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APPLICATION FOR TRACKING TESTING

On Behalf of

INNOV ELECTRONICS TECH CO.,LTD

Enclosure of Switching Power supply

Model(s): IVPxxxx-yyyy

Prepared For : **INNOV ELECTRONICS TECH CO.,LTD**
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Date of Test : **May 26, 2015 to May 27, 2015**
Date of Report : **May 28, 2015**
Report Number : **ED150525218S**

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TEST REPORT

IEC/EN 60112

Method for the determination of the proof and the comparative tracking indices of solid insulating materials

Report reference No. ..... :	ED150525218S
Compiled by (name + signature)..... :	Bill Li
Approved by (name + signature)..... :	Eric Duan
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Testing Laboratory Name ..... :	DONGGUAN EMTEK CO., LTD.
Address ..... :	No.281, Guantai Road, Nancheng District, Dongguan Guangdong, China.
Testing location / address ..... :	Same as above
Applicant's Name ..... :	INNOV ELECTRONICS TECH CO.,LTD
Address ..... :	12,NO.4 xiang yue Road,High tech industrial zone,xiang'an Xiamen
Manufacturer ..... :	INNOV ELECTRONICS TECH CO.,LTD
Address ..... :	12,NO.4 xiang yue Road,High tech industrial zone,xiang'an Xiamen
Factory..... :	INNOV ELECTRONICS TECH CO.,LTD
Address ..... :	12,NO.4 xiang yue Road,High tech industrial zone,xiang'an Xiamen
Test specification	
Standard..... :	EN 60112:2003+A1:2009
Non-standard test method ..... :	N/A
Test Report Form No..... :	60112A
Test Report Form(s) Originator..... :	Emtek
Master TRF ..... :	Dated 2014-6
Test item description ..... :	PTI test
Product name ..... :	Enclosure of Switching Power supply
Trademark ..... :	N/A
Model and/or type reference ..... :	CX7240(GG)
Rating(s) (V; Hz)..... :	--

Possible test case verdicts:

- test case does not apply to the test object.....: N/A
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

Testing:

Date of receipt of test item .....: May 25, 2015

Date (s) of performance of tests.....: May 26, 2015 to May 27, 2015

General information:

Those samples are plastic enclosure for power supply, Entrusted test: PTI 225V.
All products provided by the applicant have same material except different shape, size and colour.
The back and rear enclosure are made from the same material, and tests were carried out on white and black plastic enclosure separately.
The material information for samples see below table:

NO.	Enclosure supplier	Material manufacturer	Type	Material	UL NO.
A	INNOV ELECTRONICS TECH CO.,LTD	SABIC INNOVATIVE PLASTIC PLASTICS BV	CX7240(GG)	PC/ABS	E45329

Summary of testing:

The samples have been tested according to standard IEC/EN 60112.
And the test results: Pass PTI 225.

IEC/EN 60112			
Clause	Requirement + Test	Result - Remark	Verdict
5	**Test specimen**		**P**
	Any approximately flat surface may be used, provided that the area is sufficient to ensure that during the test no liquid flows over the edges of the test specimen		P
	The thickness of the test specimen shall be 3 mm or more. Individual pieces of material may be stacked to obtain the required thickness of at least 3 mm.	2.6 mm for one layer 2 layers	P
	Test specimens shall have nominally smooth and untextured surfaces which are free from surface imperfections such as scratches, blemishes, impurities, etc, unless otherwise stated in the product standard. If this is impossible, the results shall be reported together with a statement describing the surface of the specimen because certain characteristics on the surface of the specimen could add to the dispersion of the results.		P
	For tests on parts of products, where it is impossible to cut a suitable test specimen from a part of a product, specimens cut from moulded plaques of the same insulating material may be used. In these cases care should be taken to ensure that both the part and the plaque are produced by the same fabrication process wherever possible. Where the details of the final fabrication process are unknown, methods given in ISO 293, ISO 294-1 and ISO 294-3 and ISO 295 may be appropriate.		N/A
	In special cases, the test specimen may be ground to obtain a flat surface.		N/A
	Where the direction of the electrodes relative to any feature of the material is significant, measurements shall be made in the direction of the feature and orthogonal to it. The direction giving the lower CTI shall be reported, unless otherwise specified.		N/A
6	**Test specimen conditioning**		
6.1	Environmental conditioning		
	Unless otherwise specified, the test specimens shall be conditioned for a minimum of 24 h at 23 °C ± 5 °C, with (50 ± 10) % RH.		
6.2	Test specimen surface state		
	Unless otherwise specified,		
	a) tests shall be made on clean surfaces;		
	b) Any cleaning procedure used shall be reported. Wherever possible, the details shall be agreed between supplier and customer.		
8	**Basic test procedure**		

