



Australian Competition & Consumer Commission

Product Safety Recalls Australia

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Progress report for Chubb Fire & Security Pty Ltd t/a VitalCall—Plug-in power adaptor for VitalCall MK9 unit

Progress report number: 2029
 Recall PRA Number: 2013/13632
 Date created: 17th February 2014

Product Name

Chubb Fire & Security Pty Ltd t/a VitalCall—Plug-in power adaptor for VitalCall MK9 unit

Supplier Name

Chubb Fire & Security Pty Ltd t/a VitalCall

Quantity affected

2071

Quantity remedied (consumers)

2070

Quantity unaccounted for (consumers)

1

Quantity remedied (suppliers)

0

Quantity unaccounted (suppliers)

0

Details of complaints received regarding the product being recalled

VitalCall is not aware of any complaints received regarding the product recall.

Details of complaints received regarding the recall process

So far, we have not yet received a complaint on the process itself.

Additional information/comments

VitalCall has completed the MK9 powerpack recall. There was 1 customer which we could not contact to replace the unit. We have sent letters, tried calling the customer directly as well as their families, but they are either away or have moved to a high care facility. We have sent them a final letter on December 15th 2013, trying one more time to contact them to replace their unit, and now 45 days have been passed and VitalCall has cancelled their service.

Level of response received from each advertising medium

High level of response received. VitalCall commissioned an external call centre with 28 people to contact all affected customers. Once the first, second and third round of calls were finalised, 100% of customers were sent a letter advising of the recall. After that, VitalCall started a fourth and fifth round of calls to customers, including in many cases their families. To date, 99.9% of the customers have been notified by phone. The remainder of the customers are away with their families or in higher care at the moment and cannot be contacted.

Finalisation of recall

The following action(s) were taken on returned products

- ✦ Disposed of
- ✦ Defect rectified

Disposal description

The recovered powerpacks have been quarantined and will be disposed of as soon as VitalCall and its supplier have completed mitigation of cost recovery.

Evidence of defect rectification

- ✦ Electrical Safety - 35B09030A.pdf (819.3 KB)

Defect rectification description

Products were rectified with another brand of powerpacks. These powerpacks have been in operation for a long period of time and were the original powerpack brand VitalCall used before the change in supply. Attached is the independent testing approving the replacement powerpack.

Cause of product defect

Manufacturing fault

Details of cause of defect

VitalCall's supplier had to find additional powerpack suppliers due to high demand. This additional supplier unfortunately supplied a lower quality plastic material to our Australian supplier, resulting in those powerpacks being passed on to VitalCall.

Supply chain notification description

There was constant communication with the Australian suppliers and they have worked on a replacement plan with an alternative brand of powerpack that has passed independent testing before replacement started.

Total cost of recall

\$722368.00

Print

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This recall progress report:

- ✦ Edit
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Breakdown of cost of recall

Service Calls Completed by VitalCall Field Agents- \$285,200.00 Associated Freight/Postage
Costs- \$12,564.76 Electrical Tests - \$32,274.00 Customer/Monitoring Losses - \$674.65
Additional equipment and accessories purchased for refurbishment (inc incremental costs) -
\$135,921.83 Travel costs - \$884.02 Miscellaneous costs printing/stationary/Staff Incentives)
- \$3,912.66 Temps - Brisbane - \$62,120.66 External Company - Call centre - \$35,787.58
Staff recall cost (Hours) - \$1,717.27 Staff Overtime recall cost (Hours) - \$29,271.31 Mgt
Time - \$122,040.00

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Test Report

Chubb Fire & Security Pty Ltd

Power Adaptor

VC International 35B09030A

Vipac Reference: 30V-13-0145-TRP-335418-0
June 2013

Vipac Engineers & Scientists Ltd
Melbourne, Australia

Test Report 30V-13-0145-TRP-335418-0**Laboratory Details**

All tests were performed at :

Vipac Engineers & Scientists Ltd.
279 Normanby Road
Port Melbourne VIC 3207
Australia

Telephone : +61 3 9647 9700
Facsimile : +61 3 9646 4370
Email : Melbourne@Vipac.com.au
Web Site : www.vipac.com.au

Testing Environment

Tests were performed within the following environmental conditions:

Temperature: 22 ± 3°C
Humidity: 10% 75% RH
Pressure: 950 hPa 1050 hPa

Summary

Vipac Engineers & Scientists Ltd states that the equipment **COMPLIES** with the requirements of the standards and/or specific clauses detailed on page 4.

The test results presented in this report relate only to the item(s) tested, as supplied by the client.

Measurement Uncertainty for distance measurements is 0.04mm with a confidence level of 95% and a coverage factor of k=1.96.

Approved by :

Supervising Engineer

Checked by :

Project Engineer

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Client Details

Client : Chubb Fire & Security Pty Ltd
Address : 41 Pentex Street
Salisbury 4107
Queensland
AUSTRALIA

Equipment Description

Test Item Details

Type: Power Adapter
Name: VC International 35B09030A
Serial Number : Approval samples
Software Version : NA
Firmware Version : NA
Hardware Version: Not stated
Manufacturer : VC International Pty Ltd
Network Port(s) : NA
Other Port(s) : NA

Testing Overview

Assessed was a Class II linear mains power supply unit providing reinforced insulation between primary and secondary for a working voltage of 240Vrms.
The client has stated the device will be labelled as per the Document Appendix and include the above mentioned manufacturer and model details.



Test Report 30V-13-0145-TRP-335418-0

Regulatory Standard/s

AS/NZS 3820 Essential Safety Requirements for Electrical Equipment

Tested Standard/s and/or Clauses

Specification

AS/NZS 61558.2.6:2009

AS/NZS 3112:2011
(Incorporating Amendment No. 1)

Exclusions

None

Non-Compliances

None

Conditions of Compliance

Rating label to include information shown in Document Appendix of this report.

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AS/NZS 61558.2.6:2009

TEST RESULTS

Testing Officer: [REDACTED]
 Test Date: 13/06/2013




Legend	
Complies	C
Does Not Comply	DNC
Not Applicable	NA
Not Tested	NT
Read and understood.	NOTED

Test item particulars	
Type of transformers	Safety isolating
Application	Portable
Protection against electric shock.....	Class II
Short-circuit protection	Thermal link
inherently short-circuit proof.....	No
non-inherently short-circuit proof.....	No
non short-circuit proof.....	No
fail safe	Yes
Protection index.....	IP00
Other characteristics	NA
Rated ambient temperature ta (°C).....	Not stated
Short-circuit voltage (V).....	Not stated












AS/NZS 61558.2.6:2009
Household and similar electrical appliances-Safety
Part 1: General requirements

8	MARKING AND OTHER INFORMATION	C
8.1	Transformer marked with:	C
a)	Rated supply voltage or voltage range.....	230-240VAC C
b)	Output voltage (V)	9 VAC C
c)	Rated output (VA, kVA or W)	Not stated NA
d)	Rated output current (A)	300mA C
e)	Rated frequency (Hz)	 C
f)	Rated power factor (if not 1)	Not stated NA
g)		C
h)	Symbol for safety isolating transformer (electrical function)	60417-5222 C

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i)	Manufacturer's name or trademark or name of the responsible vendor.....:	VC International Pty Ltd	C
j)	Model or type reference.....:	35B09030A..	C
k)	Vector group according to IEC 60076 for three-phase transformer		NA
l)	Symbol for Class II		C
m)	Symbol for Class III		NA
n)	IPXX if other than		NA
o)	Rated max. ambient temperature t_a (if not 25°C)	Not stated	NA
p)	Rated minimum ambient temperature $t_{a \text{ min}}$, if <10° C and if a temperature sensitive device is used		NA
q)	Short-time duty cycle: operating time Intermittent duty cycle: operating and resting time (e.g. 5min/30min)		NA
r)	For tw-marked transformers marked with the rated max. operating temperatures, increased by multiples of 5 (e.g. tw 120; tw 125)		NA
s)	Transformers used with forced air cooling shall be marked with "AF" in m/s		NA
t)	Information from the manufacturer to the purchaser (data sheet):		NA
	– short-circuit voltage (% rated supply voltage) for stationary transformers > 1000 VA		NA
	– electrical function of the transformer		NA
8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets		NA
8.3	Adjusted voltage easily and clearly discernible		NA
8.4	For each tapping or winding: rated output voltage and rated output		NA
	Necessary connections clearly indicated		NA
8.5	For short-circuit proof transformers or non-inherently short-circuit proof transformers:		NA
	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		NA
	Manufacturer's model or type reference and rating of the device for non-inherently short-circuit proof transformers with incorporated replaceable protective device (other than fuses)		NA

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	Construction sheet for transformers with replaceable protective device (other than fuses) information with information about the replacement.		NA
8.6	Terminals for neutral: "N"		NA
	Terminal for protective earth marked with earthing symbol		NA
	Identification of input terminals: "PRI"		NA
	Identification of output terminals: "SEC"		NA
	Symbol for any point/terminal in connection with frame or core		NA
8.7	Indication for correct connection	Indication not needed	NA
8.8	Instruction sheet for type X, Y, Z attachments		NA
8.9	Transformer for indoor use shall be marked with the relevant symbol.		C
8.10	Symbol for Class II construction not confused with maker's name or trademark.	Class II symbol required	C
	Class II transformer with parts to be mounted – delivered with all parts for class II after mounting.		NA
	Symbol for class II transformer placed on the part which provide class II.		C
8.11	Correct symbols:		C
	Volts	V	C
	Amperes	A (mA)	C
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	NA
	Watts	W	NA
	Hertz	Hz	C
	Input	PRI	C
	Output	SEC	C
	Direct current	d.c. (DC) or 	NA
	Neutral	N	NA
	Single-phase a.c.		C
	Three-phase a.c.	3 	NA
	Three-phase and neutral a.c.	3/N 	NA
	Power factor	cos ϕ	NA
	Class II construction		C
	Class III construction		NA
	Fuse-link		NA
	Rated max. ambient temperature	t_a	NA
	Frame or core terminal		NA

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	Protective earth		NA
	IP number	IPXX	NA
	Earth (ground for functional earth)		NA
	For indoor use only		C
	tw5 YYY		NA
	tw10 YYY		NA
	twx YYY		NA
	Fail-safe safety isolating transformer IEC 61558-2-6:09		C
	Non-short-circuit-proof safety isolating transformer IEC 61558-2-6:09		NA
	Short-circuit-proof safety isolating transformer (inherently or non-inherently) IEC 61558-2-6:09		NA
8.12	Figures, letters or other visual means for different positions of regulating devices and switches		NA
	OFF position indicated by figure 0		NA
	Greater output, input etc. indicated by higher figure		NA
8.13	Marking not on screws or other easily removable parts		NA
	Marking clearly discernible (transformer ready for use)		NA
	Marking for terminals clearly discernible if necessary after removal of the cover		NA
	Marking for terminals: no confusion between input and output		NA
	Marking for interchangeable protective devices positioned adjacent to the base		NA
	Marking for interchangeable protective devices clearly discernible after removal of cover and protective device		NA
8.14	Special information for installation (in the catalogue, data sheet, or instruction sheet) if necessary:		NA
	For non-inherently short-circuit proof transformers with non-self-resetting or non replaceable devices (weak-point, thermal link): The device can not be reset or replaced		NA
	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.		NA
	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.		NA

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	For stationary transformers exceeding 1000 VA: The short circuit voltage in % of the rated voltage		NA
	For all transformers the electrical function: An information about the electrical function of the transformer (e.g. inherently short circuit proof safety isolating transformer)		NA
	For associated- and IP00-transformers: The max. abnormal winding temperature		NA
	For tw-transformers: The specific constant S is (e.g. S6 says S = 6000)		NA
	For transformers with more than one output winding, not for series or parallel connection		NA
	– an information in the in the instruction sheet: the transformer is not intended for series/parallel connection		NA
	For IP00 – Transformers the test of 27.2 is not performed. The result may be affected by the enclosure in the final application.		NA
8.15	Marking durable and easily legible		C

