



## Letter Report

2021-05-31

Mr. Shreyans Shingi  
Shingi Urja Pvt. Ltd  
Bldg. No. 13, Gala No. 43  
Samhita Complex, Andheri Kurla Road  
Sakinaka, Andheri (E)  
Mumbai, Maharashtra, 400072, INDIA

Reference: Project: 4789760205

Subject: Partial Discharge test of grade PF350BS under project# 4789760205

Dear Mr. Shreyans,

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

Please be informed that for the subject project, we have completed partial discharge testing at UL India. The summary is as follows.

Grade name	Test	Results
PF350BS	Partial Discharge test as per IEC 61730-2: Ed-1.1(2012)	Measured Extinction voltage (Mean) - 3.48 kV

Attached please find the data sheet as Appendix-1 to this letter and let us know if you need any clarifications.

Sincerely,	Reviewed by
V V RAY	AKIKO ARAI
Staff Engineer	Project Engineer
UL India Pvt. Ltd.,	
Tel: +91-80-41384400	
E-mail: V.V.Ray@ul.com	

**APPENDIX-1**

Number of pages in this package 09 [~~including additional pages \_\_\_\_\_~~]  
(Fill in when using printed copy as record)

CLIENT INFORMATION	
Company Name	Shingi Urja Pvt. Ltd.
Address	Bldg. No. 13, Gala No. 43 Samhita Complex, Andheri Kurla Road Sakinaka, Andheri (E) Mumbai, Maharashtra, 400072, INDIA

AUDIT INFORMATION:			
<input checked="" type="checkbox"/> Description of Tests	Per Standard No.	IEC 61730-2	Edition/ Date 1.1 / 2012-11
<input checked="" type="checkbox"/> Tests Conducted by <sup>1</sup>	K Viswanathan		
<input type="checkbox"/> UL Staff conducting or witnessing testing (WTDP, CTF Stage 1 or 2 only) <input type="checkbox"/> UL Staff supervising UL Staff in training			
<input type="checkbox"/> Authorized Signatory (CTDP, TPTDP, TCP, PPP, CTF Stage 3 or 4)			
		Printed Name	Signature. Include date for CTDP, TPTDP, TCP, PPP, CTF Stage 3 or 4

TESTS TO BE CONDUCTED:			
Test No.	Done <sup>3</sup>	Test Name	<input checked="" type="checkbox"/> Comments/Parameters <input type="checkbox"/> Tests Conducted by <sup>2</sup> <input type="checkbox"/> Link to separate data files <sup>4</sup>
1	Done	E1. PARTIAL DISCHARGE TEST (MST 15)	Completed

Instructions -

- 1 - When all tests are conducted by one person, name can be inserted here instead of including name on each page containing data.
- 2 - When test conducted by more than one person, name of person conducting the test can be inserted next to the test name instead of including name on each page containing data. Test dates may be recorded here instead of entering test dates on the individual datasheet pages.
- 3 - Use of this field is optional and may be employed differently. If used to include a date instead of entering the testing date on the individual datasheet pages, the date shall be the date the test was conducted.
- 4 - Link to separate data files for a test can be inserted here. The link must be to a server that is accessible to UL staff, that provides for backup, required retention periods and a path, including file name, that does not change and result in a broken link. Not applicable to DAP.

Special Instructions -

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

Ambient Temperature, °C                      ±                      Relative Humidity, %                      ±                      Barometric Pressure, mBar                      ±

No general environmental conditions are specified in the Standard(s) or have been identified that could affect the test results or measurements.

RISK ANALYSIS RELATED TO TESTING PERFORMANCE:

The following types of risks have been identified. Take necessary precautions. This list is not all inclusive.

<input type="checkbox"/> Electric shock	<input type="checkbox"/> Radiation
<input type="checkbox"/> Energy related hazards	<input type="checkbox"/> Chemical hazards
<input type="checkbox"/> Fire	<input type="checkbox"/> Noise
<input type="checkbox"/> Heat related hazards	<input type="checkbox"/> Vibration
<input type="checkbox"/> Mechanical	<input type="checkbox"/> Other (Specify)___

This set of datasheets covers a complete IEC 61730-2 test program.

This set of datasheets is part of a complete IEC 61730-2 test program. The test program is conducted according to the IEC re-test guidelines for acceptance of alternate constructions.

This set of datasheets covers re-testing of 2 samples of a module design following a single instance of non-compliance during the relevant test sequence under UL project [ ]. The 2 samples are to be subjected to the whole of the relevant test sequence.