IEC/EN 60112			
Clause	Requirement + Test	Result - Remark	Verdict
8.1	General		
	Where the material is substantially anisotropic, tests shall be made in the direction of the features and orthogonal to them. Results from the direction giving the lower values shall be used, unless otherwise specified.		
	Test shall be made at an ambient temperature of (23 ± 5) °C.		
	Tests shall be made on uncontaminated test specimens, unless otherwise specified.		
	The result of a test where a hole is formed is considered to be valid, irrespective of the test specimen thickness, but the formation of the hole shall be reported together with the depth of the hole (the thickness of the test specimen or stack).		
8.2	Preparation		
	After each test, clean the electrodes with an appropriate solvent and then rinse them with deionized water. If necessary, restore their shape and give a final rinse before the next test.		
	Immediately before the test ensure, if necessary by cooling the electrodes, that their temperature is sufficiently low so that they have no adverse effect on the specimen properties.		
	Ensure freedom from visual contamination and ensure that the solution to be used conforms to the conductivity requirements either by regular testing, or by measurement immediately before the test.		
	In case of dispute, the cleaning procedures used for the electrodes and dropper tube shall be agreed between purchaser and supplier.		
	Place the test specimen, with the test surface uppermost and horizontal on the specimen support table. Adjust the relative height of the test specimen and electrode mounting assembly, such that on lowering the electrodes on to the specimen, the correct orientation is achieved with a separation of 4,0 mm ± 0,1 mm. Ensure that the chisel edges make contact with the surface of the specimen with the required force and over their full width.		
	Set the test voltage to the required value which shall be an integer multiple of 25 V, and adjust the circuit parameters so that the short-circuit current is within the permitted tolerance.		
8.3	**Test procedure**		
	Start the dropping system so that drops fall on to the test surface and continue the test until one of the following occurs:		
	the over-current device operates		
	a) a persistent flame occurs		

IEC/EN 60112			
Clause	Requirement + Test	Result - Remark	Verdict
	c) at least 25 s have elapsed after the fiftieth (hundredth) drop has fallen without a) or b) occurring		
	After completion of the test, vent the chamber of noxious fumes and remove the test specimen		
9	**Determination of erosion**		
	When required, specimens which have not failed at the 50 drop point shall be cleaned of any debris or loosely attached degradation products and placed on the platform of a depth gauge. The maximum depth of erosion of each specimen shall be measured in millimetres to an accuracy of 0,1 mm, using a 1,0 mm nominal diameter probe having a hemispherical end. The result is the maximum of the five measured values.		
	Erosion depths of less than 1 mm are reported as <1 mm.		
	In the case of tests according to Clause 10, when required the erosion shall be measured on the specimens which withstood 50 drops at the specified voltage.		
	In the case of tests according to Clause 11, when required the erosion shall be measured on the five specimens tested at the maximum 50 drop voltage.		
10	**Determination of proof tracking index (PTI)**		**P**
10.1	Procedure		
	Where, in IEC standards for material or for electrical equipment specifications, or in other standards, a proof test only is required, 50 drop tests shall be made in accordance with Clause 8 but at the single voltage specified. The required number of specimens shall withstand the test period up to at least 25 s after the fiftieth drop has fallen without tracking failure, and without a persistent flame occurring.		
	Operation of the over-current device by air arcs does not constitute a tracking failure.		
	The proof voltage shall be an integer multiple of 25 V.		
10.2	Report		P
	The report shall include the following information:		P
	Identification of the material tested and details of any conditioning.	25.5°C	P
	Thickness of the specimens and the number of layers used to achieve this thickness	1 layer	P
	Nature of the test specimen surface where the original surface was not tested:	Smooth	P
	a) details of any cleaning process,		N/A
	details of any machining processes, e.g. grinding,		N/A

