 60	0.916	1.5	59.6	F1	0.916	Maximum rated output load
240 / 50	0.473	1.5	61.3	F1	0.473	Maximum rated output load
240 / 60	0.464	1.5	61.3	F1	0.464	Maximum rated output load
264 / 50	0.442	--	61.6	F1	0.442	Maximum rated output load
264 / 60	0.433	--	61.6	F1	0.433	Maximum rated output load
Supplementary information:						

14	TABLE: HEATING						N/A
type/rated output	r-cold Ω	r-warm Ω	temp. °C	ext. encl. °C	support °C	int. + ext. wire	further information
Supplementary information:							

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Clause	Requirement + Test	Result - Remark	Verdict

14	**TABLE: Heating Test**		P
	Test voltage (V).....	a) 90 Vac/60 Hz b) 264 Vac/60 Hz	—
	Ambient (ºC)	See below	—

Thermocouple Locations	**max. temperature measured (ºC)**		**max. temperature limit, (ºC)**
Test condition (With Epoxy)	**a)**	**b)**	—
AC cord body	40.6	40.9	105
Primary lead wire	55.3	53.6	105
LF1 coil	56.0	54.0	130
CX1 body (X-cap)	56.3	54.9	85
LF2 coil	60.0	57.6	130
LF3 coil	61.0	58.3	130
PCB under HS1 of BD1 and Q1	62.4	59.5	130
C1 body (Bulk-cap)	62.7	62.5	105
T1 coil	66.3	66.0	110
T1 core	62.0	61.6	110
CY1 body (Bridging-cap)	64.4	64.4	85
U4 body	63.6	63.7	100
PCB under HS2 of Q2 and D7	63.5	66.1	130
LF4 coil	66.9	67.5	130
Secondary lead wire (Output cord)	45.1	45.7	105
Enclosure inside near T1	59.9	58.9	75
Enclosure outside top near T1	53.9	53.4	80 (Plastic)
Enclosure outside bottom near T1 (Support)	56.3	54.3	85
Ambient	40.4	41.4	—

Supplementary information:
The installation manual defines 40 °C acceptable ambient temperature.
The max. temperature rise is calculated as follows:
Winding Class B_Tmax = 120 °C -10 °C = 110 °C (Thermocouple method).

15	**TABLE: SHORT-CIRCUIT AND OVERLOAD PROTECTION**		N/A
	ambient temperature (°C) .....:		—

type/rated output	r-cold Ω	r-warm Ω	temp. °C	ext. encl. °C	support °C	int. + ext. wire	further information

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Clause	Requirement + Test	Result - Remark	Verdict

15	**TABLE: SHORT CIRCUIT AND OVERLOAD PROTECTION**		P
15.3	**Ambient (ºC).....:**	40 °C	—
	At 0,9 or 1,1 times rated voltage (V)……:	90 Vac and 264 Vac	—

Thermocouple Locations	**max. temperature measured, (ºC)**		**max. temperature limit, (ºC)**
1. Transformer overload test: T1 (Pin A-B) after D7 at C14			
Test condition	90 Vac/60 Hz	264 Vac/60 Hz	--
T1 coil	91.7	91.2	190*1
T1 core	83.5	83.5	190*1
Enclosure outside top near T1	52.3	52.1	105
Enclosure outside bottom near T1 (Support)	61.7	61.3	105
Primary lead wire (PVC)	53.6	51.9	105
Secondary lead wire (Output cord)	64.6	64.9	105
2. Output overload test:			
T1 coil	91.7	91.2	190*1
T1 core	83.5	83.5	190*1
Enclosure outside top near T1	52.1	51.8	105
Enclosure outside bottom near T1 (Support)	61.5	61.3	105
Primary lead wire (PVC)	53.7	51.8	105
Secondary lead wire (Output cord)	64.6	64.9	105
3. Output short-circuit test (immediately after test 14.2 at hot condition):			
T1 coil	Unit shut down	Unit shut down	215*2
T1 core			215*2
Enclosure outside top near T1			105
Enclosure outside bottom near T1 (Support)			105
Primary lead wire (PVC)			105
Secondary lead wire (Output cord)			105

Supplementary information:

The max. temperature rise is calculated as follows:

*1: Winding Class B → Tmax = 200 °C -10 °C = 190 °C (Thermocouple method)

*2: Winding Class B → Tmax = 225 °C -10 °C = 215 °C (Thermocouple method)

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Clause	Requirement + Test	Result - Remark	Verdict

18.2	TABLE: INSULATION RESISTANCE MEASUREMENTS		P
Insulation resistance R between:	R (MΩ)	Required R (MΩ)	
Between parts separated by basic insulation:			
Between traces of L and N before fuse (F1)	>100	2	
Two ends of fuse (F1)	>100	2	
Between parts separated by double or reinforced insulation:			
Between input circuits and output circuits	>100	5	
Between T1 primary winding and secondary pin	>100	5	
Between T1 core and secondary pin	>100	5	
Between input circuits and body (enclosure outside wrapped with metal foil)	>100	7	
Between output circuits and body (enclosure outside wrapped with metal foil)	>100	7	
Between inner and outer surfaces of enclosure	>100	7	
Supplementary information: The core of transformer (T1) is considered as primary side, the TIW is used in secondary winding.			

18.3	TABLE: DIELECTRIC STRENGTH		P
Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)	
Between parts separated by basic insulation:			
Between traces of L and N before fuse (F1)	1820 Vac	No	
Two ends of fuse (F1)	1820 Vac	No	
Between input circuit and protective earth	1820 Vac	No	
Between parts separated by double or reinforced insulation:			
Between input circuits and output circuits	3958 Vac	No	
Between T1 primary winding and secondary pin	3958 Vac	No	
Between intermediate conductive part (T1 core) and secondary pin	3958 Vac	No	
Between intermediate conductive part (T1 core) and body (enclosure outside wrapped with metal foil)	3958 Vac	No	
Between input circuits and body (enclosure outside wrapped with metal foil)	3958 Vac	No	
Between output circuits and body (enclosure outside wrapped with metal foil) (Class I)	1979 Vac	No	
Supplementary information: The core of transformer (T1) is considered as primary side, the TIW is used in secondary winding.			

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: CRITICAL COMPONENTS INFORMATION				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Enclosure	SABIC INNOVATIVE PLASTICS B V	CX7211	PPE+PS, Min. V-1, Min. thickness: 2.0 mm, 105 °C	UL 94	UL recognized
Alt.	SABIC JAPAN L L C	CX7211	PPE+PS, Min. V-1, Min. thickness: 2.0 mm, 105 °C	UL 94	UL recognized
Epoxy potting compound	SUZHOU POCHELY ELECTRONIC MATERIAL CO LTD	HB-5225A/B	V-0, 90 ºC	UL 94	UL recognized
Alt.	DONGGUAN EATTO ELECTRONIC MATERIAL CO LTD	3300A/B	V-0, 90 ºC	UL 94	UL recognized
PCB	WALEX ELECTRONIC (WUXI) CO LTD	T4	Min. 1,6 mm thick, min. V-0, 130 °C	UL 796	UL recognized
Alt.	Interchangeable	Interchangeable	Min. 1,6 mm thick, min. V-0, 130 °C	UL 796	UL recognized
Fuse (F1)	Conquer Electronics Co., Ltd.	MST series	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40017118
Alt.	Ever Island Electric Co., Ltd. And Walter Electric	2010, ICP	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40018781
Alt.	WALTER ELECTRONIC CO LTD	ICP	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40012824
Alt.	Bel Fuse Ltd.	RST-Serie(s)	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40011144
Alt.	Cooper Bussmann LLC	SS-5	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40015513
Alt.	Dongguan Better	932	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40033369
Alt.	Hollyland	5ET	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40015669
Alt.	Sunny East	CFD	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40030246
Alt.	Conquer Electronics Co., Ltd.	MET series	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40017157

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: CRITICAL COMPONENTS INFORMATION				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt.	Shenzhen Lanson Electronics Co. Ltd.	SMT	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40012592
Alt.	Zhongshan Lanbao Electrical Appliances Co., Ltd.	RTI-10 Serie(s)	T3.15A, 250V	IEC 60127-1 IEC 60127-3	VDE 40017009
Varistor MOV1 (Optional)	Thinking Electronic Industrial	TVR10471K, TVR14471K	Min. 300 Vac, min. 385 Vdc, Coating V-1 or better, 85 °C	IEC 61051-1, IEC 61051-2, IEC 61051-2-2	VDE 005944
Alt.	Centra	CNR-10D471K, CNR-14D471K	Min. 300 Vac, min. 385 Vdc, Coating V-1 or better, 85 °C	IEC 61051-1, IEC 61051-2, IEC 61051-2-2	VDE 40008220
Alt.	Success Electronics Co Ltd	SVR10D471K, SVR14D471K	Min. 300 Vac, min. 385 Vdc, Coating V-1 or better, 85 °C	IEC 61051-1, IEC 61051-2, IEC 61051-2-2	VDE 4003040
Alt.	Walsin	VZ10D471K, VZ14D471K	Min. 300 Vac, min. 385 Vdc, Coating V-1 or better, 85 °C	IEC 61051-1, IEC 61051-2, IEC 61051-2-2	VDE 5932
Alt.	Lien Shun Electronics Co., Ltd.	10D471K, 14D471K	Min. 300 Vac, min. 385 Vdc, Coating V-1 or better, 85 °C	IEC 61051-1, IEC 61051-2, IEC 61051-2-2	VDE 40005858
Alt.	CERAMATE	GNR10D471K, GNR14D471K	Min. 300 Vac, min. 385 Vdc, Coating V-1 or better, 85 °C	IEC 61051-1, IEC 61051-2, IEC 61051-2-2	VDE 40031745
Alt.	Brightking	14D471K, 10D471K	Min. 300 Vac, min. 385 Vdc, Coating V-1 or better, 85 °C	IEC 61051-1, IEC 61051-2, IEC 61051-2-2	VDE 40027827
Alt.	Joyin Co., Ltd.	JVT10N471K, JVT14N471K	Min. 300 Vac, min. 385 Vdc, Coating V-1 or better, 85 °C	IEC 61051-1, IEC 61051-2, IEC 61051-2-2	VDE 005937
X capacitor (CX1) (optional)	Cheng Tung Industrial Co., Ltd.	CTX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40022642
Alt.	Tenta Electric Industrial Co. Ltd.	MEX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 119119