9	PROTECTION AGAINST ELECTRIC SHOCK		C
9.1	Protection against contact with hazardous live parts		C
9.1.1	A live part is not a hazardous live part if:		C
	– the it is separated from the supply by double or reinforced insulation		C
	– the requirements of 9.1.1.1 or 9.1.1.2 are fulfilled.		C
9.1.1.1	The touch voltage is ≤ 35 V(peak) a.c. or ≤ 60 Vd.c.		C
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:		NA
	The touch current shall not exceed:		NA
	– for a.c. 0,7 mA (peak)		NA
	– for d.c. 2,0 mA (see Annex J)		NA
	In addition, when a capacitor is connected to live parts:		—
9.1.1.2.1	Discharge: $< 45 \mu\text{C}$ (between 60 V and 15 kV)		NA
9.1.1.2.2	Energy: ≤ 350 mJ (voltage > 15 kV)		NA
9.1.2	Transformers shall have an adequate protection against accessibility to hazardous live parts:		C
	The enclosure of class I and class II transformers gives an adequate protection against accidental contact with hazardous live parts.		C

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	Class I transformers: accessible parts are separated from hazardous live parts by at least basic insulation.		NA
	Class II transformers: no accessibility to basic insulation, or conductive parts separated from hazardous live parts by basic insulation.		C
	Hazardous live parts are not accessible after removal of detachable parts.	No detachable parts	NA
	Hazardous live parts are not accessible after removal of detachable parts except for:		NA
	– lamps having caps larger B9 and E10		NA
	– type D fuse holder		NA
	Lacquers, enamel, paper, cotton, oxide film on metal parts not used for protection against accidental contact with hazardous live parts:		C
	Shafts, handles, operating levers, knobs are not hazardous life parts.		NA
	Compliance is checked by inspection and by relevant tests according to IEC 60529		NA
	Class II transformers and Class II parts of Class I construction are tested with the test pin (fig. 3)		C
	Hazardous live parts shall not be touchable by test finger (fig. 2)		C
	For Class II transformers: metal parts separated by basic insulation from hazardous live parts not touchable by test finger		NA
	Hazardous live parts shall not be touchable with the test pin		C
9.1.3	Accessibility of non hazardous live parts		C
	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:		C
	– The no load output voltage is ≤ 35 V peak a.c. or ≤ 60 V ripple free d.c., both poles are accessible		C
	– The no load output voltage is > 35 V peak a.c. or > 60 V ripple free d.c., only one pole are accessible		NA
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.		C
	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.		C
	The following tests are required:	No capacitor in circuit	NA

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	If the nominal capacitance is $\leq 0,1 \mu\text{F}$ <input type="checkbox"/> no test is conducted.		NA
	– 10 times switch the supply source on and off, or use a special equipment for to switch off at the most unfavourable electrical angle		NA
	If the measured voltage is $> 60 \text{ V}$ ripple free d.c., the discharge must be $\leq 45 \mu\text{C}$.		NA

10	CHANGE OF INPUT VOLTAGE SETTING		NA
	Voltage setting not possible to change without a tool		NA
	Different rated supply voltages:		NA
	– indication of voltage for which the transformer is set, is discernible on the transformer.		NA

11	OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD		C
11.1	Difference from rated value (without rectifier; with rectifier):	(see appended table)	C
a)	Inherently short-circuit proof transformers with one rated output voltage for output voltage: a.c $\leq 10\%$; d.c $\leq 15\%$		NA
b)	Inherently short-circuit proof transformers with more than one rated output voltage for highest voltage: a.c $\leq 10\%$; d.c $\leq 15\%$		NA
c)	Inherently short-circuit proof transformers for other voltages with more than 1 rated output voltage: a.c $\leq 15\%$; d.c $\leq 20\%$		NA
d)	Other transformers for output voltages: a.c $\leq 5\%$; d.c 10%	4.2%	C

12	NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)		C
	Remark: with rectifier measuring on both sides of the rectifier	(see appended table)	NA
12.101	No-load output voltage $< 50 \text{ V a.c.}$ or $< 120 \text{ V d.c.}$ (EN 61558-2-6:97) for independent transformers the limitation applies, even if output windings are connected in series		NA
12.102	Difference between output voltage at no load and output voltage at load (EN 61558-2-6:97)		C

13	SHORT-CIRCUIT VOLTAGE		NA
	Difference from marking for short-circuit voltage $\leq 20\%$	No short circuit marking	NA

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14	HEATING		C
14.1	General requirements		C
	No excessive temperature in normal use		C
	Room temperature: rated ambient temperature $t_a \pm 5 \text{ }^\circ\text{C}$	20°C	—
	Type X, Y, Z attachments: 1 pull (5 N) to the connection windings		C
	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		—
	Type X, Y, Z attachments: 1 pull (5 N) to the connection windings		C
	Max. temperature windings	(see appended table)	C
	– Class A: $\leq 100 \text{ }^\circ\text{C}$		C
	– Class E: $\leq 115 \text{ }^\circ\text{C}$		NA
	– Class B: $\leq 120 \text{ }^\circ\text{C}$		NA
	– Class F: $\leq 140 \text{ }^\circ\text{C}$		NA
	– Class H: $\leq 165 \text{ }^\circ\text{C}$		NA
	– other classes		NA
	Temperature of external enclosures of stationary transformers:		NA
	– metal: $\leq 70 \text{ }^\circ\text{C}$		NA
	– other material: $\leq 80 \text{ }^\circ\text{C}$		NA
	Temperature of external enclosure of stationary transformer $\leq 85 \text{ }^\circ\text{C}$ (not touchable with the IEC test finger)		NA
	Temperature of external enclosures, handles, etc. of portable transformers:		C
	– continuously held parts of metal: $\leq 55 \text{ }^\circ\text{C}$		NA
	– continuously held parts of other material: $\leq 75 \text{ }^\circ\text{C}$		NA
	– not continuously held parts of metal: $\leq 60 \text{ }^\circ\text{C}$		NA
	– not continuously held parts of other material: $\leq 80 \text{ }^\circ\text{C}$		C
	Temperature of terminals for external conductors $\leq 70 \text{ }^\circ\text{C}$		NA
	Temperature of terminals of switches $\leq 70 \text{ }^\circ\text{C}$		NA
	Temperature of internal and external wiring:		C
	– rubber: $\leq 65 \text{ }^\circ\text{C}$		NA
	– PVC: $\leq 70 \text{ }^\circ\text{C}$		C

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	Temperature of parts where safety can be affected:		NA
	– rubber: ≤ 75 °C		NA
	– phenol-formaldehyde: ≤ 105 °C		NA
	– urea-formaldehyde: ≤ 85 °C		NA
	– impregnated paper and fabric: ≤ 85 °C		NA
	– impregnated wood: ≤ 85 °C		NA
	– PVC, polystyrene and similar thermoplastic material: ≤ 65 °C		NA
	– varnished cambric: ≤ 75 °C		NA
	Temperature rise of supports ≤ 85 °C		NA
	Temperature of printed boards:		NA
	– bonded with phenol-formaldehyde: ≤ 105 °C		NA
	– melamine-formaldehyde: ≤ 105 °C		NA
	– phenol-furfural: ≤ 105 °C		NA
	– polyester: ≤ 105 °C		NA
	– bonded with epoxy: ≤ 140 °C		NA
	Electric strength between input and output windings (18.3, 1 min); test voltage (V)		C
14.2	Application of 14.1 or 14.3 according to the insulation system		C
14.2.1	Class of isolating system (classified materials according to IEC 60085 and IEC 60216)		NA
14.2.2	No classified material, or system but the measured temperature does not exceed the value of Class A		C
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		NA
14.3	Accelerated ageing test for undeclared class of isolating system		NA
	Cycling test (10 cycles):		NA
	– measuring of the no-load input current (mA)		NA
14.3.1	– heat run (temperature in table 2)		NA
14.3.2	– vibration test: 30 min; amplitude 0,35 mm; frequency range: 10 Hz, 55 Hz, 10 Hz		NA
14.3.3	– moisture treatment (48 h, 17.2)		NA
14.3.4	Measurements and tests at the beginning and after each test:		NA
	– deviation of the no-load input current, measured at the beginning of the test is ≤ 30%		NA
	– insulation resistance acc. cl.18.1 and 18.2		NA

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	- electric strength, no breakdown (18.3); 2 min; test voltage 35% of specified value (table VI)		NA
	- 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		NA

15	SHORT-CIRCUIT AND OVERLOAD PROTECTION		C
15.1	General		C
	Tests direct after 14.1 at the same t_a and without changing position.	(see appended table)	C
	Supply voltage between 0,9 times and 1,1 times of the rated supply voltage		—
	Transformer with rectifier tests of 15.2 and 15.3 at the input and the output terminals of the rectifier.		NA
	Transformers with more than one output winding or tapping, all windings tested with normal load, the winding with the highest temperature is short-circuited.		NA
	Winding protected inherently (15.2)		NA
	- Max. temperature of winding protected inherently (insulation class): $\leq 150\text{ °C}$ (A); $\leq 165\text{ °C}$ (E); $\leq 175\text{ °C}$ (B); $\leq 190\text{ °C}$ (F); $\leq 210\text{ °C}$ (H)		NA
	Winding protected by protective device:		C
	- a) 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): $\leq 200\text{ °C}$ (A); $\leq 215\text{ °C}$ (E); $\leq 225\text{ °C}$ (B); $\leq 240\text{ °C}$ (F); $\leq 260\text{ °C}$ (H)		NA
	- b) Test according 15.3.1: max. temperature of winding during the first hour, peak value (insulation class): $\leq 200\text{ °C}$ (A); $\leq 215\text{ °C}$ (E); $\leq 225\text{ °C}$ (B); $\leq 240\text{ °C}$ (F); $\leq 260\text{ °C}$ (H)		C
	- Test according 15.3.1: max. temperature of winding after first hour, peak value (insulation class): $\leq 175\text{ °C}$ (A); $\leq 190\text{ °C}$ (E); $\leq 200\text{ °C}$ (B); $\leq 215\text{ °C}$ (F); $\leq 235\text{ °C}$		C
	- Test according 15.3.1: max. temperature of winding after first hour, arithmetic mean value (insulation class): $\leq 150\text{ °C}$ (A); $\leq 165\text{ °C}$ (E); $\leq 175\text{ °C}$ (B); $\leq 190\text{ °C}$ (F); $\leq 210\text{ °C}$ (H)		C
	Max. temperature of external enclosures (accessible by test finger) $\leq 105\text{ °C}$		C

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	Max. temperature of insulation of wiring (rubber and PVC) ≤ 85 °C		C
	Temperature rise of supports ≤ 105 °C		NA
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 rise \leq values in table 3		NA
15.3	For non-inherently short-circuit proof transformers and for transformers with rectifiers: temperature rises \leq values in table 3		NA
15.3.1	Output terminals short-circuited: protection device operates, test at 0,9 □ 1,1 of the rated supply voltage		C
15.3.2	If protected by a fuse in accordance with either IEC 60269-2 or IEC 60269-3, or a technical equivalent fuse, the transformer is loaded as in table 4.		NA
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 fuses in accordance to IEC 60127, 1,5 times of the rated fuse, until steady state condition (in addition)		NA
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		NA
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		NA
	If an internal weak 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		NA
15.3.6	If thermal cut-outs, test with 0,95 times of operating current		NA
15.4	For non-short-circuit proof transformers: temperature rises \leq values in table 3, tests as indicated in 15.3		NA
15.5	For fail-safe transformers:		C
	– U _{pri} (V): 1,1 times rated supply voltage		—
	– I _{sec} (A): 1,5 times rated output current		—
	– time until steady-state conditions t ₁ (h)		—
	– time until failure t ₂ (h): $\leq t_1$; ≤ 5 h		C
	During the test:		C
	– no flames, molten material, etc.		C

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	- temperature of enclosure ≤ 175 °C		C
	- temperature of plywood support ≤ 125 °C		C
	After the test:		C
	- 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		C
	- bare hazardous live parts not accessible by test finger through holes of enclosure		C

16	MECHANICAL STRENGTH		C
16.1	General		C
	After tests of 16.2, 16.3 and 16.4		C
	- no damage		C
	- hazardous live parts not accessible by test pin according to 9.2		C
	- no damage for insulating barriers		C
	- handles, levers, etc. have not moved on shafts		NA
16.2	Transformers (stationary and portable s. 16.1)		C
	For stationary and portable transformers: 3 blows, impact energy 0,5 Nm		C
16.3	Portable transformers (except of plug in transformers)		NA
	For portable transformers: 100 falls, 25 mm		NA
16.4	Transformers with integrated pins (plug in transformers), the following tests are carried out:		C
a)	Plug-in transformers: tumbling barrel test: 50 x \leq 250 g; 25 x 250 g		C
b)	Torque test of the plug pins 0.4 Nm		C
c)	Pull force according to table 5 for each pin		C

