IEC IECEE CB SCHEME

Ref. Certif. No.

SG PSB-OF-04698

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	Printers (3D Printer)
Name and address of the applicant	**Sindoh Co., Ltd.** 3, Seongsuiro24(isipsa)-gil Seongdong-gu, Seoul 04797 REPUBLIC OF KOREA
Name and address of the manufacturer	Sindoh Co., Ltd. 3, Seongsuiro24(isipsa)-gil, Seongdong-gu, Seoul 04797, REPUBLIC OF KOREA
Name and address of the factory	SINDOH (QINGDAO) CO., LTD. 1008 Emeisan-road, Qingdao Economics & Technology Development Zone, 266555 Qingdao, Shandong, PEOPLE'S REPUBLIC OF CHINA
Ratings and principal characteristics	Rated voltage: 100-240 V~ Rated frequency: 50/60 Hz Rated current: 2.5 A Protection class: I Laser class: 1
Customer's Testing Facility (CTF) Stage used	CTF STAGE 1
Model/type Ref.	A1+, A1
Additional information (if necessary)	Certificate SG PSB-IV-00298 issued 2019-02-15 is replaced by this version due to technical changes. See Test Report for National and Group Differences.
A sample of the product was tested and found to be in conformity with	IEC 60950-1:2005 IEC 60950-1:2005/AMD1:2009 IEC 60950-1:2005/AMD2:2013
as shown in the Test Report Ref. No. which forms part of this certificate	077-2376018-100

This CB Test Certificate is issued by the National Certification Body

CBS 073988 0108 Rev. 01
Date, 2019-07-04

(Havard Lee)

TÜV SÜD PSB Singapore

TÜV SÜD PSB Pte Ltd • 1 Science Park Drive • Singapore 118221

Trade mark (image)

Sindoh or Sindoh or Sindoh

Name and address of the factory (continued)

Sindoh Co., Ltd.
1138, Suncheonhyang-ro, Baebang-eup, Asan-si, Chungcheongnam-do 31479, REPUBLIC OF KOREA

Sindoh VINA Co., Ltd.
Lot CN15, Khai Quang Industrial Zone, Vinh Yen, 280000 Vinh Phuc, VIETNAM

Test Report issued under the responsibility of:

NCB TÜV SÜD PSB Pte Ltd
1 Science Park Drive, Singapore 118221

TEST REPORT

IEC/EN 60950-1
Information technology equipment – Safety – Part 1: General requirements

Report Number. .....:	077-2376018-100
Date of issue .....:	2019-07-01
Total number of pages.....	9 pages
Applicant's name.....:	Sindoh Co., Ltd.
Address .....:	3, Seongsuiro24(isipsa)-gil, Seongdong-gu, Seoul 04797, REPUBLIC OF KOREA
Test specification:	
Standard .....:	IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60950_1F
Test Report Form(s) Originator.....:	SGS Fimko Ltd
Master TRF.....:	Dated 2014-02

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	3D Printer
Trade Mark ..... :	Sindoh or Sindoh or Sindoh
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	A1+, A1
Ratings ..... :	100-240 V~, 50/60 Hz, 2.5 A, Class I equipment

Testing procedure and testing location:			
☐	**CB Testing Laboratory:**	N/A	
Testing location/ address ..... :		N/A	
☐	**Associated CB Testing Laboratory:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name + signature) ..... :			
Approved by (name + signature) ..... :			
☒	**Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address ..... :		Sindoh Co., Ltd. 3, Seongsuiro24(isipsa)-gil, Seongdong-gu, Seoul 04797, REPUBLIC OF KOREA	
Tested by (name + signature) ..... :		Chad. An / Engineer	.....
Approved by (name + signature) ..... :		Martin Kim / Manager	.....
☐	**Testing procedure: WMT/CTF Stage 2:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name + signature) ..... :			
Witnessed by (name + signature) ..... :			
Approved by (name + signature) ..... :			
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name + signature) ..... :			
Witnessed by (name + signature) ..... :			
Approved by (name + signature) ..... :			
Supervised by (name + signature) ..... :			