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Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: CRITICAL COMPONENTS INFORMATION				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt.	Joey	MPX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40032481
Alt.	Ultra Tech Xiphi Enterprise Co. Ltd.	HQX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40015608
Alt.	Xiangtai Electronic (Shenzhen) Co., Ltd.	MKP, MPX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40036065
Alt.	Carli Electronics Co., Ltd.	MPX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40008520
Alt.	Dain Electronics Co., Ltd.	MEX, MPX, NPX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40018798
Alt.	Yuon Yu Electronics Co. Ltd.	MPX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40032392
Alt.	Sinhua Electronics (Huzhou) Co., Ltd.	MPX	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40014686
Alt.	Jiangsu Xinghua Huayu Electronics Co., Ltd.	MPX - Series	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40022417
Alt.	Jinghao	CBB62B	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40018690
Alt.	Foshan Shunde Chuang Ge Electronic Industrial Co., Ltd.	MKP-X2	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40008922
Alt.	Okaya Electric Industries Co. LTD	RE-Series	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40028657
Alt.	VISHAY Capacitors Belgium NV	F 1772	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40005095
Alt.	Winday Electronic Industrial Co., Ltd.	MPX series	Max. 0.47 uF, min. 250 V, 100 °C, X1 or X2	IEC 60384-14	VDE 40018071

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Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: CRITICAL COMPONENTS INFORMATION				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Y capacitor (CY1, CY2) (optional)	TDK-EPC Corporation,	CD	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40029780
Alt.	Success Electronics Co., Ltd.	SE	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40037211 VDE 40020002
Alt.	Success Electronics Co., Ltd.	SB	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40037221 VDE 40020001
Alt.	Walsin Technology Corp.	AH	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40001804
Alt.	Haohua Electronic Co.	CT 7	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40003902
Alt.	Xiangtai Electronic (Shenzhen) Co., Ltd.	YO-series	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40036880
Alt.	JUHONG ELECTRONICS LTD	JB- series	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40035339
Alt.	Murata Mfg. Co., Ltd.	KX	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40002831
Alt.	JYA-NAY Co., Ltd.	JN	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40001831
Alt.	Jyh Chung Electronic Co., Ltd.	JD	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 137027
Alt.	WELSON INDUSTRIAL CO LTD	WD	Min. 250 V, min. 125 °C, max. 2200 pF, Y1	IEC 60384-14	VDE 40016157
Choke (LF1)	GlobTek/ Haopuwei/ BOAM/ HEJIA	LF046	Min. 130 °C	Applicable parts of IEC 61558-2-16	Tested in appliance
Choke (LF2)	GlobTek/ Haopuwei/ BOAM/ HEJIA	LF025	Min. 130 °C	Applicable parts of IEC 61558-2-16	Tested in appliance

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: CRITICAL COMPONENTS INFORMATION				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Choke (LF3)	GlobTek/ Haopuwei/ BOAM/ HEJIA	LF050	Min. 130 °C	Applicable parts of IEC 61558-2-16	Tested in appliance
Photo coupler (U4)	Lite-On Technology Corporation	LTV-817	Dti = 0.8 mm Int., EXT.dcr = 7.8 mm, thermal cycling test,110 °C	IEC 60747-5-2	VDE 40015248
Alt.	Everlight Electronics Co., Ltd.	EL817	Dti= 0.5 mm Int., dcr= 6.0 mm EXT.dcr= 7.7 mm, thermal cycling test,110 °C	IEC 60747-5-2	VDE 132249
Alt.	Fairchild Semiconductor Pte Ltd.	H11A817B, FOD817B	Int. Cr/ Ext. Cr: ≥ 7,0/ 7,0 mm; 30/110/21,100 °C	IEC 60747-5-2	VDE 40026857
Alt.	Sharp Corporation Electronic Components and Devices Group	PC817	Int. Cr/ Ext. Cr: 7.62/ 7.62 mm; 30/100/21,100 °C	IEC 60747-5-2	VDE 40008087
Alt.	Bright Led Electronics Corp.	BPC-817 A/B/C/D/L, BPC-817 M, BPC-817 S	Dti = 0.4 mm, EXT.dcr = 7.0 mm, thermal cycling test,110 °C	IEC 60747-5-2	VDE 40007240
Alt.	Toshiba Corporation Semiconductor & Storage Products Company	TLP781F	Dti > 0.4mm, Ext cr > 8.0mm, Isolation 3000Vac min., 110 °C min., Thermal cycling test	IEC 60747-5-2	VDE 40021173
Alt.	COSMO Electronics Corporation	K1010/KP1010	Dti = 0.6 mm Int., dcr = 4.0 mm EXT.dcr = 5.0 mm, thermal cycling test,115 °C	IEC 60747-5-2	VDE 101347
Primary lead wire[2)]	Interchangeable	Interchangeable	PVC, VW-1, 80 °C, 300 V, Min. 24 AWG	Applicable parts of IEC 61558-2-16, UL 758	UL recognized
Earthing wire	Interchangeable	Interchangeable	PVC, VW-1, 80 °C, 300 V, Min. 20 AWG	Applicable parts of IEC 61558-2-16, UL 758	UL recognized
Secondary lead wire[3)]	Interchangeable	Interchangeable	PVC, VW-1, 80 °C, 300 V, Min. 24 AWG	Applicable parts of IEC 61558-2-16, UL 758	UL recognized
Bridge Rectifier (BD1)	Interchangeable	Interchangeable	Min. 4 A, min. 600 V	Applicable parts of IEC 61558-2-16	Tested in appliance

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: CRITICAL COMPONENTS INFORMATION				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Electrolytic capacitors (C1)	Interchangeable	Interchangeable	Min. 120 µF, min. 400 V, min. 105 °C	Applicable parts of IEC 61558-2-16	Tested in appliance
MOSFET (Q1)	Interchangeable	Interchangeable	Min. 7 A, min. 650 V	Applicable parts of IEC 61558-2-16	Tested in appliance
Transformer material list:					
Transformer (T1)	GlobTek, BOAM, Haopuwei, ENG	TF064	Class B	Applicable parts of IEC 61558-2-16	Tested in appliance
Insulation system	GlobTek Inc	GTX-130-TM	Class B	Applicable parts of IEC 61558-2-16	Tested in appliance
Alt.	WUXI HAOPUWEI ELECTRONICS CO LTD	ZT-130	Class B	Applicable parts of IEC 61558-2-16	Tested in appliance
Alt.	SHAN DONG BOAM ELECTRIC CO LTD	BOAM-01, B1	Class B	Applicable parts of IEC 61558-2-16	Tested in appliance
Alt.	ENG ELECTRIC CO LTD	ENG130-1	Class B	Applicable parts of IEC 61558-2-16	Tested in appliance
Primary Magnet wires	Interchangeable	Interchangeable	Min. 130 °C	UL 1446	UL recognized
Secondary TIW	Great Leoflon Industrial Co., Ltd.	TRW (B) Serie(s)	Min. 130 °C	IEC 61558-2-16 Annex K	VDE
Alt.	COSMOLINK CO. Ltd.	TIW-M Serie(s)	Min. 130 °C	IEC 61558-2-16 Annex K	VDE
Alt.	Furukawa Electric Co., Ltd	TEX-E	Min. 130 °C	IEC 61558-2-16 Annex K	VDE
Alt.	TOTOKU ELECTRIC CO LTD	TIW-2	Min. 130 °C	IEC 61558-2-16 Annex K	VDE
Alt.	E&B TECHNOLOGY CO LTD	E&B-XXXB, E&B-XXXB-1	Min. 130 °C	IEC 61558-2-16 Annex K	VDE
Alt.	SHENZHEN JIUDING NEW MATERIAL CO LTD	DTIW-B	Min. 130 °C	IEC 61558-2-16 Annex K	VDE
-Bobbin	CHANG CHUN PLASTICS CO LTD	T375J	Min. V-0, min.0.45 mm thick, 150 °C, phenolic	UL 94	UL recognized

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: CRITICAL COMPONENTS INFORMATION				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Insulating tape	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	1350F-1(b), 1350T-1, 44	Min.130 °C	UL 510	UL recognized
Alt.	BONDTEC PACIFIC CO LTD	370S (b)	Min.130 °C	UL 510	UL recognized
Alt.	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PZ, CT, WF	Min.130 °C	UL 510	UL recognized
Alt.	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	JY25-A(b)	Min.130 °C	UL 510	UL recognized
Alt.	CHANG SHU LIANG YI TAPE INDUSTRY CO LTD	LY-XX(a)(b)	Min.130 °C	UL 510	UL recognized
Tubing	GREAT HOLDING INDUSTRIAL CO LTD	TFT, TFS, TFL	Min. 200 °C	UL 94	UL recognized
-Alt.	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	WF	Min. 200 °C	UL 94	UL recognized
-Alt	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-TT-T, CB-TT-S	Min. 200 °C	UL 94	UL recognized
-Alt	LING FREE	PTFE	Min. 200 °C	UL 94	UL recognized
Plastic material list:					
Insulation tubing provided on heatsink or class I earth wire	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	RSFR RSFR-H RSFR-HPF	600V, 125°C	UL 94	UL recognized
-Alt.	QIFURUI ELECTRONICS CO	QFR-h	600 V, 125 °C	UL 94	UL recognized

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

20	TABLE: CRITICAL COMPONENTS INFORMATION				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
-Alt	DONGGUAN SALIPT CO LTD	SALIPT S-901-300, SALIPT S-901-600	Min. 300 V, 125 °C	UL 94	UL recognized
-Alt.	GUANGZHOU KAIHENG ENTERPRISE GROUP	K-2 (+) K-2 (CB)	Min. 300 V, 125 °C	UL 94	UL recognized
-Alt	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-HFT	Min. 300 V, 125 °C	UL 94	UL recognized
-Alt	SHENZHEN WOLIDA TRADING CO LTD	RSFR-H	600 V, 125 °C	UL 94	Tested with appliance E329530

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.
2) Primary lead wire: One end mechanically secured and soldered to input blade; the other end secured to PCB by solder/terminal.
3) Secondary lead wire: One end mechanically secured and soldered to input blade; the other end secured to PCB by solder/terminal.