17	PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE		NA
17.1	Degree of protection (IP code marked on the transformer)		NA
	Test according to 17.1.1 and for other IP ratings test according to IEC 60529:		NA
	- stable operating temperature before starting the test for < IPX8		NA
	- transformer mounted and wired as in normal use		NA
	- fixed transformer mounted as in normal use by the tests according to 17.1.1 A to L		NA

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	– portable transformers placed in the most unfavourable position and wired as in normal use		NA
	– glands tightened with a torque equal to two-thirds of 25.6		NA
	After the tests:		NA
	– dielectric strength test according to 18.3		NA
	Inspection:		NA
a)	In dust-proof transformers no deposit of talcum powder		NA
b)	No deposit of talcum powder inside dust-tight transformers		NA
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		NA
d)	No accumulation of water in transformers < IPX1 so as to impair safety		NA
e)	No trace of water entered in any part of water-tight transformer		NA
f)	No entry into the transformer by the relevant test probe		NA
17.1.1	Tests on transformers with enclosure:		NA
A)	Solid-object-proof transformers		NA
	– 2 IP2X test finger (IEC 60529) and test pin (fig. 3)		NA
B)	Solid-object-proof transformers:		NA
	– wire 2,5 mm; force 3 N		NA
	– IP4X, wire 1 mm; force 1 N		NA
C)	Dust-proof transformers, IP5X; dust chamber according to IEC 60529, fig. 2:		NA
a)	Transformer has operating temperature		NA
b)	Transformer, still operating, is placed in the dust chamber		NA
c)	The door of the dust chamber is closed		NA
d)	Fan/blower is switched on		NA
e)	After 1 min transformer is switched off for cooling time of 3 h		NA
D)	Dust-tight transformers (IP6X) test according to		NA
E)	Drip-proof transformers (IP6X) test according to C)		NA
F)	Rainproof transformers (IPX2) test according to fig. 3 of IEC 60529 for 10 min in operation, any angle up to 15°		NA

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G)	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.		NA
H)	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 °)		NA
I)	Jet-proof transformer (IPX5) test according to fig. 6 of IEC 60529 (nozzle 6,3mm)		NA
J)	Powerful Jet-proof transformer (IPX6) test according to fig. 6 of IEC 60529 (nozzle 12 mm)		NA
K)	Watertight transformers (IPX7)		NA
L)	Pressure watertight transformers (IPX8)		NA
17.2	After moisture test (48 h for ≤ IP20, 168 h for other transformers):		C
	– insulation resistance and electric strength (Cl. 18)		C

18	INSULATION RESISTANCE AND ELECTRIC STRENGTH		C
18.2	Insulation resistance between:		C
	– live parts and body for basic insulation $\geq 2 \text{ M}\Omega$		NA
	– live parts and body for reinforced insulation $\geq 7 \text{ M}\Omega$	>100	C
	– input circuits and output circuits for basic insulation $\geq 2 \text{ M}\Omega$		NA
	– input circuits and output circuits for double or reinforced insulation $\geq 5 \text{ M}\Omega$	>10	C
	– each input circuit and all other input circuits connected together $\geq 2 \text{ M}\Omega$		NA
	– each output circuit and all other output circuits connected together $\geq 2 \text{ M}\Omega$		NA
	– hazardous live parts and metal parts with basic insulation (Class II transformers) $\geq 2 \text{ M}\Omega$		NA
	– body and metal parts with basic insulation (Class II transformers) $\geq 5 \text{ M}\Omega$		NA
	– metal foil in contact with inner and outer surfaces of enclosures $\geq 2 \text{ M}\Omega$	>100	C
18.3	Electric strength test (1 min): no flashover or breakdown:		C
1)	Basic insulation between input circuits and out-put circuits" working voltage (V)..... test voltage (V)		NA

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2)	Double or reinforced insulation between input circuits and output circuits; working voltage : 240 test voltage (V) : 3730		C
3)	Basic or supplementary insulation between:		NA
a)	Live parts of different polarity; working voltage (V) test voltage (V)		NA
b)	Live parts and the body if intended to be connected to protective earth; working voltage (V) : test voltage (V)		NA
c)	Inlet bushings and cord guards and anchorages chorges; working voltage (V) test voltage (V)		NA
d)	Live parts and an intermediate conductive part; working voltage (V) : 240 test voltage (V) : 1866		C
e)	Intermediate conductive parts and body; working voltage (V) : 240 test voltage (V) : 1866		C
4)	Reinforced insulation between the body and live parts; working voltage (V)..... : 240 test voltage (V)..... : 3730		C
18.4	Upri (V): 2 times rated input voltage; no load; frequency (Hz): 2 times rated frequency; duration (min): 5 min		C
	No breakdown between:		C
	- turns of winding		C
	- input and output windings		C
	- adjacent input or output windings		NA
	- windings and iron core		C
18.5	Touch current and protective earth current	Class II	NA
18.5.1	Touch current		NA
	Touch current measured with the transformer loaded as described in clause 14 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 >30kHz, measuring across the 500 Ohm resistor of J1 (burn effects).	Not IEC60083 type plug	NA

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	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.		NA
	– switches n and e in on position		NA
	– switch n: off and switch e: on		NA
	– switch n: on and switch e: off		NA
18.5.2	Protective earth conductor current		NA
	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		NA
	The measured values are less than the required values of table 8b.		NA

19	CONSTRUCTION		C
19.1	Input and output circuits electrically separated (IEC 61558-2-6:09)		C
	No possibility of any connection between these circuits (IEC 61558-2-6:09)		C
19.1.1	The insulation between input and output winding(s) consist of double or reinforced insulation (exception see 19.1.3) (IEC 61558-2-6:09)		C
	Class I transformers (IEC 61558-2-6:09)		---
	– Insulation between input windings and body, connected to earth, consist of basic insulation rated to the input voltage (IEC 61558-2-6:09)		NA
	– Insulation between output windings and body, connected to earth consist of basic insulation rated for the output voltage (IEC 61558-2-6:09)		NA
	Class I transformers intended for connection to the mains by a plug (EN 61558-2-6:09):		NA
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the working voltage		NA
	– Insulation between output windings and body, connected to earth consist of supplementary insulation rated for the working voltage		NA
	Class II transformers (IEC 61558-2-6:09)		C
	– Insulation between input windings and body consist of double or reinforced insulation to the input voltage (IEC 61558-2-6:09)		C
	– Insulation between output windings and body consist of double or reinforced insulation to the output voltage (IEC 61558-2-6:09)		C

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19.1.2	Transformers with intermediate conductive parts not connected to the body (between input/output) (IEC 61558-2-6:09):		C
19.1.2.1	Class I and Class II transformers (IEC 61558-2-6:09)		—
	the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage. (IEC 61558-2-6:09)		C
	– For class II transformers 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)		C
	– 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.		NA
19.1.2.2	Class I transformers with earthed core, and not allowed for class II equipment (IEC 61558-2-6:09)		NA
	– Insulation from the input to the earthed core: basic insulation rated for the input voltage		NA
	– Insulation from the output voltage to the earthed core: basic insulation rated for the output voltage		NA
19.1.2.3	Insulation between: input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation (IEC 61558-2-6:09)		C
	– 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.		NA
19.1.3	For class I transformers, with protective screen, not connected to the mains by a plug the following conditions comply (IEC 61558-2-6:09):		NA
	– The insulation between input winding and protective screen consist of basic insulation (rated input voltage)		NA
	– The insulation between output winding and protective screen consist of basic insulation (rated output voltage)		NA
	– The protective screen consist of metal foil or a wire wound screen extending the full width of the windings and has no gaps or holes		NA

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	– 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.		NA
	– If the screen is made by a foil, the turns are isolated, overlap at least 3 mm		NA
	– The cross-section of the screen and the lead out wire is at least corresponding to the rated current of the overload device		NA
	– The lead out wire is soldered or fixed to the protective screen.		NA
	Protective screening is not allowed for transformers with plug connection to the mains (IEC 61558-2-6:09)		NA
19.1.4	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled. (IEC 61558-2-6:09)		C
19.1.5	No connection between output circuit and body, except of associated transformers (allowed by equipment standard) (IEC 61558-2-6:09)		C
19.1.6	The distance between input and output terminals for the connection of external wiring is ≥ 25 mm		NA
19.101	Portable transformers having an rated output ≤ 630 VA (IEC 61558-2-6:09)	Class II	C
19.102	No connection between input and output circuit, except of associated transformers (allowed by equipment standard) (IEC 61558-2-6:09)		C
19.103	Protective screening is not allowed for transformers with plug connection to the mains (IEC 61558-2-6:09)	No protective screen	NA
19.2	Fiercely burning material not used		C
	Unimpregnated cotton, silk, paper and fibrous material not used as insulation		C
	Wax-impregnated, etc. not used		C
19.3	Portable transformer: short-circuit proof or fail-safe	Fail-safe	C
19.4	Class II transformers: contact between accessible metal parts and conduits or metal sheaths of supply wiring impossible		NA
19.5	Class II transformers: part of supplementary or reinforced insulation, during reassembly after routine servicing not omitted		NA
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 $\leq 50\%$ specified values (Cl. 26)		NA

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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		NA
19.8	Resistors or capacitors connected between hazardous live parts and the body (accessible metal parts) consist of:		NA
	– components according to IEC 60065, 14.1 or capacitor Y1 according to IEC 60384-14		NA
	– at least two separate components		NA
	– if one component is short-circuited or opened, values specified in Cl. 9 shall not be exceeded		NA
	– if the working voltage is ≤ 250 V, one Y1 capacitor according 60384-14 is allowed		NA
19.9	Insulation material input/output and supplementary insulation of rubber resistant to ageing		NA
	Creepage distances (if cracks) \geq specified values (Cl. 26)		NA
19.10	Protection against accidental contact by insulating coating:		NA
a)	ageing test (section I, IEC 60068-2-2), test Ba: 168 h; 70 °C		NA
b)	Impact test (spring-operated impact hammer according to IEC 60068-2-63; $0,5 \pm 0,05$ J)		NA
c)	Scratch test (hardened steel pin) electric strength test according to Cl. 18		NA
19.11	Handles, levers, knobs, etc.:		NA
	– insulating material		NA
	– supplementary insulation covering		NA
	– separated from shafts or fixing by supplementary insulation		NA
19.12	Windings construction		C
19.12.1	Undue displacement in all types of transformers not allowed:		C
	– of input or output windings or turns thereof		C
	– of internal wiring or wires for external connection		C
	– of parts of windings or of internal wiring in case of rupture or loosening		C
19.12.2	Serrated tape:		NA
	– distance through insulation according to table 13		NA
	– one additional layer of serrated tape, and		NA
	– one additional layer without serration		NA

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	– in case of cheekless bobbins the end turns of each layer shall be prevented from being displaced		NA
19.12.3	Insulated windings wires:		NA
	– to all types of transformers for basic or supplementary insulation taken separately		NA
a)	Winding wire with basic or reinforced insulation		NA
	– comply with Annex K		NA
	– the insulation of the conductor: two layers		NA
b	Winding wire with double or reinforced insulation:		NA
	– comply with Annex K		NA
	– the insulation of the insulated winding wire: three layers		NA
	– dielectric strength test with the values according 18.3 multiplied by 1,25		NA
	Where the wire is wound:		NA
	– upon metal or ferrite cores		NA
	– upon enamelled wire		NA
	– under enamelled wire		NA
	An additional insulation with a dti of supplementary insulation provided between insulated an enamelled wires		NA
	100 % Routine test according to Annex K.3 for windings giving double or reinforced insulation		NA
	For windings providing reinforced insulation the values in table 13, table C.1 and table D1, box 2) c), are not required		NA
19.13	Handles, operating levers and the like shall be fixed		NA
19.14	Protection against electric shock: covers securely fixed, 2 independent fixing means, one with tool		NA
19.15	Transformer with pins for fixed socket-outlets: no strain on socket-outlet		NA
	Additional torque shall not exceed 0,25 Nm		NA
19.16			VOID
19.17	Transformers IPX1 - IPX6 totally enclosed, except for drain hole (diameter ≥ 5 mm or 20 mm ² with width ≥ 3 mm); drain hole not required for transformer completely filled with insulating materials		NA
19.18	Transformers > IPX1 with a moulded, if any		NA
19.19	Class I transformers with a non-detachable flexible cable or cord with earth conductor and a plug with earth contact		NA