Instructions to lab: Any conditions or test results signaling non-compliance with any of the tests in these datasheets are to be noted with explanation in the tables below and the responsible engineer for the project should be notified immediately.

Test name	IEC 61215 clause No.	Non-compliant result	Date

TEST LOCATION: (To be completed by Staff Conducting the Testing)					
<input checked="" type="checkbox"/> UL or Affiliate	<input type="checkbox"/> WTDP	<input type="checkbox"/> CTDP	<input type="checkbox"/> TPTDP	<input type="checkbox"/> TCP	<input type="checkbox"/> PPP
	<input type="checkbox"/> CTF	<input type="checkbox"/> CTF	<input type="checkbox"/> CTF	<input type="checkbox"/> CTF	
	Stage 1	Stage 2	Stage 3	Stage 4	
Company Name: UL INDIA PVT LTD					
Address: LABORATORY BUILDING, KALYANI PLATINA CAMPUS, SURVEY. NO. 129/4, EPIP ZONE, PHASE II, WHITEFIELD, IN - 560066, BANGALORE, INDIA					

TEST EQUIPMENT INFORMATION

UL test equipment information is recorded on Meter Use.

UL test equipment information is recorded on <<insert location and local laboratory equipment system identification.>>

Inst. ID No.	Instrument Type	Test Number +, Test Title or Conditioning	Function /Range	Last Cal. Date	Next Cal. Date

+ - If Test Number is used, the Test Number must be identified on the data sheet pages or on the Data Sheet Package cover page.

The following additional information is required when using client's or rented equipment, or when a UL ID Number for an instrument number is not used. The Inst. ID No. below corresponds to the Inst. ID No. above.

Inst. ID No.	Make/Model/Serial Number/Asset No.

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28-May-

Date 2021

**TEST SAMPLE IDENTIFICATION:**

The table below is provided to establish correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

Sample Card No.	Date Received	<input checked="" type="checkbox"/> Test No. +	Sample No.	Manufacturer, Product Identification and Ratings
3936553	2021-05-28	1		Shingi Urja Pvt. Ltd, PF350BS

+ - If Test Number is used, the Test Number or Numbers the sample was used in must be identified on the data sheet pages or on the Data Sheet Package cover page.

Sampling Procedure -

This document contains data or information using color and if printed, should be printed in color to retain legibility and the information represented by the color.

**E1. PARTIAL DISCHARGE TEST (MST 15)**

IEC 61730-2:2012 Clause 11.1

Polymeric materials which are intended for use as a superstrate or substrate, without appropriate IEC insulation pre-qualification must comply with the partial discharge test.

This test should be applied to any polymeric material serving as a superstrate or substrate.

## General:

The test shall be performed on 11 samples of the polymeric material under investigation.

The wave shape of the sinusoidal power frequency test voltage shall be substantially sinusoidal. This requirement is fulfilled if the ratio between the peak value and the r.m.s. value is  $\sqrt{2} \pm 3\%$ .

## Environmental Conditions:

Ambient:	Between 15 to 35 °C per IEC 60068-1, sub clause 5.3.1
Relative Humidity:	Between 25 to 75 RH per IEC 60068-1, sub clause 5.3.1
Air Pressure:	Between 86 to 106 kPA IEC 60068-1, sub clause 5.3.1