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

N/A

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
Clause 1.6.2 Input current Clause 4.5 Thermal requirements Clause 5.3 Abnormal operating and fault conditions	Sindoh Co., Ltd. 3, Seongsuiro24(isipsa)-gil, Seongdong-gu, Seoul 04797, REPUBLIC OF KOREA

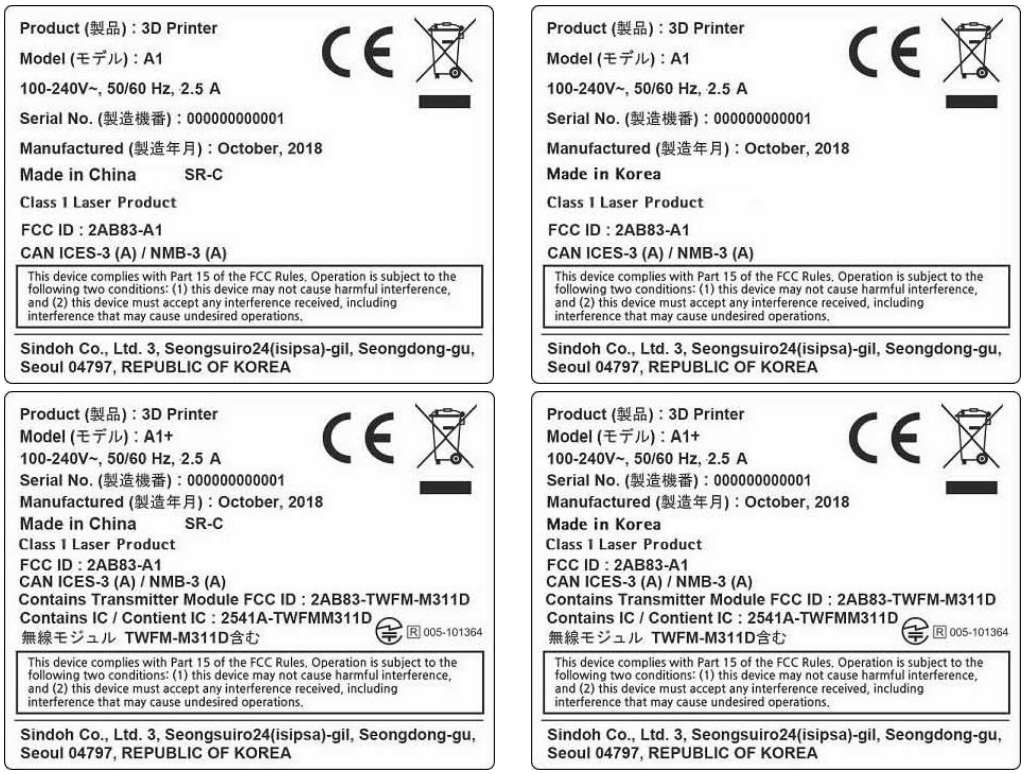
Summary of compliance with National Differences:

List of countries addressed: Compliance with European Special National Conditions, Annex ZB, and A-Deviations, Annex ZC, National Differences for Argentina (AR), Australia (AU), China (CN), Denmark (DK), Finland (FI), Germany (DE), Ireland (IE), Israel (IL), Japan (JP), Republic of Korea (KR), New Zealand (NZ), Norway (NO), Singapore (SG), Spain (ES), Sweden (SE), Switzerland (CH), United Kingdom (GB)

☒ The product fulfils the requirements of the standard IEC 60950-1:2005+A1:2009+A2:2013 and EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013.
When installing, all requirements of IEC 60950-1:2005+A1:2009+A2:2013 and EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 should be fulfilled.