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19.20	Live parts of SELV and PELV-circuits: separation not less than PRI/SEC of a safety isolating transformer		C
	– SELV output circuits separated by double or reinforced insulation from all other than SELV or PELV circuits		C
	– SELV output circuits separated by basic insulation from other SELV or PELV circuits		NA
19.20.1	SELV circuits and parts not connected to protective earth, to live parts, or protective conductors forming part of other circuits		NA
	Nominal voltage (V) > 25 V a.c. or 60 V d.c., the required insulation fulfils the high voltage test according to table 8 a		NA
19.20.2	PELV-circuits double or reinforced insulation is necessary		NA
19.21	FELV-circuits: protection against contact fulfils the min. test voltage required for the primary circuit		NA
19.22	Class II transformers shall not be provided with means for protective earth		C
	For fixed transformers an earth conductor with double or reinforced insulation to accessible metal parts is allowed		NA
19.23	Class III transformers shall not be provided with means for protective earth		NA
19.201	Transformers having integral pins for insertion into socket outlets shall comply with the appropriate requirements of AS/NZS 3112	See AS/NZS 3112 test report	C

20	COMPONENTS		C
	Components such as switches, plugs, fuses, lamp holders, flexible cables and cords, comply with relevant IEC standard		NA
	Components inside the transformer pass all tests of this standard together with the transformer tests		C
	Testing of components separately to the transformer according the relevant standard:		C
	– 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).		C
	– Components without markings tested under transformer conditions including inrush current.		NA
	– If no IEC standard exist, the component is tested under transformer conditions.		NA
20.1	Appliance couplers for main supply shall comply with:		NA

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

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	– Thermal links fulfil the relevant requirements of 20.8		C
	– The breaking capacity is in accordance with the relevant fuse standard		NA
20.6.1	For Fuses According IEC 60127 and IEC 60269, the fuse current does not exceed 1,1 times of the rated value		NA
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.		NA
20.7.1	Requirements according to IEC 60730-1		NA
20.7.1.1	Thermal cut-out tested as component shall comply with IEC 60730-1		NA
20.7.1.2	Thermal cut-out tested as a part of the transformer		NA
a)	Thermal cut outs type 1 or type 2 (IEC 60730-1)		NA
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)		NA
c)	Thermal cut outs with manual reset have a trip free mechanism (type 1E and 2E) (see IEC 60730-1)		NA
d)	The number of cycles of automatic action shall be:		NA
	– 3000 cycles for self resetting thermal cut-outs		NA
	– 300 cycles for non self resetting thermal cut-outs resetting by hand		NA
	– 300 cycles for non self resetting thermal cut-outs resetting disconnecting		NA
	– 30 cycles for non self resetting thermal cut-outs which are only resettable by a tool		NA
e)	Thermal cut outs fulfil the electrical stress according IEC 60730-1, 6.14.2		NA
f)	Characteristics of thermal cut-outs:		NA
	– ratings according IEC 60730-1, cl. 5		NA
	– classification according to:		NA
1)	Nature of supply to IEC 60730-1, cl. 6.1		NA
2)	Type of load controlled to IEC 60730-1, cl. 6.2		NA
3)	Degree of protection IPX0 to IEC 60730-1, cl. 6.5.1		NA
4)	Degree of protection IP0X to IEC 60730-1, cl. 6.5.2		NA
5)	Pollution degree to IEC 60730-1, cl. 6.5.3		NA

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6)	Comparative tracking index to IEC 60730-1, cl. 6.13		NA
7)	Max. ambient temperature to IEC 60730-1, cl. 6.7		NA
20.7.1.2	Thermal cut-out tested as a part of the transformer, test with 3 samples:		NA
	– at least micro-interruption or micro-disconnection (IEC 60730-1)		NA
	– 300 h aged at t_a (transformer) + 10 °C		NA
	– subjected to a number of cycles for automatic operating according 20.7.1.1		NA
	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		NA
20.7.2	Thermal cut-outs shall have adequate breaking capacity		NA
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.		NA
	– 3 cycles at 25° C for transformers without t_a min		NA
	– 3 cycles at t_a min for transformers with t_a min		NA
	– after the 3 cycles short circuit of the output at 1,1 of rated supply voltage for 48 h.		NA
	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.		NA
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.		NA
	– 48 h at 25° C for transformers without t_a min		NA
	– 24 h at t_a and 24 h at t_a min for transformers with t_a min		NA
	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.		NA
20.7.3	Test of a PTC resistor:		NA
	5 cycles: transformer short-circuited for 48 h by 1,1 times of the input voltage and max. t_a		NA
	5 cycles: transformer short-circuited for 48 h by 0,9 times of the input voltage and min. t_a (if declared)		NA

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	After the test: withstand the test of clause 18, show no damage in sense of this standard, and be operational.		NA
20.8	Thermal links shall be tested in one of the following two ways.		C
20.8.1	Thermal-links shall comply with IEC 60691 as a separate component.	UL 60691 approved	C
	– electrical conditions to IEC 60691, cl. 6.1		C
	– thermal conditions to IEC 60691, cl. 6.2		C
	– ratings to IEC 60691, cl. 8 b		C
	– suitability of sealing components, impregnating fluids or cleaning solvents IEC 60691, cl. 8 c		C
20.8.2	Thermal-links tested as a part of the transformer:		NA
	– ageing test 300 h by 35 ±C or ta + 10 ±C		NA
	– After transformer fault condition the thermal link operate without sustaining arcing		NA
	– after opening the thermal-link shall have an insulation resistance of at least 0,2 MΩ		NA
	– 3 cycles for replaceable thermal-links		NA
	– 3 new specimens for not replaceable thermal-links		NA
20.9	Self-resetting devices not used if mechanical, electrical, etc. hazards		NA
20.10	Thermal cut-outs which can be reset by soldering operation are not allowed		NA
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.		NA

21	INTERNAL WIRING		C
21.1	Internal wiring and electrical connections protected or enclosed		C
	Wire-ways smooth and free from sharp edges		C
21.2	Openings in sheet metal: edges rounded (radius ≥ 1,5 mm) or bushings of insulating material		C
21.3	Bare conductors: distances adequately maintained		C
21.4	When external wires are connected to terminal, internal wiring shall not work loose		NA
21.5	Insulation of heat-resistant and non-hygroscopic material for insulated conductors subject to temperature rise > limiting values given in 14.1		NA

22	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS		NA
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22.1	All cables, flexible cords etc. shall have appropriate current and voltage ratings		NA
22.2	Input and output wiring inlet and outlet openings for external wiring: separate entries without damage to protective covering of cable or cord		NA
	Input and output wiring inlet and outlet openings for flexible cables or cords: insulating material or bushing of insulating material		NA
	Bushings for external wiring: reliably fixed, not of rubber unless part of cord guard		NA
22.3	Fixed transformer:		NA
	– possible to connect after fixing		NA
	– inside space for wires allow easy introduction and connection of conductors		NA
	– fitting of cover without damage to conductors		NA
	– contact between insulation of external supply wires and live parts of different polarity not allowed		NA
22.4	Length of power supply cord for portable transformers between 2 m and 4 m; without 0,5 mm ²		NA
22.5	Power supply cords for transformers IPX0 and transformers for indoor use only \geq IPX0:		NA
	– for transformers with a mass \leq 3 kg: 60227 IEC52 (H03VV-..) (60245 IEC 53)		NA
	– for transformers with a mass $>$ 3 kg: 60227 IEC53 (H05VV-..) or 60245 IEC 53		NA
	Power supply cords for transformers for outdoor use: \geq IPX0: 60245 IEC57 (H05RN-..)		NA
22.6	Power supply cords for single-phase portable transformers with input current \leq 16A:		NA
	– cord set fitted with an appliance coupler in accordance with IEC 60320		NA
22.7	Nominal cross-sectional area (mm ²); input current (A) at rated output not less than shown in table 9		NA
22.8	Class I transformer with power supply flexible cable: green/yellow core connected to earth terminal		NA
	Power supply cords of portable transformers shall be fitted with an appropriately rated plug complying with AS/NZS 3112 or AS/NZS 3123 or IEC 60309		NA
22.9	Type X, Y or Z attachments: see relevant part 2		NA
22.9.1	For type Z attachment: moulding enclosure and power supply cable do not affect insulation of cable		NA
22.9.2	Inlet openings or inlet bushing: without risk of damage to protective covering of power supply cord		NA
	Insulation between conductor and enclosure:		NA

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	– for Class I transformer: insulation of conductor plus separate basic insulation		NA
	– for Class II transformer: insulation of conductor plus double or reinforced insulation		NA
22.9.3	Inlet bushings:		NA
	– no damage to power supply cord		NA
	– reliably fixed		NA
	– not removable without tool		NA
	– not integral with power supply cord (for type X attachment)		NA
	– not of natural rubber except for Class I transformer with type X, Y and Z attachments		NA
22.9.4	For portable transformers which are moved while operating:		NA
	– cord guards, if any, of insulating material and fixed		NA
	Compliance is tested by the oscillating test according to fig. 7:		NA
	– loaded force during the test according to fig. 7		NA
	– 10 N for a cross-sectional area > 0,75		NA
	– 5 N for a cross-sectional area < 0,75		NA
	After the test according to fig. 7:		NA
	– no short-circuit between the conductors		NA
	– no breakage of more than 10% of stands of any conductor		NA
	– no separation of the conductor from the terminal		NA
	– no loosening of any cord guards		NA
	– no damage of the cord or cord guard		NA
	– no broken strands piercing the insulation and not becoming accessible		NA
22.9.5	Cord anchorages for type X attachment:		NA
	– glands in portable transformers not used unless possibility for clamping all types and sizes of cable		NA
	– moulded-on designs, tying the cable into a knot and tying the end with string not allowed		NA
	– labyrinths, if clearly how, permitted		NA
	– replacement of cable easily possible		NA
	– protection against strain and twisting clearly how		NA
	– suitable for different types of cable unless only one type of cable for transformer		NA

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	- the entire flexible cable or cord with covering can be mounted into the cord anchorage		NA
	- if tightened or loosened no damage		NA
	- no contact between cable or cord and accessible or electrically connected clamping screws		NA
	- cord clamped by metal screw not allowed		NA
	- one part securely fixed to transformer		NA
	- for Class I transformer: insulating material or insulated from metal parts		NA
	- for Class II transformers: insulating material or supplementary insulation from metal parts		NA
	Cord anchorages for type X, Y, Z attachments: cores of power external flexible cable or cord insulated from accessible metal parts by:		NA
	- basic insulation (Class I transformers), separate insulating barrier/cord anchorage		NA
	- supplementary insulation (Class II transformers), special lining/cable or cord sheath of cable sheath of cable		NA
	Cord anchorages for type X and Y attachments:		NA
	- replacement of external flexible cable or cord does not impair compliance with standard		NA
	- the entire flexible cable or cord with covering can be mounted into the cord anchorage		NA
	- if tightened or loosened no damage		NA
	- no contact between cable or cord and accessible or electrically connected clamping screws		NA
	- cord clamped by metal screws not allowed		NA
	- knots in cord not used		NA
	- labyrinths, if clearly how, permitted		NA
	Tests for type X with special cords, type Y, type Z		NA
	Test for type X attachments one test with a cord with smallest and one test with a cord with the largest cross-sectional area:		NA
	- for the test with clamping screws or tightened with torque 2/3 of that specified in table 11		NA
	- not possible to push cable into transformer		NA
	- 25 pulls of 1 s		NA
	- 1 min torque according to table 10		NA
	- mass (kg); pull (N); torque (Nm)		—
	- during test: cable not damaged		NA

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	– after test: longitudinal displacement ≤ 2 mm for cable or cord and ≤ 1 mm for conductors in terminals		NA
	– creepage distances and clearances \geq values specified in Cl. 26		NA
22.9.6	Space for external cords or cable for fixed wiring and for type X and Y attachments:		NA
	– before fitting cover, possibility to check correct connection and position of conductors		NA
	– cover fitted without damage to supply cords		NA
	– 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		NA
	Space for external cords or cable for type X at-tachment and for connection to fixed wiring, in addition:		NA
	– conductor easily introduced and connected		NA
	– possibility of access to terminal for external conductor after removal of covers without special purpose tool		NA

23	TERMINALS FOR EXTERNAL CONDUCTORS		NA
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		NA
	Terminals are integral part of the transformer:		NA
	– comply with IEC 60999-1 under transformer conditions		NA
	Other terminals:		NA
	– separately checked according to IEC 60998-2-1, IEC 60998-2-2 or IEC 60947-7-1		NA
	– used in accordance with their marking		NA
	– checked according to IEC 60999-1 under transformer conditions		NA
	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 $\geq 50\%$ of specified value (Cl. 26)		NA
	Transformer with type Y and Z attachments for external conductors: soldered, welded, crimped, etc. connections allowed		NA

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	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 $\geq 50\%$ of specified value (Cl. 26)		NA
23.2	Terminals for type X with special cords Y and Z attachments shall be suitable for their purpose:		NA
	– test by inspection according to 23.1 and 23.2		NA
	– pull of 5 N to the connection before test according to 14.1		NA
23.3	Other terminals than Y and Z attachments shall be so fixed that when the clamping means is tightened or loosened:		NA
	– terminal does not work loose		NA
	– internal wiring is not subjected to stress		NA
	– creepage distances and clearance are not reduced below the values specified in Cl. 26		NA
23.4	Other terminals than Y and Z attachments shall be so designed that:		NA
	– they clamp the conductor between metallic surfaces with sufficient contact pressure		NA
	– without damage to the conductor		NA
	– test by inspection according to 23.3 and 23.4		NA
	– 10 times fastening and loosening a conductor with the largest cross-sectional area with 2/3 of the torque specified in Cl. 25		NA
23.5	Terminals for fixed wiring and for type X: located near their associated terminals of different polarities and the earth terminal if any		NA
23.6	Terminal blocks not accessible without the aid of a tool		NA
23.7	Transformer with type X attachments: stranded conductor test (8 mm removed):		NA
	– Class I transformers: no connection between live parts and accessible metal parts		NA
	– free wire of earth terminal: no touching of live parts		NA
	– 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		NA
23.8	Terminals for a current > 25 A:		NA
	– pressure plate, or		NA
	– two clamping screws		NA

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23.9	When terminal, other than protective earth conductor, screws loosened as far as possible, no contact:		NA
	– between terminal screws and accessible metal parts		NA
	– between terminal screws and inaccessible metal parts for Class II transformers		NA

24	PROVISION FOR PROTECTIVE EARTHING		C
24.1	Class I transformers: accessible conductive parts connected to earth terminal		NA
	Class II transformers: no provision for earth	Functional only	NA
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		NA
24.3	No risk of corrosion from contact between metal of earth terminal and other terminal		NA
	In case of earth terminal body of Al, no risk of corrosion from contact between Cu and Al		NA
	Body of earth terminal or screws/nuts of brass or other metal resistant to corrosion		NA
24.4	Resistance of connection between earth terminal and metal parts $\leq 0,1 \Omega$ with a min. 25 A or 1,5 rated input current at 1 min		NA
24.5	Class I transformers with external flexible cables or cords:		NA
	– current carrying conductors becoming touch before the earth conductor		NA

25	SCREWS AND CONNECTIONS		NA
25.1	Screwed connections withstand mechanical stresses		NA
	Screws transmitting contact pressure or likely to be tightened by the user or having a diameter $< 2,8$ mm, shall screw into metal		NA
	Screws not of metal which is soft or liable to creep (Zn, Al)		NA
	Screws of insulating material: not used for electrical connection		NA
	Screws not of insulating material if their replacement by metal screws can impair supplementary or reinforced insulation		NA
	Screws to be removed (replacement etc. of power supply cord) not of insulating material if their replacement by metal screws can impair basic insulation		NA

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	No damage after torque test: diameter (mm); torque (Nm); ten times		NA
	No damage after torque test: diameter (mm); torque (Nm); five times		NA
25.2	Screws in engagement with thread of insulating material:		NA
	– length of engagement $\geq 3 \text{ mm} + 1/2 \text{ screw diameter}$ or 8 mm		NA
	– correct introduction into screw hole		NA
25.3	Electrical connections: contact pressure not transmitted through insulating material		NA
25.4	In case of use of thread-forming (sheet metal) screws for connection of current-carrying parts: clamping and locking means provided		NA
	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		NA
	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		NA
25.5	Screws for current-carrying mechanical connections locked against loosening		NA
	Rivets for current-carrying connections subject to torsion locked against loosening		NA
25.6	Test of screwed glands with a torque according table 12. After the test no damage at the transformer and the gland.		NA

26	CREEPAGE DISTANCES AND CLEARANCES		C
26.1	Specified values according to:		C
	– table 13, material group IIIa		C
	– table C, material group II		NA
	– table D, material group I		NA
1.	Insulation between input and output circuits (double or reinforced insulation)		NA
a)	Measured values \geq specified values (mm)		NA
	Measured value:		
	Specified value:		
2.	Insulation between input and output circuits (double or reinforced insulation):		C
a)	Measured values \geq specified values (mm) :		C
	Measured value:	>9 cl	>9 cr
	Specified value:	5.5 cl	6.0 cr

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b)	Measured values \geq specified values (mm); Measured value: Specified value:		NA
c)	Measured values \geq specified values (mm) : Measured value: Specified value:	>1.5 dti 1.0 dti	C
3.	Insulation between adjacent input circuits: measured values \geq specified values (mm) : Measured value: Specified value:		NA
	Insulation between adjacent output circuits: measured values \geq specified values (mm) : Measured value: Specified value:		NA
4.	Insulation between terminals for external connection:		NA
a)	Measured values \geq specified values (mm) Measured value: Specified value:		NA
b)	Measured values \geq specified values (mm) Measured value: Specified value:		NA
c)	Measured values \geq specified values (mm) Measured value: Specified value:		NA
5.	Basic or supplementary insulation:		NA
a)	Measured values \geq specified values (mm): Measured value: Specified value:		NA
b)	Measured values \geq specified values (mm) Measured value: Specified value:		NA
c)	Measured values \geq specified values (mm) Measured value: Specified value:		NA
d)	Measured values \geq specified values (mm) Measured value: Specified value:		NA
e)	Measured values \geq specified values (mm) Measured value: Specified value:		NA

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6.	Reinforced or double insulation: measured values \geq specified values (mm)	Measured value: Specified value:	>10 cl 5.5 cl	>10 cr 6.0 cr	C
7.	Distance through insulation:				C
a)	Measured values \geq specified values (mm)	Measured value: Specified value:			NA
b)	Measured values \geq specified values (mm)	Measured value: Specified value:			NA
c)	Measured values \geq specified values (mm)	Measured value: Specified value:	>2 dti 1.0 dti		C
	Creepage distances and clearances are measured:				NA
	– for fixed wiring and type X attachments with max. and min. size				NA
	– for type X with a special cord, Y or Z attachments with the supply cable as delivered				NA
	– for layers of serrated tapes the values are so determined as if the serration coincided through the different layers				NA
	– for printed wiring shall be used the unreduced values for live parts as in table 13, C.1 or D.1, except if printed wiring complies with IEC 60664-3				NA
	If the pollution generates high and persistent conductivity caused:				NA
	– clearances of P3 increased with min. 1,6 mm				NA
	– value X in Annex A increased with 4,0 mm				NA
26.2	Creepage distances (cr) and clearances (cl)				NA
26.2.1	Windings covered with adhesive tape				NA
	– the values of pollution degree 1 are fulfilled				NA
	– all isolating material are classified acc. to IEC 60085 and IEC 60216				NA
	– test A of 26.2.3 is fulfilled				NA
26.2.2	Uncemented insulating parts pollution degree P2 or P3				NA
	– all isolating material are classified acc. to IEC 60085 and IEC 60216				NA
	– values of pollution degree 1 are not applicable				NA
26.2.3	Cemented insulating parts				NA
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216				NA

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	- values of distance through insulation (dti) are fulfilled		NA
	- creepage distances and clearances are not required		NA
	- test A of this sub clause is fulfilled		NA
	Test A		NA
	- thermal class		NA
	- working voltage		NA
	- Test with three specially prepared specimens, with uninsulated wires, without impregnation or potting	(see appended table)	NA
	Two of the three specimens are subjected to:		NA
	- the relevant humidity treatment according to 17.2 (48 h)		NA
	- the relevant dielectric strength test of 18.3 multiplied with factor 1,35		NA
	- 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		NA
	Impulse dielectric test according to 4.1.1.2.1 of IEC 60664-1 (1,2 / 50 μ s waveform) <input type="checkbox"/> see Annex R of IEC 61558-1		NA
26.2.4	Enclosed parts, by impregnation or potting		NA
26.2.4.1	- The requirements of reduced values as stated for pollution degree 1 (P1) are fulfilled		NA
	- all isolating materials are classified acc. to IEC 60085 and IEC 60216		NA
	Test B		NA
	- thermal class		NA
	- working voltage		NA
	- Test with three specially specimens, potted or impregnated. The dielectric strength test is applied directly to the joint.	(see appended table)	NA
	Two of the three specimens are subjected to:		NA
	- the relevant humidity treatment according to 17.2 (48 h)		NA
	- the relevant dielectric strength test of 18.3 multiplied with factor 1,25		C
	- 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		C

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	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60664-1 (1,2 / 50 μ s waveform) – see Annex R of IEC 61558-1		C
26.2.4.2	– The requirements of distance through insulation (dti) are fulfilled. (P1 values are not required)		NA
	– all isolating materials are classified acc. to IEC 60085 and IEC 60216		NA
	Test C		NA
	– thermal class		NA
	– working voltage		NA
	– Test with three specimens, potted or impregnated. (finished components)	(see appended table)	NA
	– Neither cracks, nor voids in the insulating compounds		NA
	Two of the three specimens are subjected to:		NA
	– the relevant humidity treatment according to 17.2 (48 h)		NA
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		NA
	– 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		NA
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60664-1 (1,2 / 50 μ s waveform) – see Annex R of IEC 61558-1		NA
26.3	Distance through insulation		C
	For double or reinforced insulation, the required values of Tables 13, C1, and D1 – boxes 2b, 2c and 7 are fulfilled		C
	The insulation fulfil the material classification according IEC 60085 or 60216 or the test of 14.3		C
26.3.1	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:		NA
	– the isolating materials are classified acc. to IEC 60085 and IEC 60216		NA
	– the test of 14.3 is fulfilled		NA
	– If both requirements are fulfilled, the required values for solid insulation can be multiplied by 0,4		NA
	– Minimum thickness of reinforced insulation \geq 0,2 mm		NA

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	– Minimum thickness of supplementary insulation $\geq 0,1$ mm		NA
26.3.2	Insulation in thin sheet form		NA
	– If the layers are non separable (glued together):		NA
	– The requirement of 3 layers is fulfilled		NA
	– The mandrel test according 26.3.3 is fulfilled with 150 N		NA
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index 'e' are fulfilled.		NA
	– If the layers are separated:		NA
	– The requirement of 2 layers is fulfilled		NA
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		NA
	– The mandrel test according 26.3.3 is fulfilled on each layer with 50 N		NA
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index 'e' are fulfilled.		NA
	– If the layers are separated (alternative:		NA
	– The requirement of 3 layers is fulfilled		NA
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		NA
	– The mandrel test according 26.3.3 is fulfilled on 2/3 of the layers with 100 N		NA
	– The required values for d.t.i. of Tables 13, C.1 and D.1 – marked by index 'e' are fulfilled.		NA
	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		NA
	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:		NA
	– rated output > 100 VA values in square brackets apply		NA
	– rated output ≥ 25 VA ≤ 100 VA 2/3 of the value in square brackets apply		NA
	– rated output < 25 VA 1/3 of the value in square brackets apply		NA
26.3.3	Mandrel test of insulation in thin sheet form (specimen Of 70 mm width are necessary):		NA

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	– If the layers are non separable – at least 3 layers glued together fulfil the test:		NA
	– pull force of 150 N		NA
	– 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.		NA
	– If the layers are separable and 2/3 of at least 3 layers fulfil the test.		NA
	– pull force of 100 N		NA
	– 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.		NA
	– If the layers are separable 1 of at least 2 layers fulfil the test:		NA
	– pull force of 50 N		NA
	– 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.		NA
26.101	The values for creepage distances clearances and distances through insulation for voltages above 1000 V are found by extrapolation.		NA

27	RESISTANCE TO HEAT, FIRE AND TRACKING		C
27.1	Resistance to heat		C
	All insulating parts are resistant to heat		C
	For parts of rubber, which passed the test of 19.9, no additional test is required.		NA
	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		NOTED
27.1.1	External accessible parts		C
	The Ball-pressure test -: diameter of impression ≤ 2 mm; heating cabinet temperature ($^{\circ}\text{C}$) at 70°C or the temperature T of 14.1 (T + 15) - is fulfilled.		C
27.1.2	Internal parts		C
	For insulating material retaining current carrying parts in position, the ball-pressure test -: diameter of impression ≤ 2 mm; heating cabinet temperature ($^{\circ}\text{C}$) at 125°C or the temperature T of 14.1 (T + 15) - is fulfilled		C
27.2	Resistance to abnormal heat under fault conditions		C
	Insulating material of transformers \geq IP20: no source of ignition for surroundings in case of abnormal heat or fire. Hazardous live parts shall not be accessible.		NA

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	Two special prepared specimens for the test in which short-circuit windings are built-in		NA
27.2.1	Portable transformers are placed on a dull painted plywood support, as described in 14.1		C
	Stationary transformers fixed in the most unfavourable position on a dull painted support:		NA
	– if this position for use is vertical or ceiling transformer and support 200 mm above a pinewood board with tissue paper		NA
	Self-resettable devices are short-circuit		NA
	Input circuits protected with 10 times rated current, min. 16 A (fuse)		NA
	Test time for protective devices of the transformer without load:		NA
	– max. 15 days, or		NA
	– definitive interruption in the input circuit		NA
	If non-self-resettable or replaceable protective devices are used the following cycle test is necessary:		C
	– non-self-resettable: 30 cycles with no load until interruption and 2 h cool down		C
	– replaceable protective device: 10 cycles with no load until interruption and 2 h cool down		NA
	During the tests:		C
	– no flames occur		C
	– support temperature shall not exceed 125 °C		C
	– no ignition of the tissue paper		C
27.2.2	After the tests:		C
a)	Transformer with definitive interruption in the input circuit withstands the test with 35% of the values according to table 8a		C
b)	Transformer with no definitive interruption with the stands the test voltage (100%) according to table 8a of Cl. 18: hazardous live parts are not touchable by the stranded test finger		NA
27.3	Resistance to fire		C
	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		C
27.3.1	External accessible parts (glow wire tests)		C
	– 650 °C for enclosures		C
	– 650 °C for parts retaining current carrying parts in position and terminals for external conductors Current ≤ 0,2 A		C

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	– 750 °C for parts retaining current carrying parts in position and terminals for external conductors with fixed wiring. Current > 0,2 A	Input current <200mA	NA
	– 850 °C for parts retaining current carrying parts in position and terminals for external conductors with non fixed wiring. Current > 0,2 A	Input current <200mA	NA
27.3.2	Internal parts		C
	– 550 °C for internal insulating material – not retaining current carrying parts in position		C
	– 650 °C for coil formers (bobbins)		C
	– 650 °C for parts retaining current carrying parts in position and terminals for external conductors . Current ≤ 0,2 A		C
	– 750 °C for parts retaining current carrying parts in position and terminals for external conductors with fixed wiring. Current > 0,2 A		NA
	– 850 °C for parts retaining current carrying parts in position and terminals for external conductors with non fixed wiring. Current > 0,2 A		NA
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		NA
	Test (175 V): no flashover or breakdown before 50 drops		NA

28	RESISTANCE TO RUSTING		NA
	Ferrous parts protected against rusting		NA

E	ANNEX E , GLOW WIRE TEST		C
	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:		C
E 1	Clause 6, "Severities" of IEC 6095-2-11, apply with the temperature stated in 27.3 of IEC 61558-1		C
E 2	Clause 8, "Conditioning", of IEC 60695-2-11 apply, preconditioning is required		C
E 3	Clause 10, "Test Procedure", of IEC 60695-2-11 apply, The tip of the glow wire is applied to the flat side of the surface.		C

F	ANNEX F, REQUIREMENTS FOR MANUALLY OPERATED SWITCHES WHICH ARE PARTS OF THE TRANSFORMER		NA
F 2	Manually operated mechanical switches, tested as separate component, shall comply with IEC 61058 under the conditions of F2.		NA

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F 3	Manually operated mechanical switches tested as part of the transformer shall comply with the conditions specified under F.3		NA
H	ANNEX H, ELECTRONIC CIRCUITS (IEC 61558-1)		C
H 1	General notes on tests (addition to clause 5)		NOTED
H 2	SHORT-CIRCUIT AND OVERLOAD PROTECTION (ADDITION TO CLAUSE 15)		C
H 2.1	Circuits designed and applied so that fault conditions do not render the appliance unsafe		C
	During and after each test:		C
	– temperatures do not exceed values specified in table 3 of Cl. 15.1		C
	– transformer complies with conditions specified in sub-clause 15.1		C
	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		NA
H 2.2	Fault conditions a) to f) of sub-clause H.2.3 are not tested if the following conditions are met:		NOTED
	– electronic circuit is a low-power circuit as specified		NOTED
	– safety of the appliance as specified does not rely on correct functioning of the electronic circuit		NOTED
H 2.3	Fault conditions tested as specified when relevant:		NA
a)	Short-circuit of creepage distances and clearances, if less than specified in Cl. 26		NA
b)	Open circuit at the terminals of any component		NA
c)	Short circuit of capacitors, unless they comply with IEC 60384-14		NA
d)	Short-circuit of any two terminals of an electronic component as specified		NA
e)	Any failure of an integrated circuit as specified		NA
f)	Low power circuit: low-power points are connected to the supply source		NA
	Cl. 15 is repeated with a simulated fault as indicated in a) to e), if the transformer incorporates an electronic circuit to ensure compliance with Cl. 15		NA
	Fault condition e) is applied for encapsulated and similar components		NA
	PTC's and NTC's are not short-circuited if they are used as specified		NA

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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:		NA
	– if $I2 < 2,1 \times I1$ test of 15.8 is repeated with fuse-link short-circuited		NA
	– if $I2 > 2 \times I1$, no other tests are necessary		NA
	If $I2 > 2,1 \times I1$ and $I2 < 2,75 \times I1$ test of 15.8 is repeated as specified		NA
	For fuses other than those complying with IEC 60127-3, the test is carried out as specified 15.3.2 to 15.3.5		NA
H 3	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION		NA
H 3.1	For live parts separated by basic insulation smaller cr and cl as in 26 are allowed, if H2 is fulfilled.		NA
	In optocouplers no requirements of cr and cl		NA
	For coatings annex W applies. Smaller distances as required in IEC 60664-3, clause 4 are applicable,		NA
	For potted transformers cycling tests acc, 26.2. are applicable		NA
H 3.2	The max. surface temperature of optocouplers is 50 K		NA

K	ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION		NA
K.1	Wire construction:		NA
	– insulated winding wire with min. two layers for basic or supplementary insulation		NA
	– insulated winding wire with min. three layers for reinforced insulation		NA
	– winding insulation material		NA
K.2	Conformance test		NA
K.2.1	Test 13 of IEC 60851-5 nominal conductor diameter $> 0,018 \text{ mm} \leq 0,1 \text{ mm}$, test as specified in 4.2.1 and 4.2.2 of IEC 60851-5		NA
	Nominal conductor diameter $> 0,1 \text{ mm}, \leq 2,5 \text{ mm}$, test as specified in 4.3.1 and 4.3.2 of IEC 60851-5		NA
	Nominal conductor diameter $< 2,5 \text{ mm}$, test as specified in 4.4.1 and 4.4.2 of IEC 60851-5		NA
	High voltage test immediately after the above specified tests:		NA
	– test voltage for two layers 3 kV		NA
	– test voltage for three layers 5,5 kV		NA

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K.2.2	Adherence and flexibility, test as specified under 5.1.4 of IEC 60851-3		NA
	– high voltage test immediately after this test		NA
	– test voltage for two layers 3 kV		NA
	– test voltage for three layers 5,5 kV		NA
K.2.3	Heat shock, test as specified under 3.1 or 3.2 of IEC 60851-6:		NA
	– high voltage test immediately after this test		NA
	– test voltage for two layers 3 kV		NA
	– test voltage for three layers 5,5 kV		NA
K.2.4	Retention of dielectric strength after bending, test as specified under test 13 of 4.6.1 c) of IEC 60851-5		NA
1	High voltage test immediately after this test		NA
2.	Test voltage for two layers 3 kV		NA
3.	Test voltage for three layers 5,5 kV		NA





U	ANNEX U – INFORMATIVE – OPTIONAL TW – MARKING FOR TRANSFORMERS		NA
	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.		NA
U1	General notes and tests		NA
	8 transformers of one type are necessary for the test. Tests according U5.		NA
U.2	Heating (addition to clause 14)		NA
14.4	Thermal endurance test		NA
	Test according U5 and measurements according 11.1		NA
	Transformers tested as a integral part of the equipment (option), assigned with tw		NA
	The thermal conditions are so adjusted, that the duration of test is as indicated by the manufacturer.		NA
	If no indications are given, the test period is 30 days		NA
	After the test, when the transformers have returned to room temperature, they fulfil the following requirements:		NA
a)	The output voltage has not changed from the measured value at the beginning by more than allowed value of clause 11.1		NA
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 MΩ		NA

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c)	The transformer fulfil the dielectric strength test with 35% of the values in Caluse 18, Table 8.a		NA
	The test result is positive, is min. 6 of the 7 samples have passed the test.		NA
	The test result is negative, if 2 or more samples fail the test		NA
	If the result is negative, the test can be repeated with 7 new samples		NA
U.3	Short circuit and overload protection (addition to clause 15)		NA
	At short circuit and overload tests the winding temperature if less than the required value of table U.1		NA
U.5	General requirements and information about thermal endurance test on windings		NA
U.5.1	Thermal endurance test		NA
	Transformers tested at rated output		NA
	Loads outside of the oven		NA
	7 transformers are placed in the oven		NA
	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		NA
	After 4 hours measuring of the actual winding temperatures. Regulation of the oven temperature if necessary		NA
	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		NA
U.5.2	The use of constant S other than 4500 in tw tests		NA
U.5.2.1	Procedure a)		NA
	The manufacturer prepares test results with a minimum of samples of 30.		NA
	T and log L are calculated from the dates		NA
	The diagram according to Figure U.2 will be founded.		NA
U.5.2.3	Procedure b)		NA
	The testing authority shall test 14 new transformers		NA
	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.		NA
	Calculation of the mean life L2 at temperature T2 according to U4		NA

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	Test 2, based on clause U.5.1 but at a calculated room temperature T2 (for 120 days). The test time with T2 exceeds L2.		NA
	If all transformers fail before L2, the result is negative.		NA

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

11	TABLE: OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD				C
	Rated output voltage	Measured output voltage	% Difference	Allowed % Difference	Result
	9V	9.38V	4.2%	5%	C

12	TABLE: NO-LOAD OUTPUT VOLTAGE				C
	No-load output voltage	Output voltage under load	% Difference	Allowed % Difference	Result
	11.8V	9.38V	25.8%	100%	C



14	TABLE: HEATING			C
Part	Measured temperature °C	Allowed temperature °C	Result	
Primary winding	32.8	100	C	
Secondary winding	34.3	100	C	
Input wire	25.4	70	C	
Output wire	27.4	70	C	
Enclosure top	23.4	80	C	
Enclosure base	21.7	80	C	

15	TABLE: SHORT-CIRCUIT AND OVERLOAD PROTECTION			C
Part	Test	Measured temperature °C	Allowed temperature °C	Result
Primary winding	Overload	80.6	150	C
Secondary winding	Overload	83.1	150	C
Input wire	Overload	48.5	85	C
Output wire	Overload	52.7	85	C
Enclosure top	Overload	40.9	105	C
Enclosure base	Overload	31.3	105	C

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26.2 TEST A	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					NA
	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.						

26.2 TEST B	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					NA
	Test with three specially prepared specimens with potting or impregnation (P1)					
	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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26.2 TEST C	TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION					NA
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.						