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Clause	Requirement + Test	Result - Remark	Verdict

25	TABLE: THREADED PART TORQUE TEST			N/A
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)	
Supplementary information:				

26.101	TABLE: WORKING VOLTAGE MEASUREMENTS									P
Transformer T1 (Pin 2: Cut off, Pin 6: No pin)										
Pri. pins / Sec. pins	Vpeak	Vrms	Vpeak	Vrms	Vpeak	Vrms	Vpeak	Vrms	Frequency (kHz)	
	Pin 1		Pin 3		Pin 4		Pin 5		87.7	
Pin A	456	240	478	225	140	207	366	199		
Pin B	**512**	**274**	345	213	340	195	388	195		
Bridging cap: CY1, CY2										
Pri. pins / Sec. pins	Vpeak	Vrms	Vpeak	Vrms	Vpeak	Vrms	Vpeak	Vrms	Vpeak	Vrms
	CY1 Pri		--		--		--		--	
CY2 Sec	342	198	--	--	--	--	--	--	--	--
Photo coupler U4										
Pri. pins / Sec. pins	Vpeak	Vrms	Vpeak	Vrms	Vpeak	Vrms	Vpeak	Vrms	Vpeak	Vrms
	Pin 3		Pin 4		--		--		--	
Pin 1	349	196	348	185	--	--	--	--	--	--
Pin 2	347	192	346	184	--	--	--	--	--	--
Supplementary information: 1. Test voltage: 240 Vac, 60 Hz. 2. Bold texts indicate the highest Vrms and Vpeak.										

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

26	TABLE: CLEARANCE AND CREEPAGE DISTANCE MEASUREMENTS					P
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
ON PCB solder side:						
BI: Under F1 trace	420	250	2.5	3.0	2.6	3.0
BI: Under L/N trace (before F1)	420	250	2.5	4.5	2.6	4.5
ON PCB component side: (Unit is filled with Epoxy Potting Compound)						
RI: L/N trace to user accessible part	420	250	4.7	> 6.5	5.0	> 6.5
RI: Two ends of U4	420	250	4.7	7.1	5.0	7.1
RI: Two ends of CY1 and CY2	420	250	4.7	12.6	5.0	12.6
RI: Primary component (HS1) to secondary (HS2)	420	250	4.7	> 6.5	5.0	> 6.5
RI: Primary component (CX1) to secondary (HS2)[4)]	420	250	4.7	10.0	5.0	10.0
RI: Primary component (C1) to secondary (HS2)[4)]	420	250	4.7	> 6.5	5.0	> 6.5
RI: Primary component (U4) to secondary (HS2)[4)]	420	250	4.7	> 6.5	5.0	> 6.5
Transformer (T1):						
RI: Trace under T1	512	274	5.1	14.8	5.5	14.8
RI: Primary windings to secondary pin	512	274	5.1	12.1	5.5	12.1
RI: T1 core to secondary (HS2)[5)]	512	274	5.1	> 6.5	5.5	> 6.5
RI: T1 core to secondary component (CY2)[5)]	512	274	5.1	> 6.5	5.5	> 6.5

Supplementary information:

1. BI: Basic Insulation, SI: Supplementary Insulation, RI: Reinforced Insulation.
2. The core of transformer (T1) is considered as primary side.
3. Unit is filled with Epoxy Potting Compound.
4. Insulating tubing for HS2 provided components (Safety relevant, RI): CX1, C1 and U4.
5. Insulating tape provided around the bottom side of transformer (T1). Refer to appendix 4 for details.

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Clause	Requirement + Test	Result - Remark	Verdict

26	TABLE: DISTANCE THROUGH INSULATION MEASUREMENTS				P
Distance through insulation di at/of:		U r.m.s (V)	Test voltage (V)	Required di (mm)	Di (mm)
RI: Enclosure (Reinforced Insulation)2)		250	4200 Vac	0.56	2.0
RI: Insulating tubing for HS2 (Reinforced Insulation)2)		250	4200 Vac	0.56	0.6

Supplementary information:

1). Working voltage is 250 Vac, required di = 0.84 mm.

2). According to clause 26.3.2, for transformers having a rated output of 25 VA up to and including 100 VA, the figures in square brackets may be reduced to two-thirds of their value.

➔ 0.84*(2/3) = 0.56 mm.

3) RI: Reinforced insulation.

26.2 TEST A	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION				N/A
	Test with three special prepared specimens with uninsulated wires, without potting or impregnation				
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C	
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

BB.26.2 TEST B	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION				N/A
	Test with three specially prepared specimens with potted – P1 values are required				
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C	
1.					

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Clause	Requirement + Test	Result - Remark	Verdict

26.2 TEST A	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test with three special prepared specimens with uninsulated wires, without potting or impregnation					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

26.2 TEST C	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test with three specially prepared specimens with potting (only dti is required)					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

26.107 61558-2-16/A1	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test for transformers, use FIW-wire					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

27	**TABLE: Resistance to heat and fire – Ball pressure tests**		P
Required impression diameter (mm)……..	≤ 2 mm		
Object/Part No./Material	test temperature (°C)	impression diameter (mm)	
Enclosure	75	0.34	
T1 bobbin	125	1.1	
supplementary information:			

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Clause	Requirement + Test	Result - Remark	Verdict

27	TABLE: RESISTANCE TO HEAT AND FIRE - GLOW WIRE TESTS							P
Object/ Part No./ Material	**Manufacturer/ trademark**	**Glow wire test (GWT); (°C)**						**Verdict**
		550	**650**		**750**		**850**	
			te	**ti**	**te**	**ti**		
T1 bobbin	See table 20 for details	N/A	No flame	No flame	N/A	N/A	N/A	P
Enclousre[1)]	See table 20 for details	N/A	N/A	N/A	No flame	No flame	N/A	P
PCB	See table 20 for details	N/A	N/A	N/A	N/A	N/A	No flame	P

Object/ Part No./ Material	**Manufacturer/ trademark**	**Glow-wire flammability index (GWFI), °C**				**GW ignition temp. (GWIT), °C**		**Verdict**
		550	**650**	**750**	**850**	**675**	**775**	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

If no, then surrounding parts passed the needle-flame test of annex E (Yes/No)…….....:	N/A
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)?.....:	Yes
Ignition of the specified layer placed underneath the test specimen (Yes/No)……..:	No

Supplementary information:
550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF
The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances.

1) By client's request.

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

H.2	**Short-circuit & Overload Protection Test**				P
	Test voltage (V)	94 Vac / 60 Hz			—
	Ambient (°C).....	25 °C / Tma: 40 °C			—
Parts / Condition	Duration/Input Current	Result	Parts measured	Temperature (°C)	Limit (°C)
Below test item protected by current fuse (F1), rating 3.15 A/250 Vac					
BD1 (AC to V+)/ short-circuited	0	F1 opened immediately, no hazard.	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
C1/short-circuited	0	F1 opened immediately, no hazard.	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
Q1 (Pin D-G) / short-circuited	0	F1 opened immediately, no hazard.	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
Q1 (Pin D-S) / short-circuited	0	F1 opened immediately, no hazard.	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
Q1 (Pin G-S)	0.06	Unit	T1 coil	—	215

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

H.2	**Short-circuit & Overload Protection Test**				P
	Test voltage (V)	94 Vac / 60 Hz			—
	Ambient (°C).....	25 °C / Tma: 40 °C			—
Parts / Condition	Duration/Input Current	Result	Parts measured	Temperature (°C)	Limit (°C)
Below test item protected by current fuse (F1), rating 3.15 A/250 Vac					
/ short-circuited		shutdown, no damage, no hazards	T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
U4 (Pin 1-2)/ short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
U4 (Pin 3-4)/ short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
U4 (Pin 2)/open-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
U4 (Pin 4)/open-	0.06	Unit shutdown, no damage,	T1 coil	—	215
			T1 core	—	215

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Clause	Requirement + Test	Result - Remark	Verdict

H.2	**Short-circuit & Overload Protection Test**				P
	Test voltage (V)		94 Vac / 60 Hz		—
	Ambient (°C).....		25 °C / Tma: 40 °C		—
Parts / Condition	Duration/Input Current	Result	Parts measured	Temperature (°C)	Limit (°C)
Below test item protected by current fuse (F1), rating 3.15 A/250 Vac					
circuited		no hazards	Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
U1 (Pin 8-6)/ short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
U1 (Pin 8-2)/ short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
T1 (Pin A-B) / short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
T1 (Pin 3-1) / short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105

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Clause	Requirement + Test	Result - Remark	Verdict

H.2	**Short-circuit & Overload Protection Test**				P
	Test voltage (V)	94 Vac / 60 Hz			—
	Ambient (°C).....	25 °C / Tma: 40 °C			—
Parts / Condition	Duration/Input Current	Result	Parts measured	Temperature (°C)	Limit (°C)
Below test item protected by current fuse (F1), rating 3.15 A/250 Vac					
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
T1 (Pin 4-5) / short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	—	215
			T1 core	—	215
			Enclosure outside top near T1	—	105
			Enclosure outside bottom near T1 (Support)	—	105
			Primary lead wire (PVC)	—	105
			Secondary lead wire (Output cord)	—	105
Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict

H.2	**Short-circuit & Overload Protection Test**				P
	Test voltage (V)	264 Vac / 60 Hz			—
	Ambient (°C).....	25 °C / Tma: 40 °C			—
Parts / Condition	Duration/Input Current	Result	Parts measured	Temperature (°C)	Limit (°C)
Below test item protected by current fuse (F1), rating 3.15 A/250 Vac					
BD1 (AC to V+)/ short-circuited	0	F1 opened immediately, no hazard.	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
C1/short-circuited	0	F1 opened immediately, no hazard.	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
Q1 (Pin D-G) / short-circuited	0	F1 opened immediately, no hazard.	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
Q1 (Pin D-S) / short-circuited	0	F1 opened immediately, no hazard.	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
Q1 (Pin G-S) / short-	0.06	Unit shutdown,	T1 coil	--	215
			T1 core	--	215

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Clause	Requirement + Test	Result - Remark	Verdict