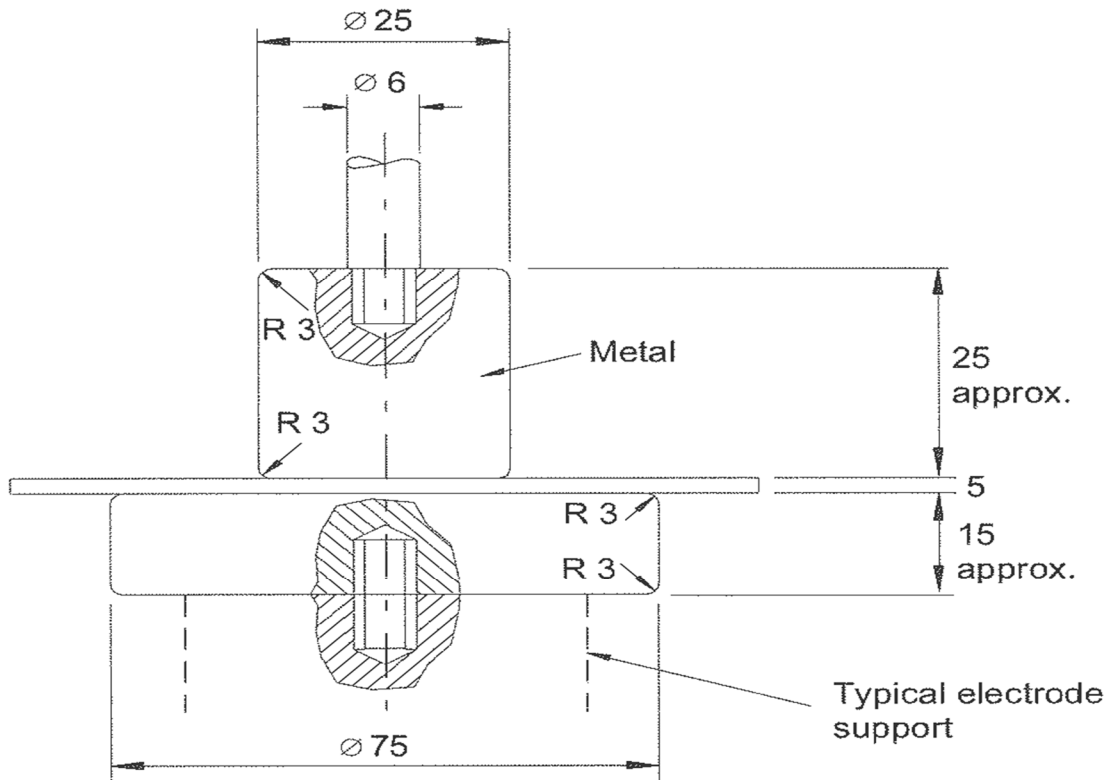
## Apparatus:

Calibrated charge measuring device or radio interference meter according to IEC 60664-1.

The test electrodes as described in Figure 1A of IEC 60243-1, Second Edition Standard, and the test samples were immersed in insulating oil, type Fluorinert FC- 40.

E1. PARTIAL DISCHARGE TEST (MST 15) (CONT'D): IEC 61730-2:2012 Clause 11.1

The electrodes/probes are described as follows:



IEC 018/98

Figure 1a – Unequal electrodes

E1. PARTIAL DISCHARGE TEST (MST 15) (CONT'D): IEC 61730-2:2012 Clause 11.1

METHOD

a) Starting from a value below the maximum system voltage, the voltage is increased to a level at which partial discharge takes place (inception voltage), defined as the level at which the charge intensity has exceeded a level of 1 pC and persisted at that level for a minimum of 60 seconds.

After reaching this level, the test voltage shall be further increased by 10 %.

b) The voltage shall then be lowered to the point at which the partial discharge extinction voltage is reached.

c) The extinction voltage shall be considered to be reached once the charge intensity has dropped to a value of 1 pC and persisted at that level for a minimum of 60 seconds.

This voltage shall be measured with an accuracy better than 5 %.

d) Repeat the measurement with 10 additional test samples.

The solid insulation has complied with the partial discharge test if the mean value minus the standard deviation of the partial discharge extinction voltage is greater than 1.5 times the given maximum system voltage.



E1. PARTIAL DISCHARGE TEST (MST 15) (CONT'D): IEC 61730-2:2012 Clause 11.1

Sample manufacturer	Shingi Urja Pvt. Ltd.
Sample type/model designation	PF350BS
Sample thickness (mm)	0.376 mm

## RESULTS

Ambient (°C)	24.8
Relative Humidity (%)	49.5
Barometric pressure (KpA)	911

Sample	INCEPTION		EXTINCTION	
	Measured voltage (kVdc)	Partial Discharge level (pC)	Measured voltage (kVdc)	Partial Discharge level (pC)
1	2.30	1.64	2.42	0.29
2	4.50	1.36	3.67	0.78
3	3.14	1.62	3.37	0.86
4	3.11	1.33	2.95	0.31
5	2.98	1.74	2.86	0.81
6	2.91	1.26	2.87	0.59
7	2.73	1.18	2.61	0.26
8	3.47	1.14	3.29	0.75
9	6.62	1.93	4.92	0.50
10	4.00	1.18	3.89	0.98
11	8.00	1.04	5.49	0.10

Measured Extinction voltage (Mean)kV	3.4855
Standard deviation (Extinction voltage)kV	0.9635
Extinction voltage (Mean - Std. Dev)kV	2.5219
Maximum system voltage in the end use (rated)kV	1.500
Maximum system voltage in end use - Peak kV	1.500
1.5 x Maximum system voltage - peak kV	2.2500

The mean value of the extinction voltage minus the standard deviation of the extinction voltage [is] [~~is not~~] greater than 1.5 times the peak of the maximum system voltage in the end use.

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