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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														
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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Annex U	U.5.2 The use of an other constant S other than 4500 in tw tests Test1: 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														
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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Annex U	U.5.2 The use of an other constant S other than 4500 in tw tests Test2: 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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AS/NZS 3112:2011 (Incorporating Amendment No. 1)

TEST RESULTS

Legend
C = Complies
DNC = Does Not Comply
NA = Not Applicable
NT = Not Tested

Testing Officer : XXXXXXXXXX

Test Date : 18/06/2013

**AS/NZS 3112:2011 (Incorporating Amendment No. 1)
Approval and test specification – Plugs and socket-outlets**

Section 2	PLUGS		C
2.1	TERMINALS AND INTERNAL CONNECTIONS		C
2.1.1	Materials		C
2.1.2	Construction of terminals		NA
2.2	PLUG PINS		C
2.2.1	Material of Pins		C
2.2.2	Assembly of pins		NA
2.2.3	Form of pin		C
2.2.4	Insulation of plug pins		C
2.3	INSULATING MATERIALS		C
2.3.1	General		C
2.3.2	Plug body		C
	(a) Properties.....	C	
	(b) Ceramic material	NA	
2.3.2	Plug cover		NA
2.4	NON-REWIREABLE PLUGS		NA
	(a) Attachment of conductors		
	(b) Attachment method.....		NA
	(c) Flexible cord		NA
2.5	MEANS OF ENTRY AND CORD ANCHORAGE FOR FLEXIBLE CORD		NA
2.5.1	General		NA
2.5.2	Side entry plugs		NA
2.6	RADIO INTERFERENCE SUPPRESSION DEVICES		NA

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2.7	FINGER-GRIP		NA
2.8	RATINGS AND DIMENSIONS OF LOW VOLTAGE PLUGS		
2.8.1	General	See appended table 2.8.1	C
2.8.2	Integrally moulded plug and cord		NA
2.8.3	Two-pin flat-pin plugs with non-parallel pins		NA
2.8.4	Compliance with dimensional requirements of Figure 2.1		C
2.8.5	Plugs, IP-rated, with threaded retaining device		NA
2.9	INTERNAL CONNECTIONS		C
2.10	ARRANGEMENT OF EARTHING CONNECTIONS	Functional earth	C
2.11	FUSES		NA
2.12	MARKING		C
2.12.1	Required marking		
	(a) Name, trademark or manufacturer	VC International	C
	(b) Current rating (A)	300mA (output)	C
	(c) Voltage	230-240VAC	C
	(d) Other marking	35B09030A	C
	(e) IP rating	NA	C
2.12.2	Location of marking		C
	(a) Items (a) and (d) of 1.12.1	Rating plate	
	(b) Items (b), (c) & (e) of 2.12.1	Rating plate	
2.12.3	Additional requirements for rewireable plugs		NA
	(a) Diagram of connection method		
	(b) Diagram of sleeving		
	(c) Description of method		
	(d) Size and type of flexible cords		
2.12.4	Earthing connections		NA
2.12.5	Live connections		C
2.12.5.1	General		NA
2.12.5.2	Location of marking		NA
2.12.6	Configuration of plugs		C
2.13	TESTS ON PLUGS		C
2.13.1	General		C

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2.13.2	Insulation resistance test		See appended table 2.13.2	C
2.13.3	High Voltage test		See appended table 2.13.3	C
2.13.4	Flexible cord anchorage test			NA
2.13.5	Test of external nut or clamping ring			NA
2.13.6	Attachment of covers			NA
2.13.7	Mechanical strength of pin tests			C
2.13.7.1	Tumbling barrel test	Number of falls:	500	C
2.13.7.2	Pin bending test			C
2.13.8	Temperature rise test For a test current of 1.1 times rated current applied for 1 hour the maximum temperature rise shall not exceed 45 K.		See appended table 2.13.8	C
2.13.9	Securement of pins			C
2.13.9.1	Movement of pins	Maximum movement:	1.092 mm	C
2.13.9.2	Fixing of pins	Maximum movement:	0.719 mm	C
2.13.10	Determination of IP rating			NA
2.13.11	Determination of ignitability and combustion propagation			C
2.13.12	Tests on non-rewireable plug and flexible cord			NA
2.13.12.1	General			NA
2.13.12.2	Attachment of flexible cord			NA
2.13.12.3	Attachment of insulated cores			NA
2.13.12.4	Attachment of sheathing (sheathed cords)			NA
2.13.12.5	Attachment of insulation (unsheathed cords)			NA
2.13.12.6	Attachment of conductors			NA
2.13.13	Tests on the insulation material of Insulated Pin Plugs			C
2.13.13.1	General			NOTED
2.13.13.2	Pressure test at high temperature			C
2.13.13.3	Static damp heat test			
		Insulation resistance test, 2.13.2 (e)	See appended table 2.13.2	C
		High voltage test, 2.13.3	See appended table 2.13.3	C
		Abrasion test, 2.13.13.6		C
2.13.13.4	Low temperature test			C
		Insulation resistance test, 2.13.2 (e)	See appended table 2.13.2	C
		High voltage test, 2.13.3	See appended table 2.13.3	C
		Abrasion test, 2.13.13.6		C
2.13.13.5	Impact test at low temperature			C
2.13.13.6	Abrasion test			C

Section 3	SOCKET -OUTLETS			NA
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3.1	TERMINALS AND INTERNAL CONNECTIONS		NA
3.1.1	Material		NA
3.1.2	Construction of terminals		NA
3.2	PROHIBITED ARRANGEMENTS		NA
3.3	SOCKET-OUTLET CONTACTS		NA
3.3.1	Material		NA
3.3.2	Construction		NA
3.3.3	Entry or withdrawal of plug pins into a socket-outlet		NA
3.3.4	Depth of contact		NA
3.3.4.1	Socket apertures for flat pins		NA
3.3.4.2	Socket apertures for round pins		NA
3.4	INSULATING MATERIALS		NA
3.5	RADIO INTERFERENCE SUPPRESSORS		NA
3.6	DIMENSIONS		NA
3.6.1	Pin entry apertures for plugs		NA
3.6.2	Spacing of socket-outlets		NA
3.6.3	Socket-outlet faceplate		NA
3.6.4	Fully recessed socket		NA
3.6.5	Socket, IP rated with threaded retaining device		NA
3.7	ARRANGEMENT OF EARTHING CONNECTIONS		NA
3.8	PREVENTION OF CONTACT WITH LIVE PINS		NA
3.8.1	During normal insertion		NA
3.8.2	During other than normal insertion		NA
3.8.3	Alignment of faceplates		NA
3.9	FUSES		NA
3.10	FLOOR SOCKET-OUTLETS		NA
3.11	SWITCHED SOCKET-OUTLETS		NA
3.11.1	Socket-outlets switched by insertion of plug pins		NA
3.11.2	Socket-outlet switches		NA

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3.12	SHUTTERED SOCKET-OUTLETS		NA
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3.13	MARKING		NA
3.13.1	Required marking		NA
3.13.2	Location of marking		NA
3.13.3	Earthing connections		NA
3.13.4	Live connections		NA
3.13.5	Instructions		NA

3.14	TESTS FOR SOCKET-OUTLETS		NA
3.14.1	General		NA
3.14.2	Insulation resistance test No.1		NA
3.14.3	High voltage test		NA
3.14.4	Current breaking test		NA
3.14.5	Test of temperature rise		NA
3.14.6	Insulation resistance test No.2		NA
3.14.7	Test of earthing connection		NA
3.14.8	Strength of contact test		NA
3.14.8.1	Test of lateral strain		NA
3.14.8.2	Withdrawal force test		NA
3.14.9	Switch test		NA
3.14.10	Determination of IP rating		NA
3.14.10.1	General		NA
3.14.10.2	Tests		NA
3.14.11	Determination of ignitability and combustion propagation		NA

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Appendix A	Gauge for three-pin flat-pin plugs		NOTED
Appendix B	Gauge for two-pin flat-pin plugs with parallel pins		NOTED
Appendix C	Three-pin test plug with flat pins for full-insertion test and the finger test during normal insertion test		NOTED
Appendix D	Three-pin test plug with flat pins for abnormal insertion test		NOTED
Appendix E	Plugs and socket-outlets for use in extra-low voltage circuits		NOTED
Appendix F	Gauge for flat and round pin plugs		NOTED
Appendix G	Three-pin test plug with flat and round pins for the full-insertion test and the finger test during normal insertion test		NOTED
Appendix H	Dimensions for plugs and socket-outlets, IP-rated, with threaded retaining devices		NOTED
Appendix I	Three-pin test plug with flat pins for full-insertion test and the finger test during normal insertion test		NOTED
I1	Scope		NOTED
I2	Protective dummy plug		NOTED
I3	Requirements for the protective dummy plugs		NOTED
I3.1	Construction		NA
I3.1.1	Mechanical strength		NA
I3.1.2	Material		NA
I3.2	Insertion and withdrawal		NA
I3.3	Dimensions		NA
I3.3.1	Pin dimensions		NA
I3.3.2	Maximum plug radius		NA
I3.3.3	High voltage test		NA
I3.4	Pin bending test		NA
Appendix J	Equipment with integral pins for insertion into socket-outlets		C
J1	Scope		NOTED
J2	Requirements for plug portion		NOTED
J2.1	Definition		NOTED
J2.1.1	Plug portion		NOTED
J2.2	<i>Requirements</i>		NOTED
J2.2.1	Plug pins of plug portions	Refer clause 2.2	C

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J2.2.2	Rating and dimensions for low voltage plug portions	Refer clauses 2.8.1 & 2.8.4	C
J2.2.3	Internal connections for plug portions	Refer clause 2.9	C
J2.2.4	Arrangement of earthing connections for plug portions	Refer clause 2.10	C
J2.2.5	Configuration of plug portions	Refer clause 2.12.6	C
J2.2.6	Tests		C
J2.2.6.1	General		NOTED
J2.2.6.2	High Voltage Test	Refer clause 2.13.3	C
J.2.2.6.3	Mechanical Strength of pin test		C
J.2.2.6.3.1	Tumbling Barrel Test	Refer clause 2.13.7.1	C
J.2.2.6.3.2	Pin Bending test	Refer clause 2.13.7.2	C
J.2.2.6.4	Temperature rise test	Refer clause 2.13.8	C
J2.2.6.5	Securement of pins of the plug portion	Refer clause 2.13.9	C
J2.2.6.6	Test on the insulation	Refer clause 2.13.13	C
J2.2.6.7	Equipment with integral pins intended to be supported by the contacts of a socket-outlet		C

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2.8.1	TABLE: Dimensions of low voltage plugs					C
Plug Type: 10A configuration,		Figures: a1, a2, & c				
Dimension	≤10 A Min Tolerance	≤10 A ≤10 A	Max Tolerance	Tolerance	Measured (mm)	C or NA
A metal (L)	6.2	6.35	6.5	± 0.15	6.31	C
A insulation (L)	6.2	6.35	6.5	± 0.15	6.33	C
A metal (N)	6.2	6.35	6.5	± 0.15	6.31	C
A insulation (N)	6.2	6.35	6.5	± 0.15	6.33	C
B Earth	6.2	6.35	6.5	± 0.15	6.28	C
C metal (L)	1.58	1.63	1.78	+0.15, -0.05	1.62	C
C metal (N)	1.58	1.63	1.78	+0.15, -0.05	1.62	C
C metal (E)	1.58	1.63	1.78	+0.15, -0.05	1.57	C
C insulation (L)	1.58	1.63	1.78	+0.15, -0.05	1.63	C
C insulation (N)	1.58	1.63	1.78	+0.15, -0.05	1.63	C
D	-	7.92	-	↑	Use gauge	C
E	-	10.31	-	↑	Use gauge	C
F metal (L)	16.66	17.06	17.46	± 0.4	16.79	C
F insulation (L)	8.2	8.7	9.2	± 0.5	8.50	C
F metal (N)	16.66	17.06	17.46	± 0.4	16.78	C
F insulation (N)	8.2	8.7	9.2	± 0.5	8.50	C
G earth pin	19.14	19.94	20.74	± 0.8	20.23	C

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2.8.1	TABLE: Dimensions of low voltage plugs				NA
Plug Type: 15A & 20 A configuration		Figures:		a1 & a2	
Dimension	15 A Fig a1	20 A Fig a2	Tolerance	Measured (mm)	C or NA
A metal (L)	6.35	9.08	± 0.15		NA
A insulation (L)	6.35	6.35	± 0.15		NA
A metal (N)	6.35	6.35	± 0.15		NA
A insulation (N)	6.35	6.35	± 0.15		NA
B	9.08	9.08	± 0.15		NA
C *	1.63	1.63	+0.15, -0.05		NA
D	7.92	7.92	↑		NA
E	10.31	10.31	↑		NA
F metal	17.06	17.06	± 0.4		NA
F insulation	8.7	8.7	± 0.5		NA
G earth pin	19.94	19.94	± 0.8		NA
N	-	3.18	↑		NA

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2.8.1	TABLE: Dimensions of low voltage plugs					C
Case dimensions						
Upper limit	Measured	Dimension	Lower limit	C or NA		
> 27 mm	19.86	Centre to top	< 21.9	C		
> 27 mm	19.36	Centre to base	< 21.9	C		
> 27 mm	19.61	Centre to left side	< 21.9	C		
> 27 mm	19.59	Centre to right side	< 21.9	C		
-	8.9	Plug depth	Min 8.6mm	C		
42 mm dia	39.83	Plug dia (base)	-	C		
42 mm dia	39.22	Plug dia at pin face	38 mm dia	C		
Plug Type: 125 V max, figure b						
Dimension	10 A	Tolerance	Measured (mm)	C or NA		
H	6.35	± 0.15		NA		
L *	1.63	± 0.15		NA		
J	6.35	↑		NA		
K	17.06	± 0.4		NA		
M	12.70	↑		NA		
Plug Type: 10 A Round pins, figures f & g						
Dimension	10 A (Min tolerance)	10 A	10 A (Max Tolerance)	Tolerance	Measured (mm)	C or NA
A	6.2	6.35	6.5	± 0.15		NA
C *	1.58	1.63	1.78	+0.15, -0.05		NA
D	-	7.92	-	↑		NA
E	-	10.31	-	↑		NA
F	16.66	17.06	17.46	± 0.4		NA
G earth pin	19.14	19.94	20.74	± 0.8		NA
P	4.7	4.75	4.8	± 0.05		NA
↑ Dimensions without tolerances are nominal. Samples are to be checked with the gauge specified in Appendix A, B or F of AS/NZS 3112 as appropriate.						