H.2	**Short-circuit & Overload Protection Test**				P
	Test voltage (V)	264 Vac / 60 Hz			—
	Ambient (°C).....	25 °C / Tma: 40 °C			—
Parts / Condition	Duration/Input Current	Result	Parts measured	Temperature (°C)	Limit (°C)
Below test item protected by current fuse (F1), rating 3.15 A/250 Vac					
circuited		no damage, no hazards	Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
U4 (Pin 1-2)/ short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
U4 (Pin 3-4)/ short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
U4 (Pin 2)/open-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
U4 (Pin 4)/open-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

H.2	**Short-circuit & Overload Protection Test**				P
	Test voltage (V)	264 Vac / 60 Hz			—
	Ambient (°C).....	25 °C / Tma: 40 °C			—
Parts / Condition	Duration/Input Current	Result	Parts measured	Temperature (°C)	Limit (°C)
Below test item protected by current fuse (F1), rating 3.15 A/250 Vac					
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
U1 (Pin 8-6)/ short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
U1 (Pin 8-2)/ short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
T1 (Pin A-B) / short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
T1 (Pin 3-1) / short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105

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Clause	Requirement + Test	Result - Remark	Verdict

H.2	**Short-circuit & Overload Protection Test**				P
	Test voltage (V)	264 Vac / 60 Hz			—
	Ambient (°C).....	25 °C / Tma: 40 °C			—
Parts / Condition	Duration/Input Current	Result	Parts measured	Temperature (°C)	Limit (°C)
Below test item protected by current fuse (F1), rating 3.15 A/250 Vac					
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
T1 (Pin 4-5) / short-circuited	0.06	Unit shutdown, no damage, no hazards	T1 coil	--	215
			T1 core	--	215
			Enclosure outside top near T1	--	105
			Enclosure outside bottom near T1 (Support)	--	105
			Primary lead wire (PVC)	--	105
			Secondary lead wire (Output cord)	--	105
Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict

Annex U	**U.5.1 THERMAL ENDURANCE TEST**													
Type ref.														
Rated PRI-Voltage														
Rated SEC-Voltage														
Material of Winding														
Material of bobbin														
Material of resin														
Material of potting														
Material of foil														
Components removed for test														
t_w														
S														
Objective test duration (days)														
Theoretical test temperature														
Sample	1		2		3		4		5		6		7	
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC
Start – Rk														
After 4 h – Rw														
After 4 h – winding temperature														
After 4 h - oven temperature														
After 24 h – Rw														
After 24 h – winding temperature														
After 24 h - oven temperature														
Final test period (days)														
Output voltage (11.1) under load														
Insulating resistance														
High voltage test (35% of the values in Table 8.a)														

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Clause	Requirement + Test	Result - Remark	Verdict

Annex U	**U.5.2 The use of another constant S other than 4500 in tw tests Test 1:10 days**													
Type ref.														
Rated PRI-Voltage														
Rated SEC-Voltage														
Material of Winding														
Material of bobbin														
Material of resin														
Material of potting														
Material of foil														
Components removed for test														
t_w														
S														
Objective test duration (days)														
Theoretical test temperature														
Sample	1		2		3		4		5		6		7	
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC
Start – Rk														
After 4 h – Rw														
After 4 h – winding temperature														
After 4 h - oven temperature														
After 24 h – Rw														
After 24 h – winding temperature														
After 24 h - oven temperature														
Final test period (days)														
Output voltage (11.1) under load														
Insulating resistance														
High voltage test (35% of the values in Table 8.a)														

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Clause	Requirement + Test	Result - Remark	Verdict

Annex U	**U.5.2 The use of another constant S other than 4500 in t_w tests Test 2:120 days**													
Type ref.														
Rated PRI-Voltage														
Rated SEC-Voltage														
Material of Winding														
Material of bobbin														
Material of resin														
Material of potting														
Material of foil														
Components removed for test														
tw														
S														
Objective test duration (days)														
Theoretical test temperature														
Sample	1		2		3		4		5		6		7	
Winding	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC
Start – Rk														
After 4 h – Rw														
After 4 h – winding temperature														
After 4 h - oven temperature														
After 24 h – Rw														
After 24 h – winding temperature														
After 24 h - oven temperature														
Final test period (days)														
Output voltage (11.1) under load														
Insulating resistance														
High voltage test (35% of the values in Table 8.a)														

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Clause	Requirement + Test	Result - Remark	Verdict
AA	**Annex AA**		N/A
	Partial discharge (PD) test		N/A
BB	**Annex BB**		N/A
	Particular requirements for associated transformers for switch mode power supplies with internal frequencies > 500 Hz		N/A
	See separate test report-form for these Annex.		N/A
BB.8	**MARKING AND OTHER INFORMATION**		N/A
BB.8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets		N/A
BB.8.11	Correct symbols:		N/A
	Volts	V	N/A
	Amperes	A (mA)	N/A
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	N/A
	Watts	W	N/A
	Hertz	Hz	N/A
	Input	PRI	N/A
	Output	SEC	N/A
	Direct current	d.c. (DC) or ⎓	N/A
	Neutral	N	N/A
	Single-phase a.c.	∼	N/A
	Three-phase a.c.	3 ∼	N/A
	Three-phase and neutral a.c.	3N ∼	N/A
	Power factor	cosφ	N/A
	Class II construction	⧈	N/A
	Class III construction	III	N/A
	Fuse-link		N/A
	Rated max. ambient temperature	t_a	N/A
	Frame or core terminal		N/A
	Protective earth		N/A
	IP number	IPXX	N/A
	Earth (ground for functional earth)		N/A
	For indoor use only		N/A
	t_{W5} YYY		N/A
	t_{W10} YYY		N/A

