



March 11, 2015

Mr. Seth Sinnema
Chief Technical Officer
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Our Reference: File E474577 Project 4786811961
Your Reference: PO06311
Subject: Preliminary Investigation of a Desktop 3D printer model KT-PR0035-XXXXXX (where X can be any numeric character or blank)

Dear Mr. Sinnema:

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

We have completed our preliminary review of the subject product, and this letter will serve as a preliminary report.

Please see our comments below that provide suggestions to consider when responding to this letter.

For the record, the subject product is being evaluated to the following standards:

- *UL 60950-1 (2nd Edition + Amendment 1) Information Technology Equipment – Safety – Part 1: General Requirements - Edition 2 - Revision Date 2011/12/19.*
- *CSA C22.2 No. 60950-1-07 (2nd Edition + Amendment 1) Information Technology Equipment Safety Part 1: General Requirements - Edition 2 - Revision Date 2011/12/19.*
- EN60950-1:2006 + A1:2010 + A11:2009 + A12:2011 Information Technology Equipment - Safety -- Part 1: General Requirements - Edition N/A - Revision Date 2011/01/01
- IEC 60950-1 (2nd Edition + Amendment 1) Information Technology Equipment - Safety - Part 1: General Requirements - Edition 2 - Revision Date 2009/12/01

Unless otherwise noted, any paragraphs or sub-clauses referenced in this report will apply to these Standards.

PRODUCT DESCRIPTION

For the record, the product submitted for preliminary construction evaluation tentatively designated as “**KT-PR0035-XXXXXX**” is an early prototype and further redesign of the product is expected; additional construction review may be required prior to the complete evaluation of the product.

The product is a Class I, high performance desktop 3D printer employing an R/C (QQGQ2) Power Supply, various SELV circuitries, motors, gears, fans, extruders and movable heat table. Product design is further described in the attached draft report reference E474577-A1-CB-1.

CONSTRUCTION ISSUES

During the preliminary construction review of the end product, the following non-compliant issues have been identified.

1. The equipment under consideration in its current design employs various moving parts as well as large surface areas that operate at hazardous temperatures. These hazards are located in an Operator Accessible Areas and “shall be so arranged, enclosed or guarded as to reduce the risk of injury to persons.” The final product would have to comply with the requirements of Clause 4.4.1 and would have to provide a MECHANICAL ENCLOSURE.
2. In the current design of the desktop 3D printer, compartment where the PSU, USB board and the main fan are located is considered to be a FIRE ENCLOSURE. Clause 4.7.3.4 specifies that materials inside a fire enclosure should be of minimum V-2 Class. Unfortunately, fan manufactured by Runda type RSH8015B24N30 does not meet the requirements. In addition, USB printed wiring board should be at the minimum be rated V-1 or better.

The printing area of the desktop 3D printer model KT-PR0035-XXXXXX is not considered to be a Fire Enclosure, however, the standard in its Clause 4.7.3.3 specifies that materials outside a fire enclosure shall be of flammability Class HB or better except for connectors which shall be of Class V-2. Since most of the thermoplastic materials in this area of the printer were manufactured by 3D printing it was not possible to determine compliance to the requirements of *4.7.3.3 Materials for components and other parts outside fire enclosures*.

The standard allows for an exception to the requirement, however, due to the amount of material and the size of the components the exception for *“gears, cams, belts, bearings and other small parts that would contribute negligible fuel to a fire”* would not apply.

3. During the construction review of the product we were not able to verify that the following components were suitable for the intended use:
 - a. Appliance Inlet manufactured by Bulgin type PF0030/63.
 - b. Heater unknown manufacturer.
 - c. Heat Shrink unknown manufacturer.
 - d. Fuseholder for fuses F1-F3 unknown manufacturer.
 - e. Fan manufactured by Runda Electronics type RSH8015B24N30.

These and other critical components were identified and described in the attached draft reports.

TESTING

Testing of the final product design could be performed at any of the UL's facilities, at the manufacturing premises, or a combination of the two. If any testing is to be performed at the manufacturing facilities, acceptability of the testing equipment, consumables and facilities must be determined prior to the start of the evaluation.

Based on the information provided during the construction review, the following UL60950-1 tentative test plan is proposed:

- 1.6.2 - Input Test: Single-Phase
- 1.7.11 - Durability of Marking Test
- 2.1.1.1, 2.8.2, Access to Energized Parts Test
- 2.1.1.7 Capacitance Discharge Test
- 2.5 Limited Power Source Measurements
- 2.6.3.4, 2.6.1 Protective Bonding Test I
- 4.2.1 - 4.2.4 Steady Force Tests
- 4.2.6 Drop Test
- 4.5.1, 1.4.12, 1.4.13 Heating Test
- 5.1, Annex D Touch Current Test (Single-Phase; TN/TT System)
- 5.2.2 Electric Strength Test
- 5.3.1, 5.3.9 Abnormal Operation Tests

The above proposed test program is a tentative test plan and it may be modified at any time. Some tests could be waived and additional tests could be added based on the information provided during the full evaluation.

If you have any questions, please do not hesitate to contact us.

Sincerely,

Reviewed by:



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