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2.13.2	TABLE: insulation resistance measurements			C
Initial Insulation resistance IR between:		IR (MΩ)	Required IR (MΩ)	
Between all poles of the plug		>10	≥ 5 MΩ	
Between live poles of the plug and external metal		NA	≥ 5 MΩ	
Between live poles of the plug and the earth terminal		>100	≥ 5 MΩ	
Between live poles non-conductive parts		>100	≥ 5 MΩ	
For insulated pin plugs		>100	≥ 5 MΩ	

2.13.2	TABLE: insulation resistance measurements			C
Insulation resistance IR (Following 2.13.13.3) between:		IR (MΩ)	Required IR (MΩ)	
For insulated pin plugs		>100	≥ 5 MΩ	

2.13.2	TABLE: insulation resistance measurements			C
Insulation resistance IR (Following 2.13.13.4) between:		IR (MΩ)	Required IR (MΩ)	
For insulated pin plugs		>100	≥ 5 MΩ	

2.13.3	TABLE: electric strength measurements			C
Initial High Voltage Test		Test voltage (V)	Breakdown (Yes/No)	
1000 V applied between all poles of the plug taken in pairs		1000	No	
3500 V applied between live poles of the plug and external metal		-	NA	
1000 V applied between live poles and earthing terminal of exposed metal		-	NA	
3500 V applied between live poles and parts handled in service		3500	No	
1250 V applied between live poles & 4 mm wide metal foil wrapped around insulation on each live pin		1250	No	

2.13.3	TABLE: electric strength measurements			C
High Voltage Test (Following 2.13.13.3)		Test voltage (V)	Breakdown (Yes/No)	
1000 V applied between all poles of the plug taken in pairs		1000	No	
3500 V applied between live poles of the plug and external metal		-	NA	
1000 V applied between live poles and earthing terminal of exposed metal		-	NA	
3500 V applied between live poles and parts handled in service		3500	No	
1250 V applied between live poles & 4 mm wide metal foil wrapped around insulation on each live pin		1250	No	

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2.13.3	TABLE: electric strength measurements		C
High Voltage Test (Following 2.13.13.4)		Test voltage (V)	Breakdown (Yes/No)
1000 V applied between all poles of the plug taken in pairs		1000	No
3500 V applied between live poles of the plug and external metal		-	NA
1000 V applied between live poles and earthing terminal of exposed metal		-	NA
3500 V applied between live poles and parts handled in service		3500	No
1250 V applied between live poles & 4 mm wide metal foil wrapped around insulation on each live pin		1250	No

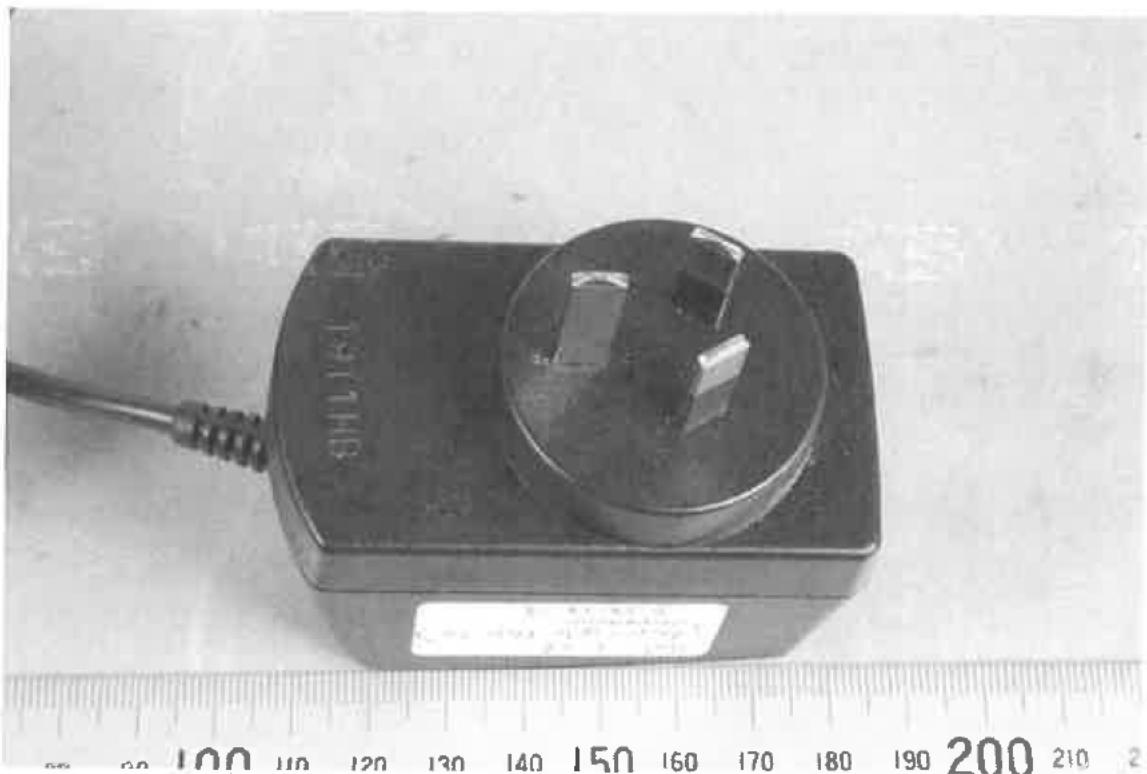
2.13.8	TABLE: Temperature rise test		C
Temperature Rise dT of Pins		dT (K)	
Test Condition No.		Active	Neutral
1.1 x Rated output		5.4K	5.4K
		Limit	
		Max dT (K)	
		45	

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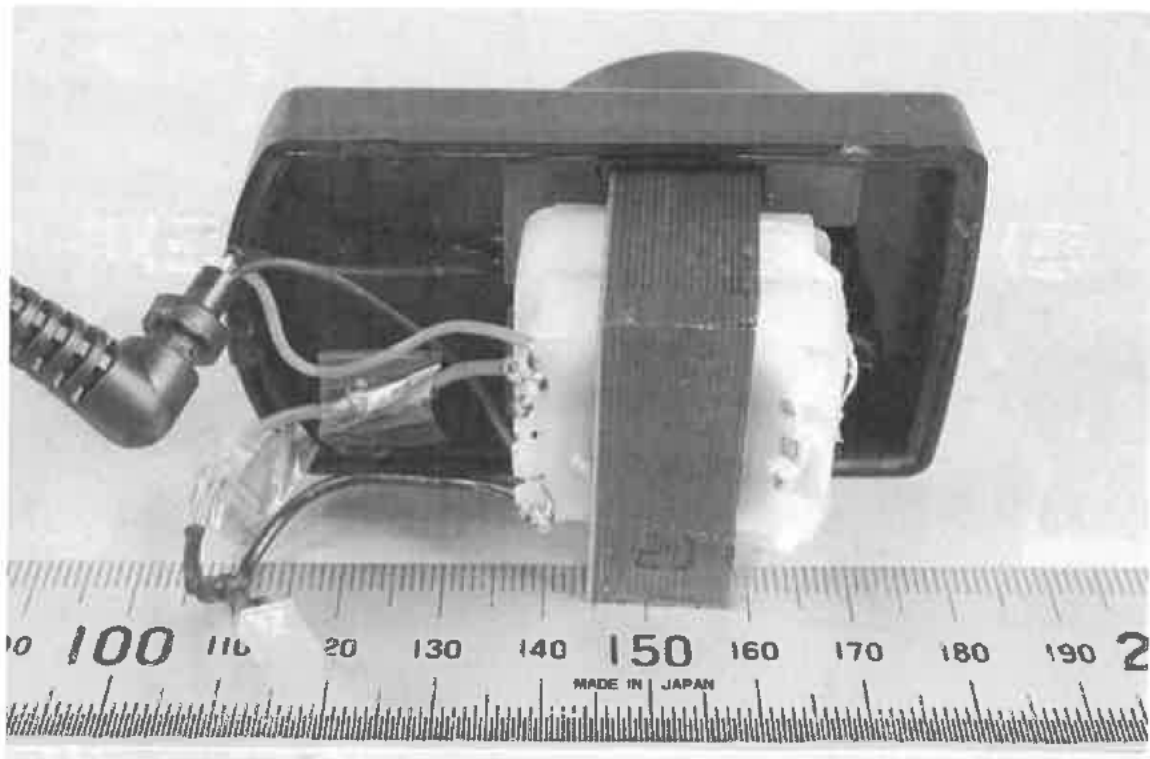
VIPAC
Engineers & Scientists

Appendix A

Test Report 30V-13-0145-TRP-335418-0
Appendix A : Photographs



Test Report 30V-13-0145-TRP-335418-0
Appendix A : Photographs



Test Report 30V-13-0145-TRP-335418-0

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Appendix B

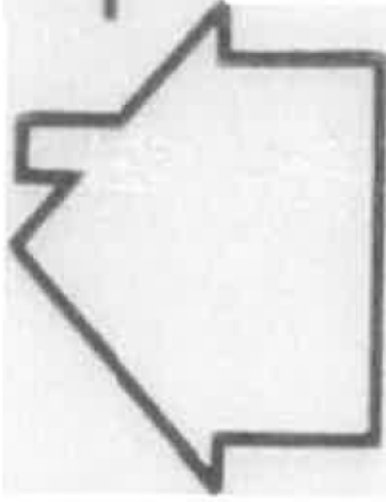
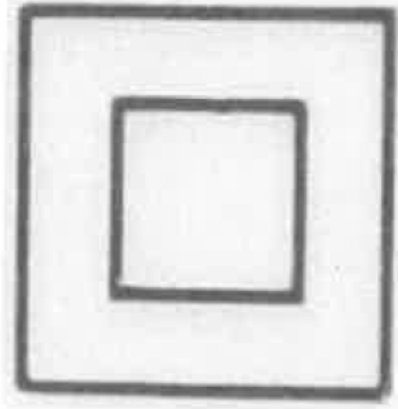
AC/AC ADAPTOR

MODEL:

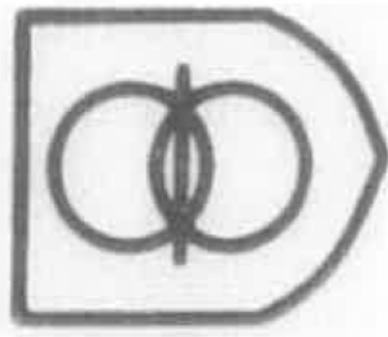
PRI: 230-240V --- 50HZ 35mA

SEC: 9V --- 300mA (TV) 2Ja

MADE IN CHINA



125°C



F