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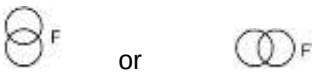
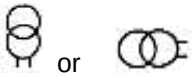
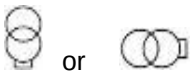
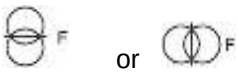
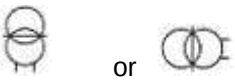
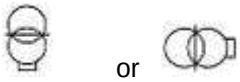
Clause	Requirement + Test	Result - Remark	Verdict
	t_{Wx} YYY		N/A
	Additional Symbols (IEC 61558-2-16:09)		N/A
	SMPS incorporating a **Fail-safe separating transformer**		N/A
	Additional Symbols (IEC 61558-2-16:09)		N/A
	SMPS incorporating a **Non-short-circuit-proof separating transformer**		N/A
	SMPS incorporating a **Short-circuit-proof separating transformer** (inherently or non-inherently)		N/A
	SMPS incorporating a **Fail-safe isolating transformer**		N/A
	SMPS incorporating a **Non-short-circuit-proof isolating transformer**		N/A
	SMPS incorporating a **Short-circuit-proof isolating transformer** (inherently or non-inherently)		N/A
	SMPS incorporating a **Fail-safe safety isolating transformer**		N/A
	SMPS incorporating a **Non-short-circuit-proof safety isolating transformer**		N/A
	SMPS incorporating a **Short-circuit-proof safety isolating transformer** (inherently or non-inherently)		N/A
	SMPS (Switch mode power supply unit)		N/A
BB.9	**PROTECTION AGAINST ELECTRIC SHOCK**		N/A
BB.10	**CHANGE OF INPUT VOLTAGE SETTING**		N/A
BB.11	**OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD**		N/A
BB.12	**NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)**		N/A
BB.13	**SHORT-CIRCUIT VOLTAGE**		N/A
BB.14	**HEATING**		N/A
BB.14.2	Application of 14.1 or 14.3 according to the insulation system		N/A
BB.14.2.1	Class of isolating system (classified materials according to IEC 60085 and IEC 60216)		N/A
BB.14.2.2	No classified material, or system but the measured temperature does not exceed the value of Class A		N/A
BB.14.2.3	No classified material or system but the measured temperature exceeds the value for Class A, the live parts of the transformers are submitted to the test of 14.3		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
BB.14.3	Accelerated ageing test for undeclared class of isolating system		N/A
	Cycling test (10 cycles):		N/A
	- measuring of the no-load input current (mA)		N/A
BB.14.3.1	- heat run (temperature in table 2)		N/A
BB.14.3.2	- vibration test: 30 min; amplitude 0,35 mm; frequency range: 10 Hz, 55 Hz, 10 Hz		N/A
BB.14.3.3	- moisture treatment (48 h, 17.2)		N/A
BB.14.3.4	Measurements and tests at the beginning and after each test:		N/A
	- deviation of the no-load input current, measured at the beginning of the test is 30%		N/A
	- insulation resistance acc. cl.18.1 and 18.2		N/A
	- electric strength, no breakdown (18.3); 2 min; test voltage 35% of specified value (table VI)		N/A
	- Transformers (50 or 60 Hz version) are tested after the dielectric strength test as follows: under no load; duration: 5 min; Upri(V):1,2 times rated supply voltage; frequency (Hz): 2 times rated frequency		N/A
BB.15	**SHORT-CIRCUIT AND OVERLOAD PROTECTION**		N/A
BB.16	**MECHANICAL STRENGTH**		N/A
BB.17	**PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE**		N/A
BB.18	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		N/A
BB.18.2	Insulation resistance between:		N/A
	- live parts and body for basic insulation 2 M		N/A
	- live parts and body for reinforced insulation 7 M		N/A
	- input circuits and output circuits for basic insulation 2 M		N/A
	- input circuits and output circuits for double or reinforced insulation 5 M		N/A
	- each input circuit and all other input circuits connected together 2 M		N/A
	- each output circuit and all other output circuits connected together 2 M		N/A
	- hazardous live parts and metal parts with basic insulation (Class II transformers) 2 M		N/A
	- body and metal parts with basic insulation (Class II transformers) 5 M		N/A
	- metal foil in contact with inner and outer surfaces of enclosures 2 M		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
BB.18.3	Electric strength test (1 min): no flashover or break-down:		N/A
	1) basic insulation between input circuits and output circuits; working voltage (V); test voltage (V)……:		N/A
	2) double or reinforced insulation between input circuits and output circuits; working voltage (V); test voltage (V) ..... ….:		N/A
	3) basic or supplementary insulation between....:		N/A
	a) live parts of different polarity; working voltage (V); test voltage (V) .....:		N/A
	b) live parts and the body if intended to be connected to protective earth ..... :		N/A
	c) inlet bushings and cord guards and anchorages ..... :		N/A
	d) live parts and an intermediate conductive part ..... .:		N/A
	e) intermediate conductive parts and body...:		N/A
	4) Reinforced insulation between the body and live parts; working voltage (V); test voltage (V) ..... :		N/A
	5) Functional insulation for windings intended to be connected in series or parallel (test voltage = working voltage + 500 V) (IEC 61558-2-16:2009)		N/A
18.102 (A1)	Partial discharge tests according IEC 60664-1, if the working voltage is > 750 V peak		N/A
	Partial discharge is ≤ 10 pC at time P2 See Fig. 19.101		N/A
BB.19	**CONSTRUCTION**		N/A
BB.19.1	Separation of input and output circuits		N/A
BB.19.1.1	SMPS incorporating auto-transformers (IEC 61558-2-16:2009)		N/A
BB.19.1.2	SMPS incorporating separating transformers (IEC 61558-2-16:2009)		N/A
BB.19.1.2.1	Input and output circuits electrically separated. (IEC 61558-2-16:09)		N/A
BB.19.1.2.2	The insulation between input and output winding(s) consist of basic insulation (IEC 61558-2-16:09)		N/A
	Class I SMPS		N/A
	– Insulation between input windings and body consist of basic insulation		N/A
	– Insulation between output windings and body consist of basic insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Class II SMPS (IEC 61558-2-16:09)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation		N/A
	– Insulation between output windings and body consist of double or reinforced insulation		N/A
BB.19.1.2.3	The insulation between input windings and intermediate conductive parts and the output windings and intermediate part consist of basic insulation (IEC 61558-2-16:09)		N/A
	For class I SMPS the insulation between input and output windings via the intermediate conductive parts consist of basic insulation (IEC 61558-2-16:09)		N/A
	For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation (IEC 61558-2-16:09)		N/A
BB.19.1.2.4	Parts of output circuits may be connected to protective earth (IEC 61558-2-16:09)		N/A
BB.19.1.2.5	No direct contact between output circuits and the body, unless: (IEC 61558-2-16:2009)		N/A
	– Allowed for associated transformers by the equipment standard		N/A
	– Clause 19.8 of part 1 is fulfilled		N/A
BB.19.1.3	SMPS incorporating isolating transformers and safety isolating transformers (IEC 61558-2-16:09)		N/A
BB.19.1.3.1	Input and output circuits electrically separated (IEC 61558-2-16:09)		N/A
	No possibility of any connection between these circuits		N/A
BB.19.1.3.2	The insulation between input and output winding(s) consist of double or reinforced insulation (exception see 19.1.3.4) (IEC 61558-2-16:09)		N/A
	Class I SMPS **not** intended for connection to the mains by a plug:		—
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the input voltage		N/A
	– Insulation between output windings and body, connected to earth consist of basic insulation rated for the output voltage		N/A
	Class I SMPS intended for connection to the mains by a plug (EN 61558-2-16:09):		N/A
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the working voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– Insulation between output windings and body, connected to earth consist of supplementary insulation rated for the working voltage		N/A
			N/A
	Class II SMPS (IEC 61558-2-16:09)		N/A
	– Insulation between input windings and body consist of double or reinforced insulation rated to the input voltage		N/A
	– Insulation between output windings and body consist of double or reinforced insulation, rated to the output voltage		N/A
BB.19.1.3.3	SMPS with intermediate conductive parts not connected to the body (between input/output) (EN 61558-2-16:09):		N/A
19.1.3.3.1	For class I and class II SMPS the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage (EN 61558-2-16:09)		N/A
	– For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (rated to the input voltage, for SELV circuits only basic insulation to the body))		N/A
	– For transformers, different from independent, the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
BB.19.1.3.3.2	Class I transformers with earthed core, and not allowed for class II equipment (EN 61558-2-16:09)		N/A
	– Insulation from the input to the earthed core: basic insulation rated for the input voltage		N/A
	– Insulation from the output voltage to the earthed core: basic insulation rated for the output voltage		N/A
BB.19.1.3.3.3	Insulation between: input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation (EN 61558-2-16:09)		N/A
	– If the insulation from input or output to the intermediate metal part is less than basic insulation, the part is considered to be connected to input or output.		N/A
BB.19.1.3.4	For class I SMPS, with protective screen, not connected to the mains by a plug the following conditions comply (EN 61558-2-16:09):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– The insulation between input winding and protective screen consist of basic insulation (rated input voltage)		N/A
	– The insulation between output winding and protective screen consist of basic insulation (rated output voltage)		N/A
	– The protective screen consists of metal foil or a wire wound screen extending the full width of the windings and has no gaps or holes		N/A
	– Where the protective screen does not cover the entire width of the input winding, additional insulation to ensure double insulation in this area, is used.		N/A
	– If the screen is made by a foil, the turns are isolated, overlap at least 3 mm		N/A
	– The cross-section of the screen and the lead out wire is at least corresponding to the rated current of the overload device		N/A
	– The lead our wire is soldered or fixed to the protective screen.		N/A
	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
BB.19.1.3.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled (EN 61558-2-16:09)		N/A
BB.19.1.3.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		N/A
BB.19.1.3.7	The distance between input and output terminals for the connection of external wiring is 25 mm		N/A
BB.19.1.3.8	Portable SMPS having a rated output ≤ 630 VA (EN 61558-2-16:09)		N/A
BB.19.1.3.9	No connection between output circuit, and body except of associated transformers (allowed by equipment standard) (EN 61558-2-16:09)		N/A
BB.19.1.3.10	Protective screening is not allowed for SMPS with plug connection to the mains (EN 61558-2-16:09)		N/A
BB.19.11	Handles, levers, knobs, etc.:		N/A
	- insulating material		N/A
	- supplementary insulation covering		N/A
	- separated from shafts or fixing by supplementary insulation		N/A
BB.19.12	Windings construction		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
BB.19.12.1	Undue displacement in all types of transformers not allowed:		N/A
	- of input or output windings or turns thereof		N/A
	- of internal wiring or wires for external connection		N/A
	- of parts of windings or of internal wiring in case of rupture or loosening		N/A
BB.19.12.2	Serrated tape:		N/A
	- distance through insulation according to table 13		N/A
	- one additional layer of serrated tape, and		N/A
	- one additional layer without serration		N/A
	- in case of cheek less bobbins the end turns of each layer shall be prevented from being displaced		N/A
BB.19.12.3 (A1)	Insulated windings wires providing basic, supplementary or reinforced insulation, meet the following requirements:		N/A
	• Multi-layer extruded or spirally wrapped insulation, passed the tests of annex K		N/A
	• Basic insulation: two wrapped or one extruded wire		N/A
	• Supplementary insulation: two layers, wrapped or extruded		N/A
	• Reinforced insulation: three layers wrapped or extruded		N/A
	Spirally wrapped insulation:		N/A
	• creepage distances between wrapped layers > cl. 26 _ P1 values		N/A
	• path between wrapped layers sealed, the test voltage of K2 is multiplied with 1,35		N/A
	• test 26.2.3 – Test A, passed for wrapped layers		N/A
	• the finished component passes the electric strength test according to cl. 18.3		N/A
a)	Insulated winding wire used for basic or supplementary insulation in a wound part:		N/A
	• comply with annex K		N/A
	• two layers for supplementary insulation		N/A
	• one layer for basic insulation		N/A
	• one layer for mechanical separation between the insulated wires of primary and secondary. This layer fulfils the requirement of basic insulation.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
b)	Insulated winding wire used for reinforced insulation in a wound part:		N/A
	• comply with annex K		N/A
	• three layers		N/A
	• relevant dielectric strength test of 18.3		N/A
	Where the insulated winding wire is wound:		N/A
	• upon metal or ferrite cores		N/A
	• upon enamelled wire		N/A
	• under enamelled wire		N/A
	• one layer for mechanical separation between the insulated wires and the core or the enamelled wires is required. This layer fulfils the requirement of basic insulation.		N/A
	• both windings shall not touch each other and also not the core.		N/A
	100 % routine test of Annex K3 of part 1 is fulfilled		N/A
	no creepage distances and clearances for insulated winding wirers		N/A
	for TIW wires values of box 2) c) of table 13, table C.1 and table D.1 of part 1 and of clause 26.106 are not required		N/A
FIW	Transformers which use FIW wire		-
BB 19.12.101 (A1)	Max. class F for transformers which use FIW-wire		N/A
BB 19.12.102 (A1)	FIW wires comply with IEC 60851-5, Ed.4.1; IEC 60317-0-7 and IEC 60317-56, Ed.1.		N/A
	• other nominal diameter as mentioned in table 19.101 can be calculated with the formula after table 19.111		N/A
	FIW wire used for basic or supplementary insulation for transformers according 19.1.2 (separating-transformers) of IEC 61558-2-16:		–
	• the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	• one layer for mechanical separation is located between the insulated wires of primary and secondary. This layer fulfil the requirement of basic insulation		N/A
	• between FIW and enamelled wire, no requirements of creepage distances and clearances		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• no touch of FIW and enamelled wires (grad 1, or grad 2 …)		N/A
	FIW wire used for double or reinforced insulation for transformers according 19.1.3 (isolating and safety isolating transformers) of IEC 61558-2-16 (PRI and SEC basic insulated FIW-wire):		N/A
	• the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A
	• for primary and secondary winding FIW-wire for basic insulation is used		N/A
	• one layer for mechanical separation is located between the insulated wires of primary and secondary. This layer fulfils the requirement of basic insulation		N/A
	• no touch between the basic insulated PRI and SEC FIW-wires		N/A
	• between PRI- and SEC-FIW wires, no requirements of creepage distances and clearances		N/A
	Alternative construction used for reinforced insulation (reinforced insulated FIW wire and enamelled wire)		N/A
	• the test voltage of table 8a – part 1, based on the working voltage reinforced insulation, comply with the min. voltage strength of table 19.111		N/A
	• one layer for mechanical separation is located between the reinforced insulated FIW wire and the enamelled wire. This layer fulfils the requirement of basic insulation		N/A
	• no touch between the FIW wire and the enamelled wire		N/A
	• between the reinforced FIW wire and any other parts, no requirements of creepage distances and clearances exist		N/A
	Alternative construction with FIW wires, basic or supplementary insulated for transformers with double or reinforced insulation according to 19.1.3 (basic/supplementary insulated FIW wire + enamelled wire + creepage distance and clearances for basic insulation)		–
	• the test voltage of table 8a – part 1, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 19.111		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• PRI or SEC basic insulated FIW wire and to the other winding (enamelled wire) requirements of supplementary insulation		N/A
	• creepage distances and clearances between the basic insulated FIW wire and the enamelled wire for basic or supplementary insulation are required.		N/A
	Where the FIW wire is wound		N/A
	• upon metal or ferrite cores		N/A
	• one layer for mechanical separation between the insulated wires and the core or the enamelled wires is required. This layer fulfils the requirement of basic insulation.		N/A
	• both windings shall not touch each other and also not the core.		N/A
BB.20	**COMPONENTS**		N/A
BB.21	**INTERNAL WIRING**		N/A
BB.22	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS**		N/A
BB.23	**TERMINALS FOR EXTERNAL CONDUCTORS**		N/A
BB.24	**PROVISION FOR PROTECTIVE EARTHING**		N/A
BB.25	**SCREWS AND CONNECTIONS**		N/A
BB.26	**CREEPAGE DISTANCES AND CLEARANCES**		N/A
BB.26.1	See 26.101		N/A
BB.26.2	Creepage distances (cr) and clearances (cr)		N/A
BB.26.2.1	Windings covered with adhesive tape		N/A
	- the values of pollution degree 1 are fulfilled		N/A
	- all isolating material are classified acc. to IEC 60085 and IEC 60216		N/A
	- test A of 26.2.3 is fulfilled		N/A
BB.26.2.2	Uncemented insulating parts pollution degree P2 or P3		N/A
	- all isolating material are classified acc. to IEC 60085 and IEC 60216		N/A
	- values of pollution degree 1 are not applicable		N/A
BB.26.2.3	Cemented insulating parts		N/A
	- all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	- values of distance through insulation (dti) are fulfilled		N/A
	- creepage distances and clearances are not required		N/A
	- test A of this sub clause is fulfilled		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test A		N/A
	- thermal class		N/A
	- working voltage		N/A
	- Test with three specially specimens, with uninsulated wires, without impregnation or potting		N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	Impulse dielectric test according to 4.1.1.2.1 of IEC 60664-1 (1,2 / 50 us waveform) – see Annex R of IEC 61558-1		N/A
BB.26.2.4	Enclosed parts, by impregnation or potting		N/A
BB.26.2.4.1	- The requirements of reduced values as stated for pollution degree 1 (P1) are fulfilled		N/A
	- all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test B		N/A
	- thermal class		N/A
	- working voltage		N/A
	- Test with three specially specimens, potted or impregnated. The dielectric strength test is applied directly to the joint.	(see appended table)	N/A
	Two of the three specimens are subjected to:		N/A
	- the relevant humidity treatment according to 17.2 (48 h)		N/A
	- the relevant dielectric strength test of 18.3 multiplied with factor 1,25		N/A
	- One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,25 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 s waveform) – see Annex R of IEC 61558-1		N/A
BB.26.2.4.2	- The requirements of distance through insulation (dti) are fulfilled. (P1 values are not required)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- all isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	Test C		N/A
	- thermal class		N/A
	- working voltage		N/A
	- Test with three specimens, potted or impregnated. (finished components)		N/A
	- Neither cracks, nor voids in the insulating compounds		N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60664-1 (1,2 / 50 us waveform) – see Annex R of IEC 61558-1		N/A
BB.26.3	Distance through insulation		N/A
	For double or reinforced insulation, the required values of Tables 13, C1, and D1 – boxes 2b, 2c and 7 are fulfilled		N/A
	The insulation fulfils the material classification according IEC 60085 or 60216 or the test of 14.3		N/A
BB.26.3.1	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:		N/A
	- the isolating materials are classified acc. to IEC 60085 and IEC 60216		N/A
	- the test of 14.3 is fulfilled		N/A
	- If both requirements are fulfilled, the required values for solid insulation can be multiplied by 0,4		N/A
	- Minimum thickness of reinforced insulation ≥0,2 mm		N/A
	- Minimum thickness of supplementary insulation ≥ 0,1 mm		N/A
BB.26.3.2	Insulation in thin sheet form		N/A
	- If the layers are non-separable (glued together):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– The requirement of 3 layers is fulfilled		N/A
	– The mandrel test according 26.3.3 is fulfilled with 150 N		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is fulfilled.		N/A
	- If the layers are separated:		N/A
	– The requirement of 2 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.3 is fulfilled on each layer with 50 N		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is fulfilled.		N/A
	- If the layers are separated (alternative:		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.3 is fulfilled on 2/3 of the layers with 100 N		N/A
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index ”e” is fulfilled		N/A
	Test according to 14.3 and if the isolating materials are classified acc. to IEC 60085 and IEC 60216 no distances through insulation are required for insulation in thin sheet form		N/A
	The figures within square brackets in box 2 and 7 of table 13 (C.1/D.1) are used for insulation in thin sheet form as follows:		N/A
	- rated output > 100 VA values in square brackets apply		N/A
	- rated output ≥ 25 VA ≤ 100 VA, 2/3 of the value in square brackets apply		N/A
	- rated output ≤ 25 VA, 1/3 of the value in square brackets apply		N/A
BB.26.3.3	Mandrel test of insulation in thin sheet form (specimen of 70 mm width are necessary):		N/A
	- If the layers are non-separable – at least 3 layers glued together fulfil the test:		N/A
	– pull force of 150 N		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
	- If the layers are separable and 2/3 of at least 3 layers fulfil the test.		N/A
	– pull force of 100 N		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdowns.		N/A
	- If the layers are separable 1 of at least 2 layers fulfil the test:		N/A
	– pull force of 50 N		N/A
	– high voltage test of 5,0 kV or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
BB.26.101	Creepage distances, clearances and distances through insulation, specified values according to (EN 61558-2-16:09):		N/A
	- table 13, material group IIIa (part 1)		N/A
	- table C, material group II (part 1)		N/A
	- table D, material group I (part 1)		N/A
	- working voltage		N/A
	- rated supply frequency 50/60 Hz		N/A
	- rated internal frequency		N/A
	1. Insulation between input and output circuits (basic insulation):		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A
	2. Insulation between input and output circuits (double or reinforced insulation):		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
	3. Insulation between adjacent input circuits: measured values ≥ specified values (mm) ..... :		N/A
	Insulation between adjacent output circuits: measured values ≥ specified values (mm) ..... :		N/A
	4. Insulation between terminals for external connection:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
	5. Basic or supplementary insulation:		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
	d) measured values ≥ specified values (mm) ..... :		N/A
	e) measured values ≥ specified values (mm) ..... :		N/A
	6. Reinforced or double insulation: measured values ≥ specified values (mm) ..... :		N/A
	7. Distance through insulation:		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
BB.26.102	Values of IEC 61558-2-16 applicable for frequency up to 3 MHz (EN 61558-2-16:09)		N/A
	For frequency above 3 MHz clause 7 of IEC 60664-4 is applicable (high frequency testing)		N/A
BB.26.103	Clearance (EN 61558-2-16:09)		N/A
	a.) Clearance for frequency ≥ 30 kHz according figure 101 two determinations are necessary:		N/A
	– determination based on peak working voltage according Table 104:		N/A
	Peak working voltage		N/A
	Basic insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– and alternative if applicable for approximately homogeneous field according to Table 102		N/A
	Peak working voltage		N/A
	Basic insulation: required / measured		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Double or reinforced insulation: required / measured value		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	The minimum clearance is the greater of the two values.		N/A
	b.) Clearance for frequency ≤ 30 kHz according figure 101 two determinations are necessary:		N/A
	– determination based on peak working voltage with recurring peak voltages according Table 103:		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	The minimum clearance is the greater of the two values		N/A
BB.26.104	The working voltages of Table 102, 103 and 104 are peak voltages including µsec peaks EN 61558-2-16:09)		N/A
	The working voltage according to Table 13 of part 1 are r.m.s. voltages		N/A
BB.26.105	Creepage distances		N/A
	Two determinations of creepage distances are necessary (see Figure 102)		N/A
	– determination based on measured peak working voltage according Tables 105 to 110		N/A
	Peak working voltage		N/A
	Pollution degree		N/A
	Basic or supplementary insulation: required / measured		N/A
	Double or reinforced insulation: required / measured value		N/A
	– determination based on measured r.m.s. working voltage according Tables 13, C1 and D1 (see clause 26.101)		N/A
	If the values based on table 105 to 110 are lower than the relevant values in Tables 13, C.1 or D.1, the higher values shall be applicable		N/A
BB.26.106	Distance through insulation (EN 61558-2-16:09)		N/A
	Instead of partial discharge with high frequency voltage the test of the distance and the calculation of the electric field is applicable under the following conditions:		N/A
	– the max. frequency is < 10 MHz		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– the field strength approximately comply with Figure 103		N/A
	– no voids or gaps are present in between the solid insulation		N/A
	For thick layers d1 ≥ 0,75 the peak value of the field strength is ≤ 2 kV/mm		N/A
	For thin layers d2 ≤ 30 µm the peak value of the field strength is ≤ 10 kV/mm		N/A
	For d1 > d > d2 equation (1) is used for calculation the field strength		N/A
BB.26.107 (A1)	For transformers with FIW wires the following test is required		N/A
	• 10 cycles are required		N/A
	• 68 h test at max heating temperature + 10°C or test at max. allowed winding temperature based on the insulation class (required in table 1) + 10°C		N/A
	• 1 h at 25° C		N/A
	• 2 h at 0° C		N/A
	• 1 h at 25° C – (next cycle start again with 68 h max winding temp + 10)		N/A
	• during the 10 cycles test 2 x working voltage is connected between PRI and SEC		N/A
	• after 10 cycle test 2 transformers are subjected to the 17.2 test for 48 h and direct after the 48 h the dielectric strength test of 18.3 (100 % test voltage) is done		N/A
	• after the 10 cycle test the third sample is tested at the end of the last cycle in the hot position with the dielectric strength test of 18.3 (100 % test voltage)		N/A
	• the partial discharge test according to 18.101 is done after the cycling test and after the high voltage test, if the **peak** working voltage is >750 V		N/A
BB.27	**RESISTANCE TO HEAT, FIRE AND TRACKING**		N/A