IEC/EN 60112			
Clause	Requirement + Test	Result - Remark	Verdict
	details of any coating on the tested surface.		N/A
	State of the surface before testing, with regard to surface imperfections, e.g. surface scratches, blemishes, impurities, etc.	No scratches, blemishes, impurities, etc	P
	The cleaning procedure used for the electrodes and dropper.		P
	Where the measurements were not made in an essentially draught free space, report on the approximate air flow rate.		N/A
	Orientation of the electrodes in relation to any known characteristics of the material.		N/A
	Report on the result of the proof tracking index test where there is no requirement for the determination of the degree of erosion as follows:		P
	Pass or fail at the specified voltage with an indication of the type of solution if Type B. EXAMPLE 'Pass PTI 175' or 'Fail PTI 175 M'.	PTI 225	P
	Where there is an erosion requirement the result shall be reported as follows:		N/A
	Pass or fail at the specified voltage with an indication of the type of solution if Type B, and the maximum depth of erosion. EXAMPLE 'Fail PTI 250 - 3', or 'Pass PTI 250 M - 3'.		N/A
	Where the erosion cannot be reported because the specimen flamed, this shall be reported.		N/A
	Where a hole developed through the specimen, its formation shall be reported together with an indication of its depth (specimen thickness).		N/A
	Where the tests were invalid due to air arcs, this shall be reported.		N/A
11	**Determination of comparative tracking index (CTI)**		**N/A**
11.1	General		N/A
	Determination of the comparative tracking index requires the determination of the maximum voltage at which five specimens withstand the test period for 50 drops without failure and whether, at a voltage of 25 V lower than the maximum 50 drop figure, the specimen withstands 100 drops. If this is not the case, the maximum 100 drop withstand voltage has to be determined.		N/A
11.2	Determination of the 100 drop point		N/A
	Using the basic procedure described in Clause 8, set the voltage at a selected level and make the test until at least 25 s have elapsed after the one hundredth drop has fallen or until previous failure occurs.		N/A
	If the behaviour of the material is unknown, it is recommended that the starting voltage be 350 V.		N/A
	If the over-current device operated due to the occurrence of an air arc above the test specimen, the test was invalid. Repeat the test procedure at		N/A

IEC/EN 60112			
Clause	Requirement + Test	Result - Remark	Verdict
	the same voltage using a new test specimen or site after cleaning the apparatus and following the procedure in Clause 8. If the same event occurs, repeat the test at progressively lower and lower voltages until a valid failure or pass occurs. Report the details of the tests (see 11.4).		
	If the over-current device operated due to the passage of an excessive current across the surface of the test specimen, or if a persistent flame occurred, the specimen failed the test at that voltage. Repeat the test on a new site/specimen using a lower test voltage after cleaning the apparatus, etc. as described in Clause 8.		N/A
	If none of the above occurred and at least 25 s elapsed after the one hundredth drop had fallen without the over-current device operating, the test is valid and the test specimen is considered to have passed. Repeat the test on new sites/specimens at progressively higher and higher voltages until the maximum voltage is established at which no failure occurred during the test period of up to at least 25 s after the one hundredth drop has fallen in the first five tests at that voltage. Five separate specimens or five sites on one plaque may be used for the tests after cleaning the apparatus and following the procedure described in Clause 8.		N/A
	If a hole appeared through the test specimen, record the result noting both that a hole was formed and the depth of the hole (the thickness of the test specimen or stack), and then continue the tests as described above.		N/A
	Where the properties of the test specimen are unknown, increases in test voltage at voltages above 400 V shall be limited to 50 V per test.		N/A
	Record, as the 100 drop result, the maximum voltage at which five specimens withstood the 100 drop period without failure.		N/A
	Continue by determining the maximum 50 drop withstand voltage.		N/A
11.3	Determination of the maximum 50 drop withstand voltage		N/A
	By inference from the 100 drop data, repeat the test procedure at an appropriate test voltage, using a new site/specimen and determine whether the specimen withstands the test for the period up to at least 25 s after the fiftieth drop has fallen.		N/A
	If the over-current device operated due to the occurrence of an air arc above the test specimen, the test was invalid. Repeat the test procedure at the same voltage using a new site/test specimen after cleaning the apparatus and following the procedure as described in Clause 8. If the same event occurs, repeat the test at progressively lower and lower voltages until a valid failure or pass		N/A

IEC/EN 60112			
Clause	Requirement + Test	Result - Remark	Verdict
	occurs. Report the details of the tests (see 11.4).		
	If the over-current device operated due to the passage of an excessive current across the surface of the test specimen, or if a persistent flame occurred, the specimen failed the test at that voltage. Repeat the test on a new ite/specimen using a lower test voltage after cleaning the apparatus, etc. as described in Clause 8.		N/A
	If none of the above occurred and at least 25 s elapsed after the fiftieth drop had fallen without the over-current device operating, the test was valid and the test specimen is considered to have passed.		N/A
	If a hole has not formed through the test specimen during the test, repeat the test on new sites/ specimens, at progressively higher and higher voltages until the maximum voltage is established at which no failure occurred during the test period of up to at least 25 s after the fiftieth drop has fallen in the first five tests at that voltage. Five specimens or five sites on one plaque may be used for the tests after cleaning the apparatus and following the procedure described in Clause 8.		N/A
	If a hole appeared through the test specimen, record the result noting both that a hole was Formed, and the depth of the hole (the thickness of the test specimen or stack), and then continue the tests as described above.		N/A
	The result of tests where a hole formed, irrespective of the test specimen thickness, are considered to be valid, but the formation of the hole shall be reported together with the depth of the hole (the thickness of the test specimen stack).		N/A
	Record, as the 50 drop result, the maximum voltage at which five specimens withstood the 50 drop period without failure.		N/A
11.4	Report		N/A
	The report shall include the following information:		N/A
1	Identification of the material tested and details of any conditioning.		N/A
2	Thickness of the specimens and number of layers used to achieve this thickness.		N/A
3	Nature of the test specimen surface where the original surface was not tested:		
	3.1 details of any cleaning process,		N/A
	3.2 details of any machining processes, e.g. grinding,		N/A
	3.3 details of any coating on the tested surface;		N/A
4	State of the surface before testing, with regard to surface imperfections, e.g. scratches, blemishes, impurities, etc.;		N/A
5	Cleaning procedure used for the electrodes and dropper;		N/A
6	Where the measurements were not made in an		N/A

IEC/EN 60112			
Clause	Requirement + Test	Result - Remark	Verdict
	essentially draught free space, report on the approximate air flow rate.		
7	Orientation of the electrodes in relation to any known characteristics of the material.		N/A
8	Report on the result of the comparative tracking index test where there is no requirement for the determination of the degree of erosion as follows:		N/A
	CTI the numerical value of the maximum 50 drop voltage, obtained in five consecutive tests (the numerical value of the highest 100 drop voltage determined in five consecutive tests, if more than 25 V below the maximum 50 drop figure), when appropriate followed by the letter “M” to indicate that Solution B was used. EXAMPLE ‘CTI 175’, ‘CTI 175 M’, or ‘CTI 400(350) M’		N/A
	Where there is an erosion requirement the result shall be reported as follows:		N/A
	CTI the numerical value of the maximum 50 drop voltage, obtained in five consecutive tests, (the numerical value of the highest 100 drop voltage determined in five consecutive tests, if more than 25 V below the maximum 50 drop figure), when appropriate followed by the letter “M” to indicate that Solution B was used – the maximum depth of erosion being in millimetres. EXAMPLE ‘CTI 275 - 1,2’, ‘CTI 375 M - 2,4,’ or ‘CTI 400(350) M - 3,4’		N/A
	If, for some reason (such as extensive flaming) the erosion cannot be measured, this shall be reported.		N/A
	Where a hole developed through the specimen, its formation shall be reported together with an indication of its depth (specimen thickness).		N/A
	Where the tests were invalid due to air arcs, this shall be reported.		N/A

Picture

Figure 1: Before test (for front enclosure)

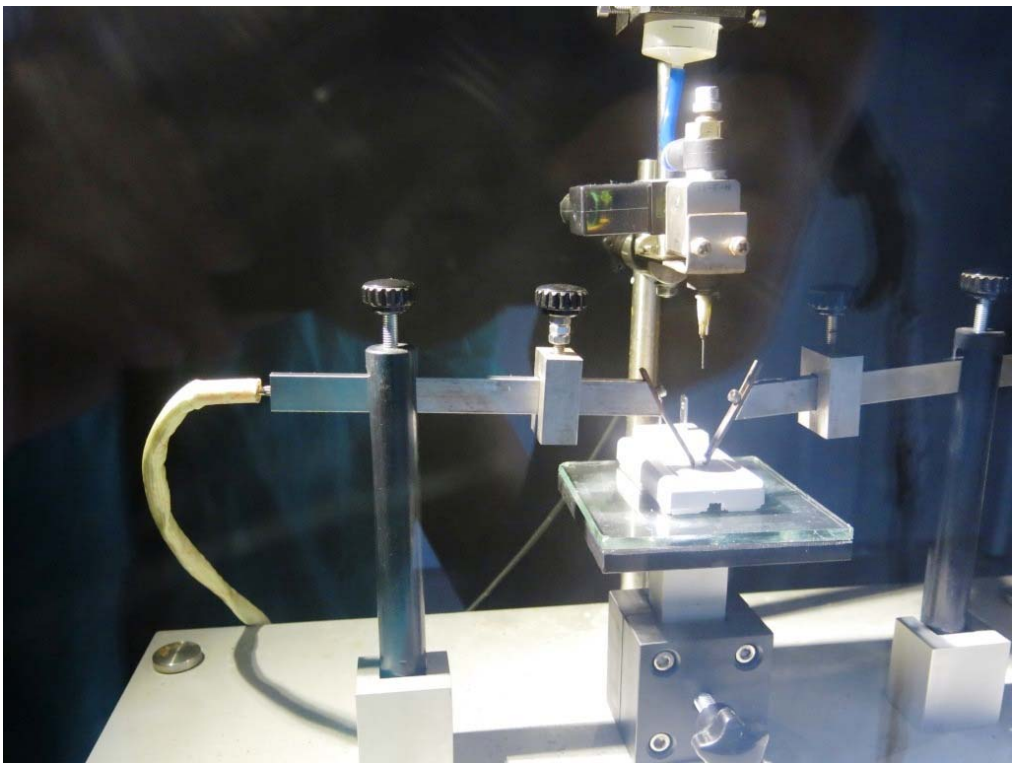

Figure 2: Under test (for front enclosure)

Picture

Figure 3: After test (for front enclosure)

Figure 4: Before test (for rear enclosure)

Picture

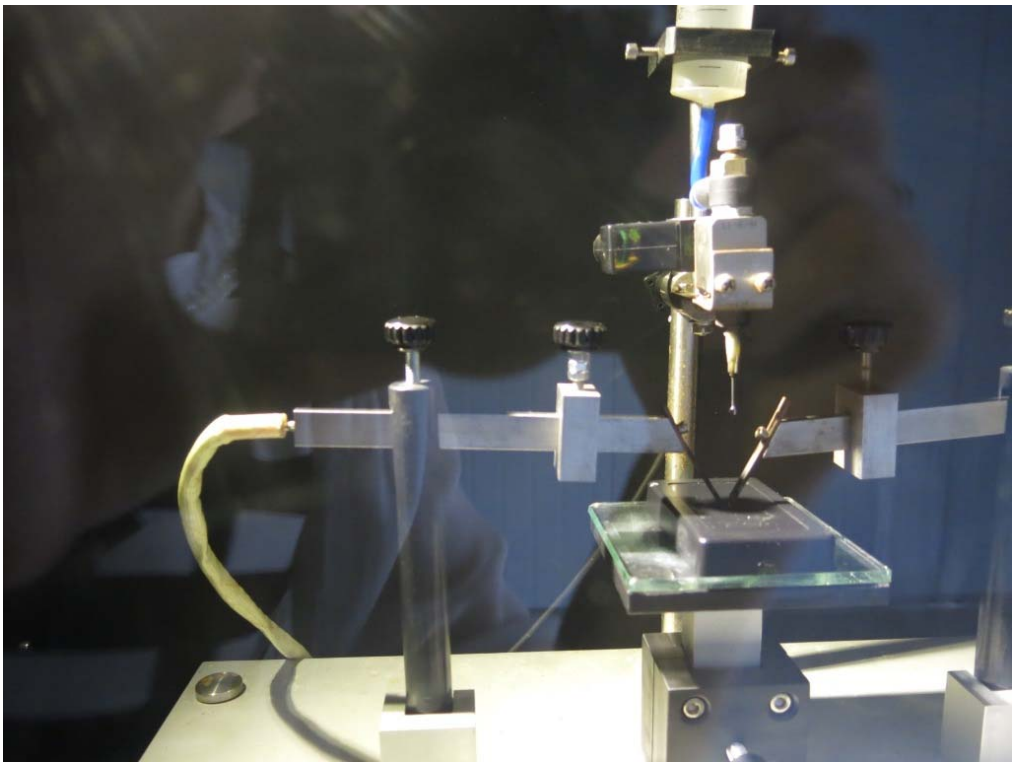

Figure 5: Under test (for rear enclosure)

Figure 6: After test (for rear enclosure)

Picture

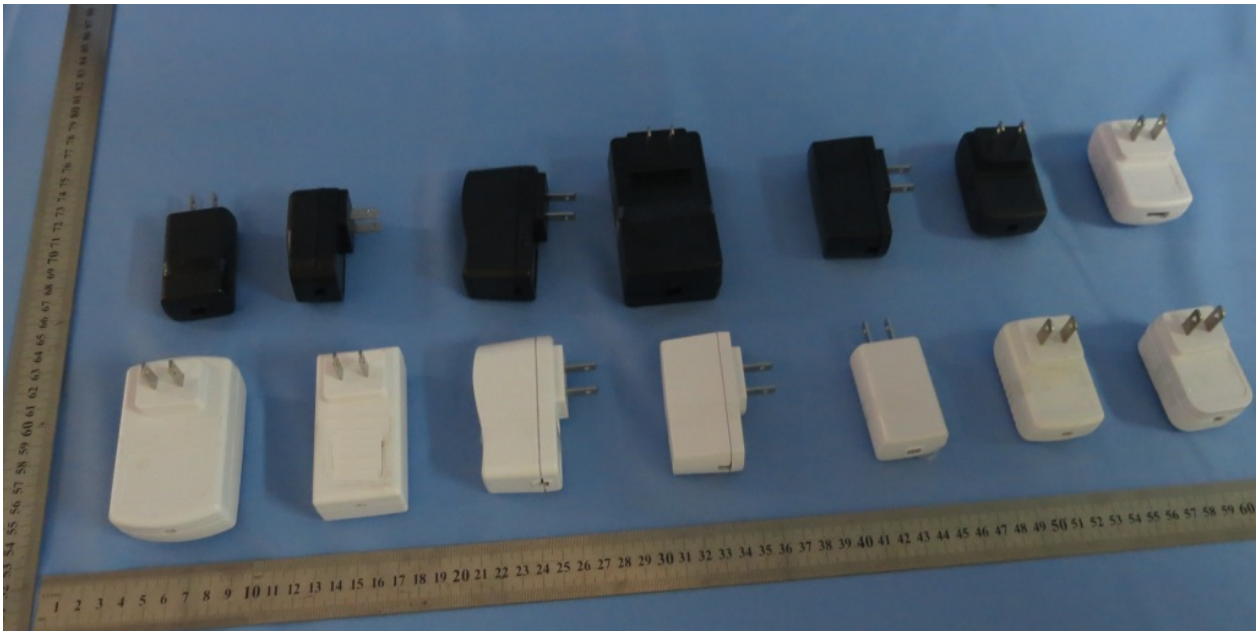

Figure 7: enclosure

==========END OF REPORT==========