Copy of marking plate:

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



Test item particulars	
Equipment mobility.....:	[] movable [] hand-held [] transportable [x] stationary [] for building-in [] direct plug-in
Connection to the mains.....:	[] pluggable equipment [x] type A [] type B [] permanent connection [x] detachable power supply cord [] non-detachable power supply cord [] not directly connected to the mains
Operating condition.....:	[x] continuous [] rated operating / resting time:
Access location .....:	[x] operator accessible [] restricted access location
Over voltage category (OVC) .....:	[] OVC I [x] OVC II [] OVC III [] OVC IV [] other:
Mains supply tolerance (%) or absolute mains supply values .....:	-10 %, +10 %
Tested for IT power systems .....:	[] Yes [x] No
IT testing, phase-phase voltage (V) .....:	N/A
Class of equipment .....:	[x] Class I [] Class II [] Class III [] Not classified
Considered current rating of protective device as part of the building installation (A) .....:	16 A
Pollution degree (PD) .....:	[] PD 1 [x] PD 2 [] PD 3
IP protection class .....:	IPX0
Altitude during operation (m) .....:	Up to 5000 m
Altitude of test laboratory (m) .....:	70 m
Mass of equipment (kg) .....:	Approximately 44.7 kg
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 .....:	2019-06-19
Date (s) of performance of tests.....:	2019-06-20 to 2019-06-26
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	

Remark 1: This modification report is to supplement the earlier CB Ref. Cert. No. SG PSB-IV-00298 (Test Report Ref. No.: 077-2376018-000)

Remark 2: 1. This modification report is to revise model differences.
2. This modification report is to add alternate components (PTC Heater and Air Pump Motor).
3. This modification report is to add factory (Sindoh VINA Co., Ltd.).
4. All additional tests were conducted with model A1+.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☒ **Yes** ☐ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :

Factory 1: SINDOH (QINGDAO) CO., LTD
1008 Emeisan-road, Qingdao Economics & Technology Development Zone, 266555 Qingdao, Shandong, PEOPLE'S REPUBLIC OF CHINA

Factory 2: Sindoh Co., Ltd.
1138, Suncheonhyang-ro, Baebang-eup, Asan-si, Chungcheongnam-do 31479, REPUBLIC OF KOREA

Factory 3: Sindoh VINA Co., Ltd.
Lot CN15, Khai Quang Industrial Zone, Vinh Yen, 280000 Vinh Phuc, VIETNAM

General product information:

1. The model A1+ and A1 are 3D Printer.
   - Derived A1 is identical to basic model A1+ except for only model designation.
2. All tests were conducted on the basic model A1+.
3. The maximum ambient temperature permitted by the manufacturer (Tma): 30 °C.

Abbreviations used in the report:

- normal conditions	**N.C.**	- single fault conditions	**S.F.C**
- functional insulation	**OP**	- basic insulation	**BI**
- double insulation	**DI**	- supplementary insulation	**SI**
- between parts of opposite polarity	**BOP**	- reinforced insulation	**RI**

Indicate used abbreviations (if any)

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1	**GENERAL**		P
1.5	**Components**		P
1.5.1	General		P
	Comply with IEC 60950-1 or relevant component standard	(see appended table 1.5.1)	P
1.5.2	Evaluation and testing of components	Certified components are used in accordance with their ratings, certifications and they comply with applicable parts of this standard. Components not certified are used in accordance with their ratings and they comply with applicable parts of IEC 60950-1 and the relevant component standard. Components, for which no relevant IEC standard exists, have been tested under the conditions occurring in the equipment, using applicable parts of IEC 60950-1.	P
1.6	**Power interface**		P
1.6.1	AC power distribution systems	TN Power system	P
1.6.2	Input current	(see appended table 1.6.2)	P
1.6.3	Voltage limit of hand-held equipment	Not hand-held equipment.	N/A
1.6.4	Neutral conductor	Neutral Conductor is insulated from Earth same as line conductor.	P
4	**PHYSICAL REQUIREMENTS**		P
4.5	**Thermal requirements**		P
4.5.1	General		P
4.5.2	Temperature tests	(see appended table 4.5)	P
	Normal load condition per Annex L ..... :	L.5	—
4.5.3	Temperature limits for materials	(see appended table 4.5)	P
4.5.4	Touch temperature limits	(see appended table 4.5)	P
4.5.5	Resistance to abnormal heat ..... :		N/A
5	**ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS**		**P**