BB.E	**ANNEX E, GLOW WIRE TEST**		N/A
	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:		N/A
BB.E.1	Clause 6, ”Severities” of IEC 6095-2-11, apply with the temperature stated in 27.3 of IEC 61558-1		N/A
BB.E2	Clause 8, ”Conditioning”, of IEC 60695-2-11 apply, preconditioning is required		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
BB.E3	Clause 10, ”Test Procedure”, of IEC 60695-2-11apply, the tip of the glow wire is applied to the flat side of the surface.		N/A
BB.F	**ANNEX F, REQUIREMENTS FOR MANUALLY OPERATED SWITCHES WHICH ARE PARTS OF THE TRANSFORMER**		N/A
BB.H	**ANNEX H, ELECTRONIC CIRCUITS (IEC 61558-1)**		N/A
BB.K 61558-2-16/A1	**ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION**		N/A
BB.K.1	Wire construction:		N/A
	• insulated winding wire for basic or supplementary insulation (see 19.12.3)		N/A
	• insulated winding wire for reinforced insulation (see 19.12.3)		N/A
	• splid circular winding wires and stranded winding wires with 0,05 to 5 mm diameter		N/A
	• spirally wrapped insulation - overlapping		N/A
BB.K.2	Type tests		N/A
BB.K.2.1	General Tests between ambient temperature between 15° C and 35° C and at a humidity between 45% and 75 %		N/A
BB K.2.2	Electric strength test		N/A
BB K.2.2.1	Solid circular winding wires and stranded winding wires		N/A
	Test samples prepared according to clause 4.4.1 of IEC 60851-5:2008 (twisted pair)		N/A
	Dielectric strength test: 6 kV for reinforced insulation		N/A
	Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
BB K.2.2.2	Square or rectangular wires		N/A
	Test samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
BB K.2.3	Flexibility and adherence		N/A
	Claus 5.1 in Test 8 of IEC 60851-3:2009 shall be used		N/A
	Test samples prepared according to clause 5.1.1.4 of IEC 60851-3:2009		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
	Mandrel diameter according table K.1		N/A
	The tension to the wire during winding on mandrel is 118 N/mm² (118 MPa)		N/A
BB.K.2.4	Heat shock		N/A
	Test samples prepared according to 3.1.1 (in Test 9) of IEC 60851-6:1996		N/A
	• high voltage test immediately after this test		N/A
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
BB.K.2.5	Retention of dielectric strength after bending (test as specified under test 13 of 4.6.1 c) of IEC 60851-5)		N/A
	• high voltage test immediately after this test • Dielectric strength test: 5,5 kV for reinforced insulation • Dielectric strength test: 2,75 kV for basic or supplementary insulation		N/A
BB.K.3	Testing during manufacturing		N/A
BB.K.3.1	General Tests as subjected in K.3.2 and K.3.3		N/A
BB K.3.2	Routine test		N/A
	• Dielectric strength test: 4,2 kV for reinforced insulation		N/A
	• Dielectric strength test: 2,1 kV for basic or supplementary insulation		N/A
BB K.3.3	Sampling test		N/A
BB K.3.3.1	Solid circular winding wires and stranded winding wires		N/A
	Test with a twisted pair, prepared according clause 4.4.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 6 kV for reinforced insulation		N/A
	• Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
BB K.3.3.2	Square rectangular wire		N/A
	Samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• Dielectric strength test: 5,5 kV for reinforced insulation		N/A
	• Dielectric strength test: 3 kV for basic or supplementary insulation		N/A
BB.U	**ANNEX U – INFORMATIVE – OPTIONAL TW – MARKING FOR TRANSFORMERS**		N/A

V	**ANNEX V, SYMBOLS TO BE USED FOR THERMAL CUT-OUTS**	N/A

BB.26.2 TEST A	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test with three special prepared specimens with uninsulated wires, without potting or impregnation					N/A
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

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Clause	Requirement + Test	Result - Remark	Verdict

BB.26.2 TEST B	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test with three specially prepared specimens with potted – P1 values are required					N/A
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

BB.26.2 TEST C	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test with three specially prepared specimens with potting (only dti is required)					N/A
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

BB.26.107 61558-2-16/A1	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test for transformers, use FIW-wire					N/A
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

BB 18.3	**TABLE: Dielectric Strength**		N/A
Test voltage applied between:		**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Supplementary information:			

BB 18.3	**TABLE: insulation resistance measurements**		N/A
Insulation resistance R between:		**R (MΩ)**	**Required R (MΩ)**
Supplementary information:			

BB 26	**TABLE: Clearance And Creepage Distance Measurements**					N/A
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
Supplementary information:						

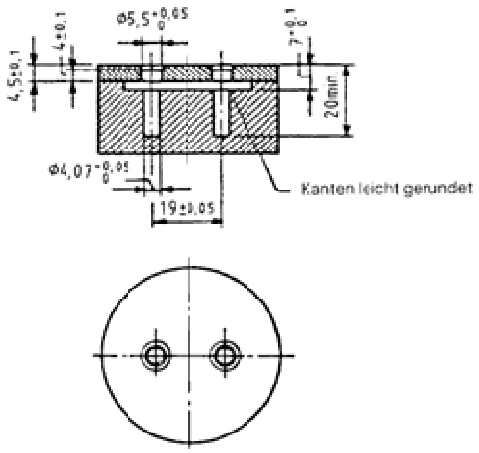
IEC 61558-2-16			
Clause	Requirement + Test	Result - Remark	Verdict

BB 26	TABLE: Distance Through Insulation Measurements				N/A
Distance through insulation di at/of:	**U r.m.s. (V)**	**Test voltage (V)**	**Required di (mm)**	**Di (mm)**	
Supplementary information:					

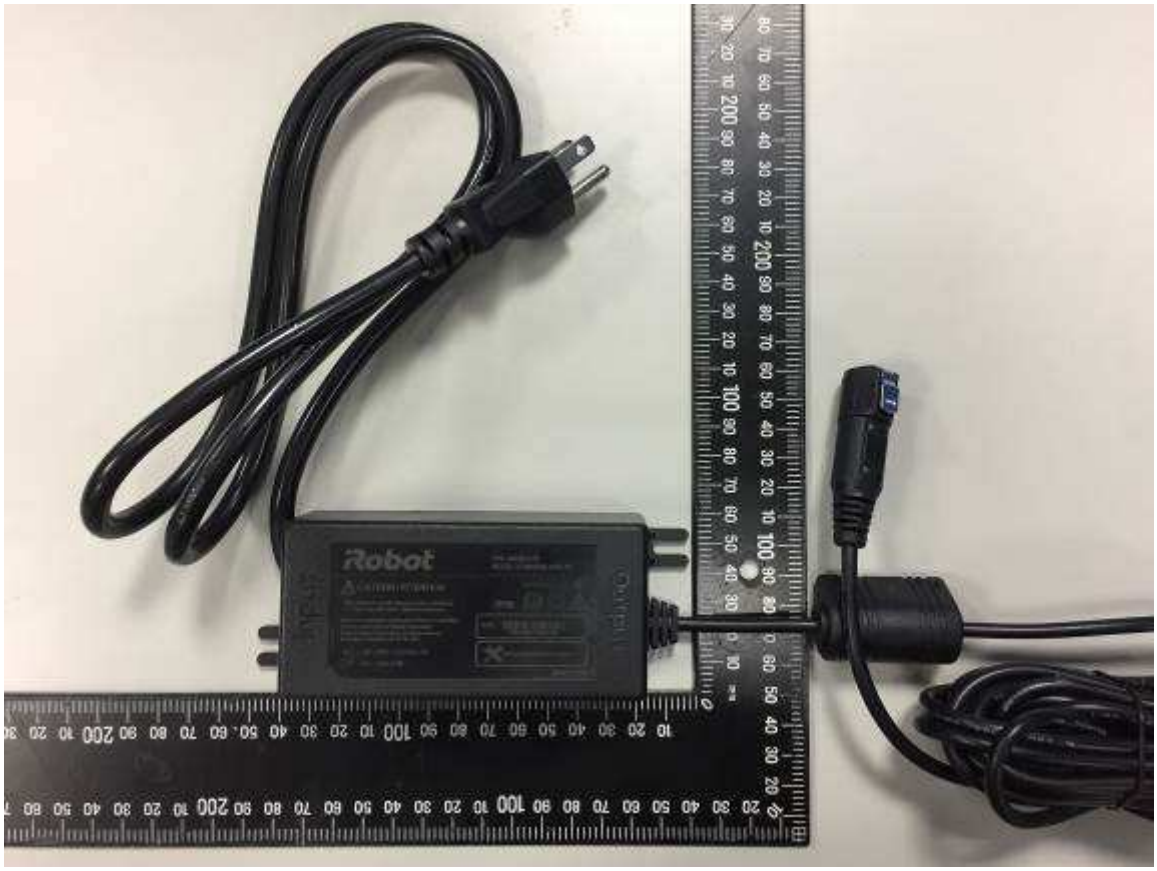
List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to TMP/CTF stage 1 or WMT/CTF stage 2 procedure has been used.

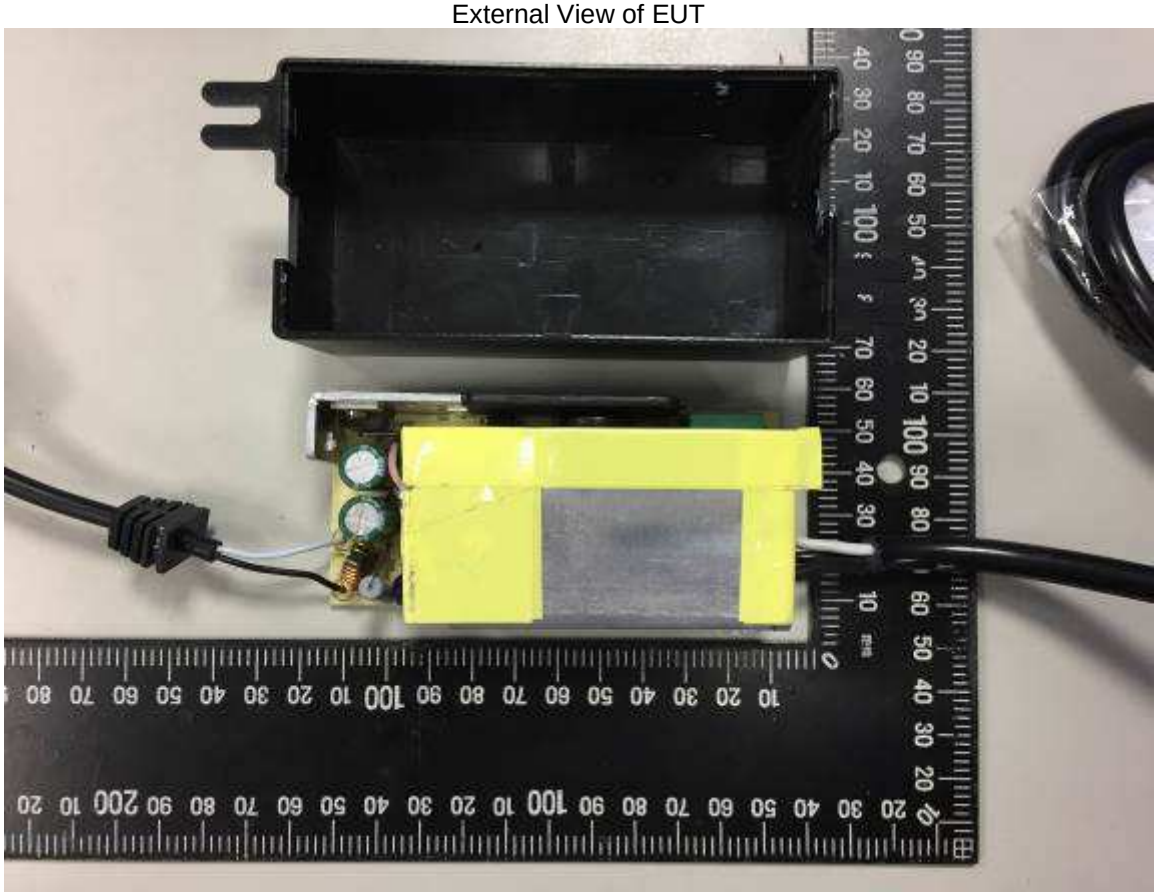
Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
N/A					

National differences			
Clause	Requirement + Test	Result - Remark	Verdict
	National Differences Germany (DE) **IEC 61558-1, 2nd ed.** (DIN EN 61558-1 (VDE 0570-1):2006-07: EK1-557-13 2013-07) Last modification 2014-01-09		N/A
16.4	Bei Steckernetzteilen wird der angeformte Stecker als Komponente betrachtet und in Deutschland generell nach DIN VDE 0620-1:2010 bzw. DIN VDE 0620-1:2013 und DIN VDE 0620-2-1:2013 beurteilt. Nach der Prüfung gemäß DIN VDE 0620-2-1:2013, Abschnitt 24.2 muss der Stecker noch die Prüfung entsprechend DIN VDE 0620-101:1992 Abschnitt 7 Bild 2 „ Lehre für die Auswechselbarkeit” bestehen. Es muss möglich sein, die Stecker in die Lehre ohne übermäßige Kraft so einzuführen, dass ihre Stirnfläche die Oberfläche der Lehre berührt. The moulded plug of plug-in power supplies will be considered as component and will be generally evaluated in Germany according to DIN VDE 0620-1:2010 respectively DIN VDE 0620-1:2013 and DIN VDE 0620-2-1:2013 After the test according to DIN VDE 0620-2-1:2013, sub-clause 24.2, the plug be shall still pass the test according to DIN VDE 0620-101:1992 clause 7, figure 2 “Gauge for interchangeability” It should be possible to insert the plug without applying an excessive force such that the end surface touches the surface of the gauge 		N/A

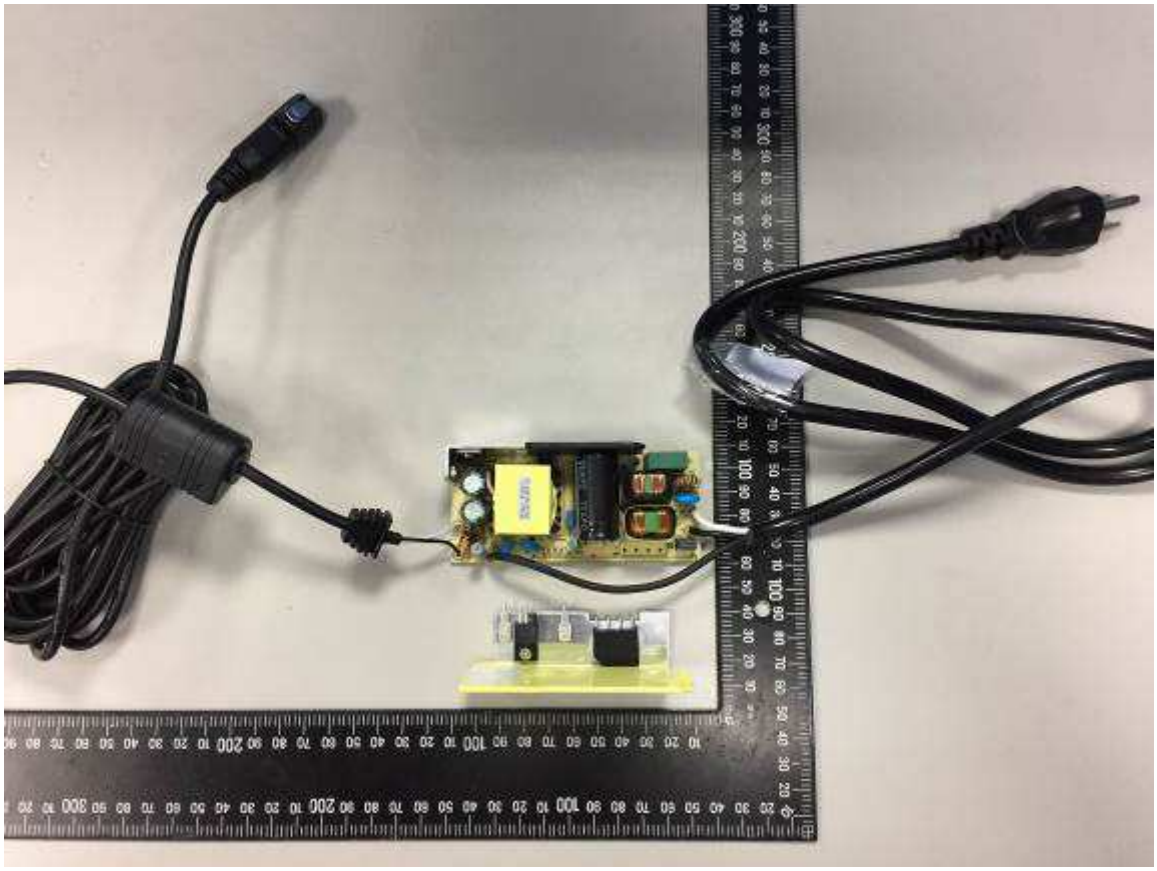
External View of EUT



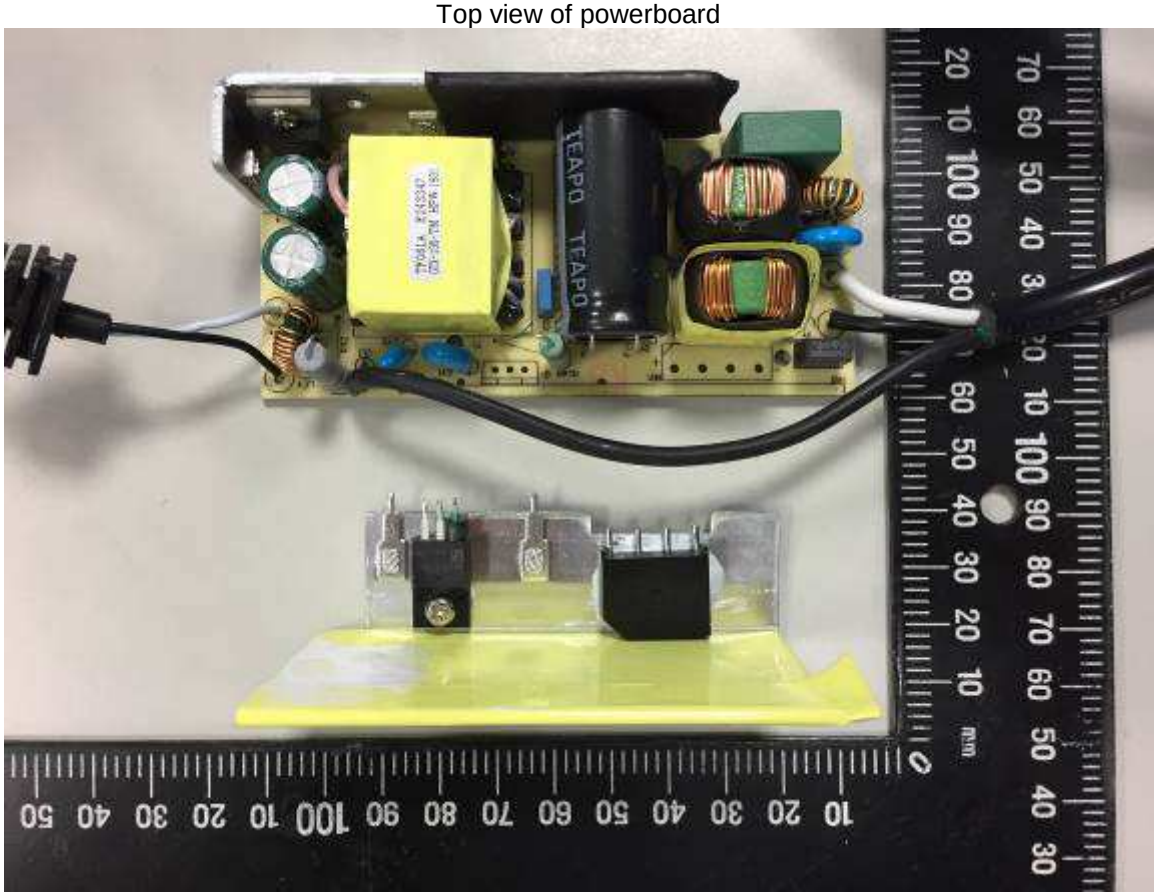
External View of EUT



Internal View of EUT



Top view of powerboard



Bottom view of powerboard