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.3	**Abnormal operating and fault conditions**		P
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors	(see appended Annex B)	P
5.3.3	Transformers	(see appended Annex C)	P
5.3.4	Functional insulation ..... :	c)	P
5.3.5	Electromechanical components		N/A
5.3.6	Audio amplifiers in ITE ..... :	No audio amplifier in the equipment.	N/A
5.3.7	Simulation of faults	(see appended table 5.3)	P
5.3.8	Unattended equipment		N/A
5.3.9	Compliance criteria for abnormal operating and fault conditions		P
5.3.9.1	During the tests	No fire, emission of molten metal or deformation was noted during the tests.	P
5.3.9.2	After the tests	No reduction of clearance and creepage distances. Electric strength test is made on reinforced insulation.	P

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

1.5.1	TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
2. Motor, Fan, PTC Fan Heater, Interlock Switch					
AIR PUMP Motor	SKOOCOM ELECTRONIC CO., LTD.	SC6001PM	12 V d.c.	IEC/EN 60950-1	Tested in equipment
Alt.	**SHENZHEN WEIZHEN MOTOR CO., LTD.**	**MT3612V04**	**12 V d.c.**	**IEC/EN 60950-1**	**Tested in equipment**
PTC FAN HEATER	ShenZhen Lankeda Technology Co., Ltd.	LKD-PTC24V/100W	24 V d.c., 100 W	IEC/EN 60950-1	Tested in equipment
Alt.	**TAIWAN KING LUNG CHIN PTC CO., LTD.**	**SS-0204V0202B2Z01**	**24 V d.c., 100 W**	**IEC/EN 60950-1**	**Tested in equipment**
Frame, Gasket	BASF SE	A3X2G5	V-0, 115 °C, Min. 0.81 mm thickness	UL 94 UL 746	UL(E41871)
Supplementary information: **[1]) Provided evidence ensures the agreed level of compliance. See OD-CB2039**.					

1.6.2	TABLE: Electrical data (in normal conditions)					P
U (V)	I (Ah)	Irated (A)	P (Wh)	Fuse #	Ifuse (A)	Condition/status
90 V a.c.	2.19	-	195.1	F1	2.19	Max. Normal operating condition. 50 Hz, 0.5 A loaded for USB port.
100 V a.c.	1.92	2.5	192.5	F1	1.92	
240 V a.c.	0.80	2.5	191.0	F1	0.80	
264 V a.c.	0.76	-	199.0	F1	0.76	
90 V a.c.	2.23	-	202.0	F1	2.23	Max. Normal operating condition. 60 Hz, 0.5 A loaded for USB port.
100 V a.c.	1.95	2.5	195.4	F1	1.95	
240 V a.c.	0.82	2.5	196.0	F1	0.82	
264 V a.c.	0.75	-	197.1	F1	0.75	
Supplementary information:						

IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	**TABLE: Thermal requirements**					P
	Supply voltage (V) ..... :	264 V / 60 Hz				—
	Ambient T_{min} (°C) ..... :	25.3				—
	Ambient T_{max} (°C) ..... :	25.3				—
Maximum measured temperature T of part/at.....:		T (°C)				Allowed T_{max} (°C)
DC motor near heater(Air Pump Motor)		44.7				100
PTC Heater cover (Upper)		64.4				85
PTC Heater cover (Lovwer)		47.9				85
Ambient		30 (25.3°C)				-

Supplementary information:
Maximum temperature T at Tma (30 °C) is calculated. (T at Tma = Tmeasured - Tamb + Tma)

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class

Supplementary information:

5.3	**TABLE: Fault condition tests**		P
	Ambient temperature (°C) ..... :	See below	—
	Power source for EUT: Manufacturer, model/type, output rating ..... :	-	—

Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Air pump motor	Locked	264	1h 40min.	F1	0.524	Unit operated continuously and then stopped after 10 min. with displaying the message on the LCD. No components damaged. Motor body: 26.4 °C (max temperatruer 31.4°C during the test) Ambient: 25.4 °C

Supplementary information: