

सिपेट : एस. ए. आर. पि.-पॉलीमेरीक, मटेरीयल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला

रसायन एवं पेट्रोरसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/२५, सि.एन.आई.कॉम्प्लेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

**CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS**



CIPET सिपेट  
probe - perform - practice - Plastics

Dept. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India

B/25, C.N.I. Complex, Patia, Bhubaneswar-751 024, Odisha

Ph : 0674 - 2742852, 2740173, Fax : 0674 - 2740463

E-mail : larpm@cipet.gov.in, Web : www.larpm.gov.in

LARPM/CIPET/Testing/2023-24/

Date: 11.07.2023

To

Ms. Samiksha Ganeriwal

M/s. Kagzi Bottles Private Limited

Plot No. 6, KK owners society, doolapalli road,

phase 5, jeedimetla, Hyderabad-500055

Mob: 9999105362

Sub -Test Report -Reg.

Dear Sir,

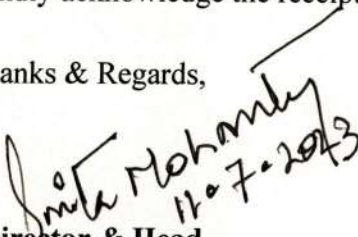
Ref. No: 1) SSF dated 19.05.2023

2) Our Work Order No.: LARPM/BBS./2023-24/053 dated 09.06.2023

With reference to the above cited subject, please find enclosed here with Test Report No. 00901 dated 11.07.2023.

Kindly acknowledge the receipt of the same.

Thanks & Regards,

  
Director & Head  
(Principal Scientist)

Encl: As above

सिपेट : एस. ए. आर. पि.-पॉलीमेरिक, मटेरियल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला

रसायन एवं पेट्रोरसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/ २५, सि.एन.आई.कॉम्प्लेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

**CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS**



CIPET सिपेट  
probe - perform - practice - Plastics

Dept. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India

B/25, C.N.I. Complex, Patia, Bhubaneswar-751 024, Odisha

Ph : 0674 - 2742852, 2740173, Fax : 0674 - 2740463

E-mail : larpm@cipet.gov.in, Web : www.larpm.gov.in

**CERTIFICATE OF ANALYSIS AS PER IS 14534: 2016**

LARPM/CIPET/Testing/2023-24/  
To

Date- 11.07.2023

M/s. Kagzi Bottles Private Limited  
Plot No. 6, KK owners society, Doolapalli road,  
Phase 5, Jeedimetla, Hyderabad-500055

Sub –Test Report–Reg.

Dear Sir,

Ref No.: 1) SSF dated 19.05.2023

2) Our Work Order No.: LARPM/BBS./2023-24/053 dated 09.06.2023

With reference to the above, the submitted sample “**Bamboo Based Bottle**” was mechanically recycled as per IS 14534:2016. The summary detail of testing & analysis is given below:

Name Of the sample	: “ <b>Bamboo Based Bottle</b> ”-as stated by the party
Test standard	: IS 14534: 2016
Report No	: 00901 dated 11.07.2023
Date of Initiation	: 09.06.2023
Date of Completion	: 11.07.2023

**ANALYSIS REPORT:**

The Identification of the received sample indicated presence of **Polyethylene (PE) & Fiber** which is evident from the stretching peaks in the FTIR as well as DSC melting transition at 129.35°C. The TGA analysis shows multi degradation at 489.41°C & 648.87°C with final residue of 2.27% at 800°C. Hence the above sample is Fiber reinforced **Polyethylene (PE)** based bottle.

Mechanical Recycling of the supplied sample was undertaken employing Twin Screw Extruder followed by injection moulding into molded specimens. The material was easily processable into molded specimens without any processing defects in the 1<sup>st</sup> to 3<sup>rd</sup> recycle. The properties viz. Density, MFI, Impact, Tensile Strength & Elongation did not show any appreciable change from recycle 1 to 3. Other Chemical and thermal properties of 1<sup>st</sup>, 2<sup>nd</sup>, & 3<sup>rd</sup> recycles is mentioned in the report to use in different application other than food contact & pharmaceutical applications.

Hence, from the above analysis it may be concluded that supplied sample i.e. “**Bamboo Based Bottle**” is recyclable & can be easily recycled to molded part.

Thanks & Regards,

  
Quality Manager

Encl: Analysis report

सिपेट : एस. ए. आर. पि.-पॉलीमेरिक, मटेरीयल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला

रसायन एवं पेट्रोसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/२५, सि.एन.आई.कॉम्प्लेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

**CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS**



CIPET सिपेट  
probe - perform - practice - Plastics

Dept. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India

B/25, C.N.I. Complex, Patia, Bhubaneswar-751 024, Odisha

Ph : 0674 - 2742852, 2740173, Fax : 0674 - 2740463

E-mail : larpm@cipet.gov.in, Web : www.larpm.gov.in

459255

ULR-TC56932300000072P

Page : 01 of 07

**ANALYSIS REPORT**

Report No. : 00901

Date : 11.07.2023

Issued to

To,

**M/s. Kagzi Bottles Private Limited**

**Plot No. 6, KK owners society, Doolapalli road,**

**Phase 5, Jeedimetla, Hyderabad-500055**

**Customer Ref. No. & Date : SSF dated 19.05.2023**

**Work order Ref. No. & Date : LARPM/BBS./2023-24/053 dated 09.06.2023**

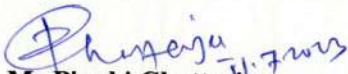
**As per Standard : As per part C**

**PART A: PARTICULARS OF SAMPLE SUBMITTED**

- a) Name of the Sample : "Bamboo Based Bottle"-as stated by the party.  
b) Grade/Variety/Type/Size/Class etc. : Nil.  
c) Code No. : Nil.  
d) Quantity (pcs./mtr/gm/nos) : 1.0 Kg (Approx.).  
e) Mode of packing  
(Sealed carton/polypouch/container or not) : Sample packed in carton.  
f) Date of receipt of sample : 08.06.2023 & 23.06.2023  
g) Date of Performance of test : 09.06.2023-11.07.2023  
h) Any other information : Nil

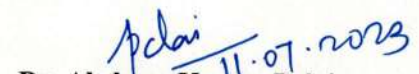
**PART B: SUPPLEMENTARY INFORMATION**

- a) Reference to sampling procedure : Drawn & supplied by the party  
b) Supporting documents for  
Measurements taken and results derived : As per part -C  
like graphs, tables, sketches and/or  
photographs as appropriate to test report  
If any (to be attached)  
c) Deviation from the test methods as : Nil  
prescribed in relevant ASTM/ISO/DIS/  
Work Instructions, If any--



**Mr. Pinaki Chatterjee**  
**(Technical Manager)**

**AUTHORISED SIGNATORY**



**Dr. Akshaya Kumar Palai**  
**(Quality Manager)**

**AUTHORISED SIGNATORY**

सिपेट : एस. ए. आर. पि.-पॉलीमेरिक, मटेरीयल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला

रसायन एवं पेट्रोरसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/२५, सि.एन.आई.कॉम्प्लेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS



Dept. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India

B/25, C.N.I. Complex, Patia, Bhubaneswar-751 024, Odisha

Ph : 0674 - 2742852, 2740173, Fax : 0674 - 2740463

E-mail : larpm@cipet.gov.in, Web : www.larpm.gov.in

459256

ULR-TC569323000000072P

Page : 02 of 07

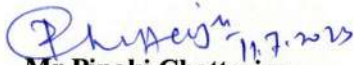
ANALYSIS REPORT

PART C: TEST RESULTS

Report No. : 00901

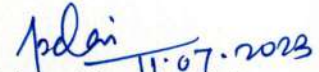
Date : 11.07.2023

Sl. No.	Name of the Test	Test Method /Standard	Unit	Result Obtained	Specified Requirement
Sample Details : “ Bamboo Based Bottle ” – as stated by the party.					
1	Material Recovery by Mechanical Recycling Input: -Pre-Consumer Plastic bottle Option:- Material Recovery Process:-Mechanical Recycling Output:- Finished Product				
1.1	Source Pre-consumer Source of Materials	IS 14534:2016 Cl. No 4.2.1	--	“ Bamboo Based Bottle” - As stated by party.	---
1.2	Identification of Material (Pre Recycle)				
1.2.1	FTIR Analysis	ASTM E 1252	--	(As per analysis sheet attached Annexure-I)	--
1.2.2	DSC (Scan Rate-10°C/min)	ASTM D 3418	°C	During 2 <sup>nd</sup> heating cycle thermal transition was observed at 129.35°C during cooling cycle thermal transition was observed at 114.73. (As per analysis sheet attached as Annexure-I)	--
1.2.3	TGA (RT-800 °C) (Scan Rate-10°C/min)	ASTM E 1868	--	Multi. Degradation temp: 489.41°C & 648.87 °C with Final residue of 2.27% at 800 °C (As per analysis sheet attached as Annexure-I)	--
Comments: From the above FTIR & DSC analysis it may be concluded that the base material of the supplied sample is Fiber reinforced Polyethylene (PE) based bottle. TGA Analysis shows multi. degradation temp 489.41°C & 648.87 °C with final residue of 2.27% at 800 °C .					

  
11.7.2023

Mr. Pinaki Chatterjee  
(Technical Manager)

AUTHORISED SIGNATORY

  
11.07.2023

Dr. Akshaya Kumar Palai  
(Quality Manager)

AUTHORISED SIGNATORY



ULR-TC569323000000072P

Page : 03 of 07

**ANALYSIS REPORT**

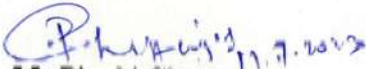
**PART C: TEST RESULTS**

Report No. : 00901

Date : 11.07.2023

Sl. No.	Name of the Test	Test Method/standard	Unit	Result Obtained	Specified Requirement
1.3	<b>Material Recovery (Cl. No 5.2)</b>				
1.3.1	<b>Sequence of Operation for Recyclate 1</b> Extruding /Specimen Preparation using injection moulding	IS 14534:2016 Cl. No 5.2.2.1 &5.2.2.3	--	Continuous strands indicating ease of recycling. The processability & molding of specimen was smooth.	--
1.3.2	<b>Sequence of Operation for Recyclate 2</b> Extruding /Specimen Preparation using injection moulding	IS 14534:2016 Cl. No 5.2.2.1 &5.2.2.3	--	Continuous strands indicating ease of recycling. The processability& molding of specimen was smooth.	--
1.3.3	<b>Sequence of Operation for Recyclate 3</b> Extruding /Specimen Preparation using injection moulding	IS 14534:2016 Cl. No 5.2.2.1 &5.2.2.3	--	Continuous strands indicating ease of recycling. The processability& molding of specimen was smooth.	--
2.0	<b>Quality Requirement (Cl. No 6)</b>				
2.1	<b>Contamination</b>		--	No Contamination	--
2.2	<b>Visual and Aesthetic Aspects</b>	IS 14534:2016 Cl. No 6.3	--	Fine Granules free from dust particles.	--

- Images attached as Annexure-II.

  
Mr. Pinaki Chatterjee  
(Technical Manager)  
AUTHORISED SIGNATORY

  
Dr. Akshaya Kumar Palai  
(Quality Manager)  
AUTHORISED SIGNATORY

सिपेट : एस. ए. आर. पि.-पॉलीमेरिक, मटेरीयल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला

रसायन एवं पेट्रोरसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/२५, सि.एन.आई.कॉम्प्लेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS



CIPET सिपेट  
probe · perform · practice · Plastics

Dept. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India

B/25, C.N.I. Complex, Patia, Bhubaneswar-751 024, Odisha

Ph : 0674 - 2742852, 2740173, Fax : 0674 - 2740463

E-mail : larpm@cipet.gov.in, Web : www.larpm.gov.in

459258

ULR-TC56932300000072P

Page : 04 of 07

ANALYSIS REPORT

PART C: TEST RESULTS

Report No. : 00901

Date : 11.07.2023

Sl. No.	Name of the Test	Test Method /standard	Unit	Result Obtained	Specified Requirement
2.3	Properties of Recyclate (Recycle-1)	IS 14534:2016 Cl. No 6.4	--	---	--
a.	Density(23 °C)	ASTM D 792	g/cc	0.976	--
b.	MFI at 190 °C, load: 2.16 kg, Procedure-A	ASTM D 1238	g/10min	0.167	--
c.	Tensile Stress at yield. Nominal Strain at break (Test speed: 50mm/min.)	ASTM D 638	MPa %	23.721 430.902	--
d.	Izod Impact Strength (notched)	ASTM D 256	J/m	No Break	--
e.	FTIR Analysis	ASTM E 1252	--	As per analysis sheet attached as Annexure-I	--
f.	DSC (Scan Rate-10°C/min)	ASTM D 3418	°C	During 2 <sup>nd</sup> heating cycle thermal transition was observed at 129.64°C during cooling cycle thermal transition was observed at 115.99. (As per analysis sheet attached as Annexure-I)	--
g.	TGA (RT-800 °C) (Scan Rate-10°C/min)	ASTM E 1868	--	Multi. Degradation temp 492.64°C & 656.61 °C with Final residue of 4.06% at 800 °C (As per analysis sheet attached as Annexure-I)	--

  
Mr. Pinaki Chatterjee  
(Technical Manager)

AUTHORISED SIGNATORY

  
Dr. Akshaya Kumar Palai  
(Quality Manager)

AUTHORISED SIGNATORY

# सिपेट : एस. ए. आर. पि.-पॉलीमेरीक, मटेरीयल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला

रसायन एवं पेट्रोसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/ २५, सि.एन.आई.कॉम्प्लेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

## CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS



CIPET सिपेट  
probe · perform · practice · Plastics

Dept. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India

B/25, C.N.I. Complex, Patia, Bhubaneswar-751 024, Odisha

Ph : 0674 - 2742852, 2740173, Fax : 0674 - 2740463

E-mail : larpm@cipet.gov.in, Web : www.larpm.gov.in



ULR-TC569323000000072P

Page : 05 of 07

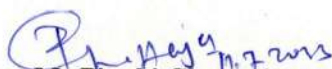
### ANALYSIS REPORT

#### PART C: TEST RESULTS

Report No. : 00901

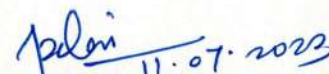
Date : 11.07.2023

Sl. No.	Name of the Test	Test Method /standard	Unit	Result Obtained	Specified Requirement
2.4	Properties of Recyclate (Recycle-2)	IS 14534:2016 Cl. No 6.4	--	---	--
a.	Density (23 °C)	ASTM D 792	g/cc	0.977	--
b.	MFI at 190 °C, load: 2.16 kg, Procedure-A	ASTM D 1238	g/10min	0.149	--
c.	Tensile Stress at yield Nominal Strain at break (Test speed: 50mm/min.)	ASTM D 638	MPa %	22.646 245.819	--
d.	Izod Impact Strength (notched)	ASTM D 256	J/m	No Break	--
e.	FTIR Analysis	ASTM E 1252	--	As per analysis sheet attached as Annexure-I	--
f.	DSC (Scan Rate-10°C/min)	ASTM D 3418	°C	During 2 <sup>nd</sup> heating cycle thermal transition was observed at 131.70°C during cooling cycle thermal transition was observed at 113.47. (As per analysis sheet attached as Annexure-I)	--
g.	TGA (RT-800 °C) (Scan Rate-10°C/min)	ASTM E 1868	--	Multi. Degradation temp 491.35°C & 654.03 °C with Final residue of 3.68% at 800 °C (As per analysis sheet attached as Annexure-I)	--

  
Mr. Pinaki Chatterjee

(Technical Manager)

AUTHORISED SIGNATORY

  
11.07.2023

Dr. Akshaya Kumar Palai  
(Quality Manager)

AUTHORISED SIGNATORY

# सिपेट : एस. ए. आर. पि.-पॉलीमेरीक, मटेरीयल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला

रसायन एवं पेट्रोरसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/२५, सि.एन.आई.कॉम्प्लेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

## CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS

Dept. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India

B/25, C.N.I. Complex, Patia, Bhubaneswar-751 024, Odisha

Ph : 0674 - 2742852, 2740173, Fax : 0674 - 2740463

E-mail : larpm@cipet.gov.in, Web : www.larpm.gov.in



CIPET सिपेट  
probe · perform · practice · Plastics



ULR-TC569323000000072P

Page : 06 of 07

### ANALYSIS REPORT

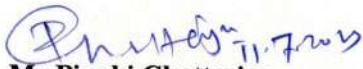
#### PART C: TEST RESULTS

Report No. : 00901

Date : 11.07.2023

Sl. No.	Name of the Test	Test Method /standard	Unit	Result Obtained	Specified Requirement
2.5	Properties of Recyclate (Recycle-3)	IS 14534:2016 Cl. No 6.4	--	--	--
a.	Density(23 °C)	ASTM D 792	g/cc	0.978	--
b.	MFI at 190 °C, load: 2.16 kg, Procedure-A	ASTM D 1238	g/10min	0.149	--
c.	Tensile Stress at yield Nominal Strain at break (Test speed: 50mm/min.)	ASTM D 638	MPa %	23.029 264.069	--
d.	Izod Impact Strength (notched)	ASTM D 256	J/m	No Break	--
e.	FTIR Analysis	ASTM E 1252	--	(As per analysis sheet attached as Annexure-I)	--
f.	DSC (Scan Rate-10°C/min)	ASTM D 3418	°C	During 2 <sup>nd</sup> heating cycle thermal transition was observed at 130.96°C during cooling cycle thermal transition was observed at 113.63. (As per analysis sheet attached as Annexure-I)	--
g.	TGA (RT-800 °C) (Scan Rate-10°C/min)	ASTM E 1868	--	Multi Degradation temp 492.64°C & 655.97 °C with Final residue of 3.73% at 800 °C (As per analysis sheet attached as Annexure-I)	--

Note: All analysis sheet attached as Annexure-I.



Mr. Pinaki Chatterjee  
(Technical Manager)

AUTHORISED SIGNATORY



Dr. Akshayu Kumar Palai  
(Quality Manager)

AUTHORISED SIGNATORY





**ULR-TC569323000000072P**

Page : 07 of 07

**ANALYSIS REPORT**

**PART C: TEST RESULTS**

Report No. : 00901

Date : 11.07.2023

**ANALYSIS REPORT:**

The Identification of the received sample indicated presence of **Polyethylene (PE) & Fiber** which is evident from the stretching peaks in the FTIR as well as DSC melting transition at 129.35°C. The TGA analysis shows multi degradation at 489.41°C & 648.87°C with final residue of 2.27% at 800°C. Hence the above sample is **Fiber reinforced Polyethylene (PE)** based bottle.

Mechanical Recycling of the supplied sample was undertaken employing Twin Screw Extruder followed by injection moulding into molded specimens. The material was easily processable into molded specimens without any processing defects in the 1<sup>st</sup> to 3<sup>rd</sup> recycle. The properties viz. Density, MFI, Impact, Tensile Strength & Elongation did not show any appreciable change from recycle 1 to 3. Other Chemical and thermal properties of 1<sup>st</sup>, 2<sup>nd</sup>, & 3<sup>rd</sup> recycles is mentioned in the report to use in different application other than food contact & pharmaceutical applications.

Hence, from the above analysis it may be concluded that supplied sample i.e. "**Bamboo Based Bottle**" is recyclable & can be easily recycled to molded part.

**PART D: REMARKS -NIL**

- Note:**
1. This Test Report / Certificate is issued only for the samples submitted to CIPET:SARP-LARPM.
  2. The results stated above related only to the items tested.
  3. The quality of the subsequent production lot has to be ensured by the purchaser.
  4. This Test Report shall not be reproduced except in full without the written approval of the laboratory.
  5. Any anomaly/discrepancy in this report should be brought to the notice of CIPET:SARP-LARPM within 30 days from the date of issue.
  6. Subcontracted Tests (if any): Nil.

**\*\* End of the Report \*\***

  
**Mr. Pinaki Chatterjee**  
**(Technical Manager)**  
**AUTHORISED SIGNATORY**

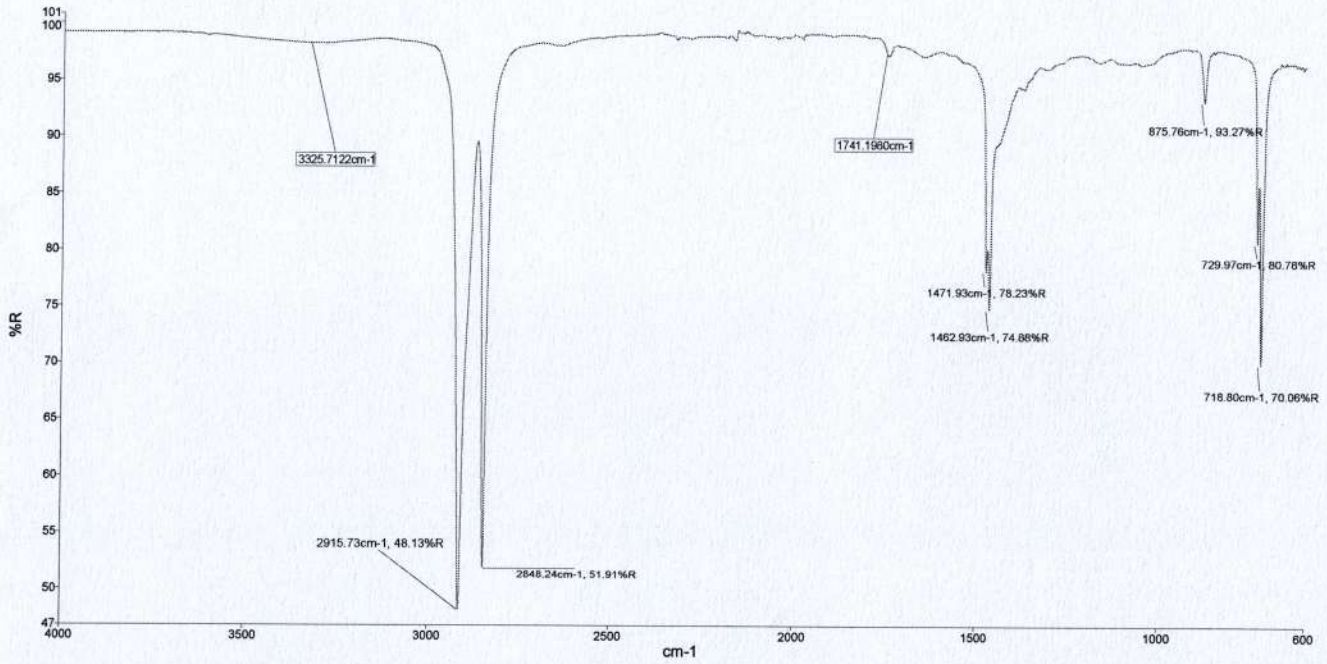
  
**Dr. Akshaya Kumar Palai**  
**(Quality Manager)**  
**AUTHORISED SIGNATORY**

ANALYSIS SHEET

TEST REPORT NO. -00901

DATE : 11.07.2023

FTIR Analysis :Pre-Recycle



Wave Number (cm <sup>-1</sup> )	Possible Nature of the Bond
3325.71	OH Stretch
2915.73, 2848.24	CH Stretch
1741.19	C=O Stretch
1471.93, 1462.93	CH <sub>2</sub> Bend
718.80, 729.97	CH <sub>2</sub> Rock

*Mr. Pinaki Chatterjee*  
**Mr. Pinaki Chatterjee**  
 (Technical Manager)  
 AUTHORISED SIGNATORY

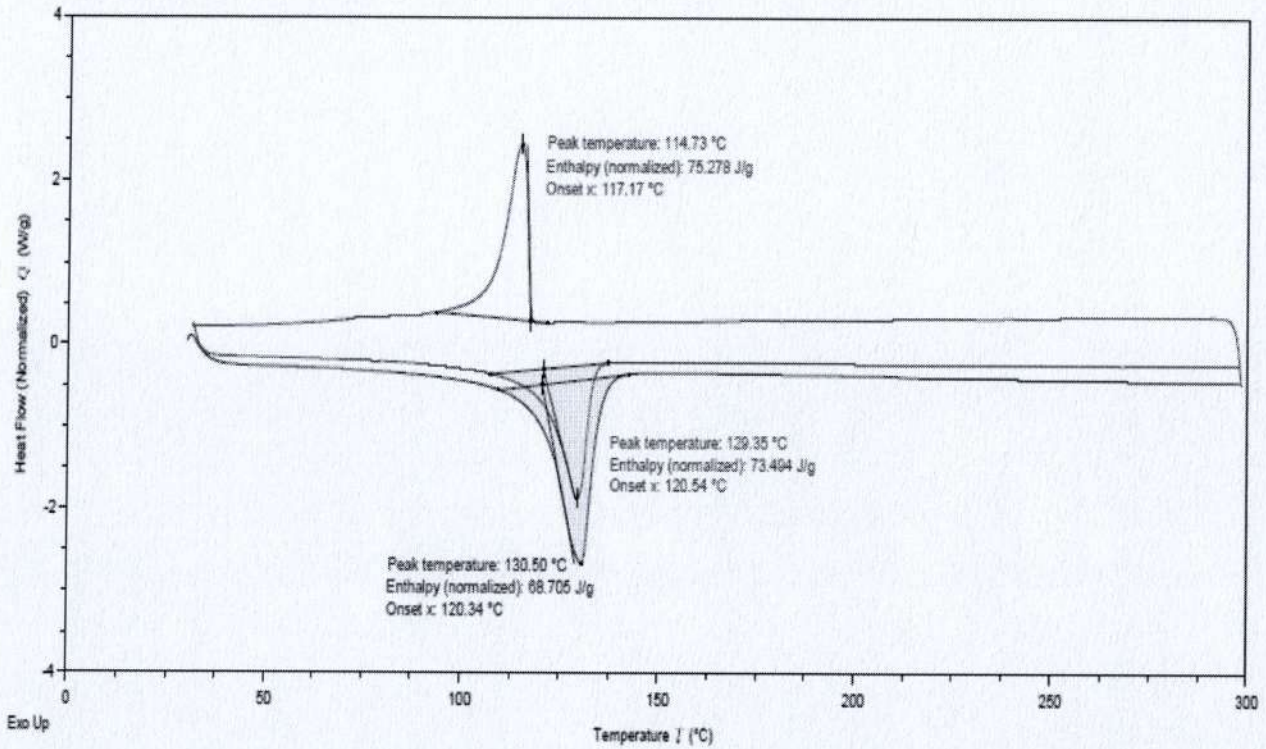
*Dr. Akshaya Kumar Palai*  
**Dr. Akshaya Kumar Palai**  
 (Quality Manager)  
 AUTHORISED SIGNATORY

ANALYSIS SHEET

TEST REPORT NO. -00901

DATE : 11.07.2023

DSC Analysis : Pre Recycle



*Pinaki Chatterjee*

Mr. Pinaki Chatterjee  
(Technical Manager)  
AUTHORISED SIGNATORY

*Akshaya Kumar Palai*  
11.07.2023

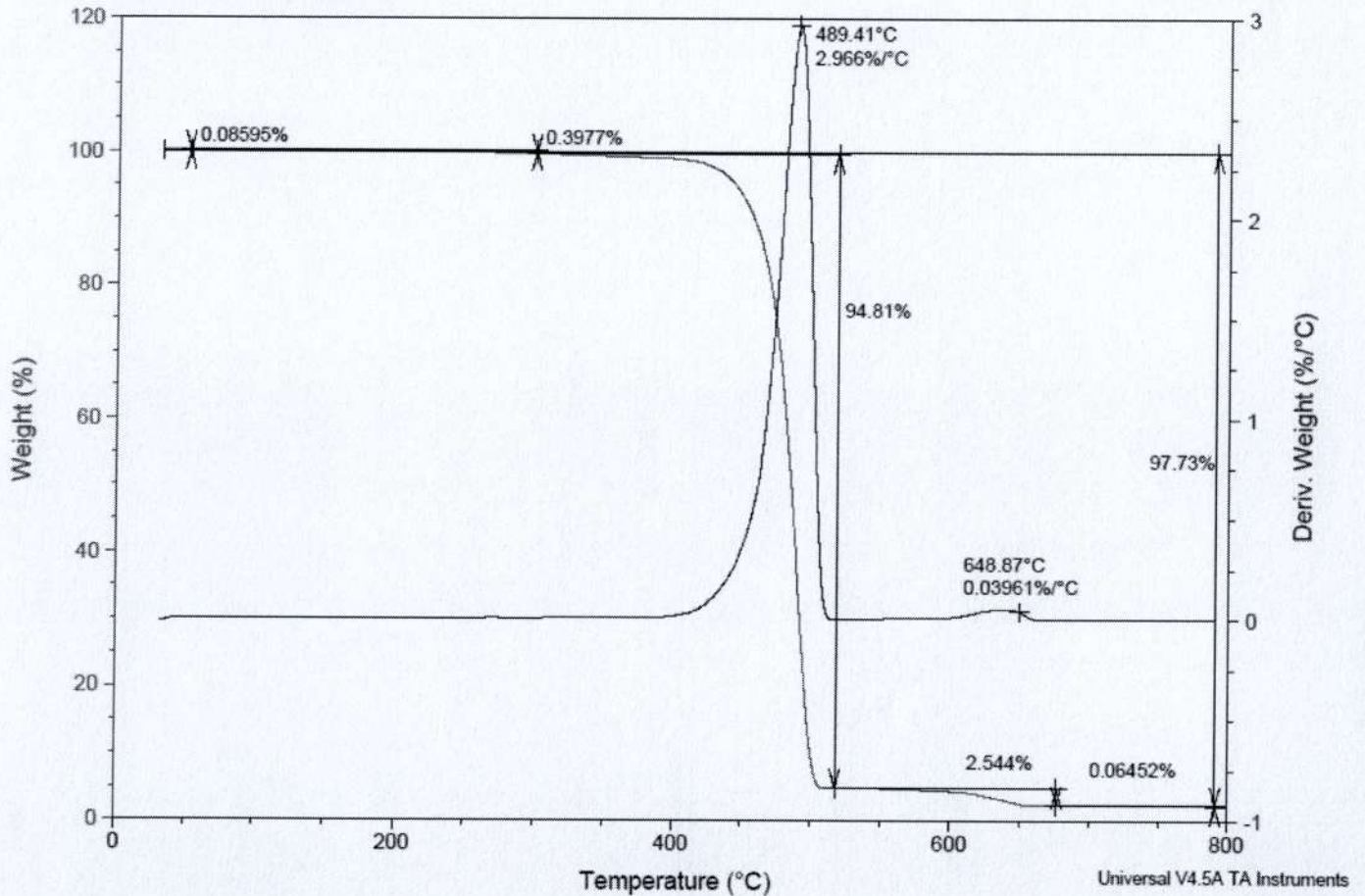
Dr. Akshaya Kumar Palai  
(Quality Manager)  
AUTHORISED SIGNATORY

ANALYSIS SHEET

TEST REPORT NO. -00901

DATE : 11.07.2023

TGA Analysis: Pre Recycle



*Pinaki Chatterjee*

Mr. Pinaki Chatterjee  
(Technical Manager)  
AUTHORISED SIGNATORY

*Dr. Akshaya Kumar Palai*  
11.07.2023

Dr. Akshaya Kumar Palai  
(Quality Manager)  
AUTHORISED SIGNATORY

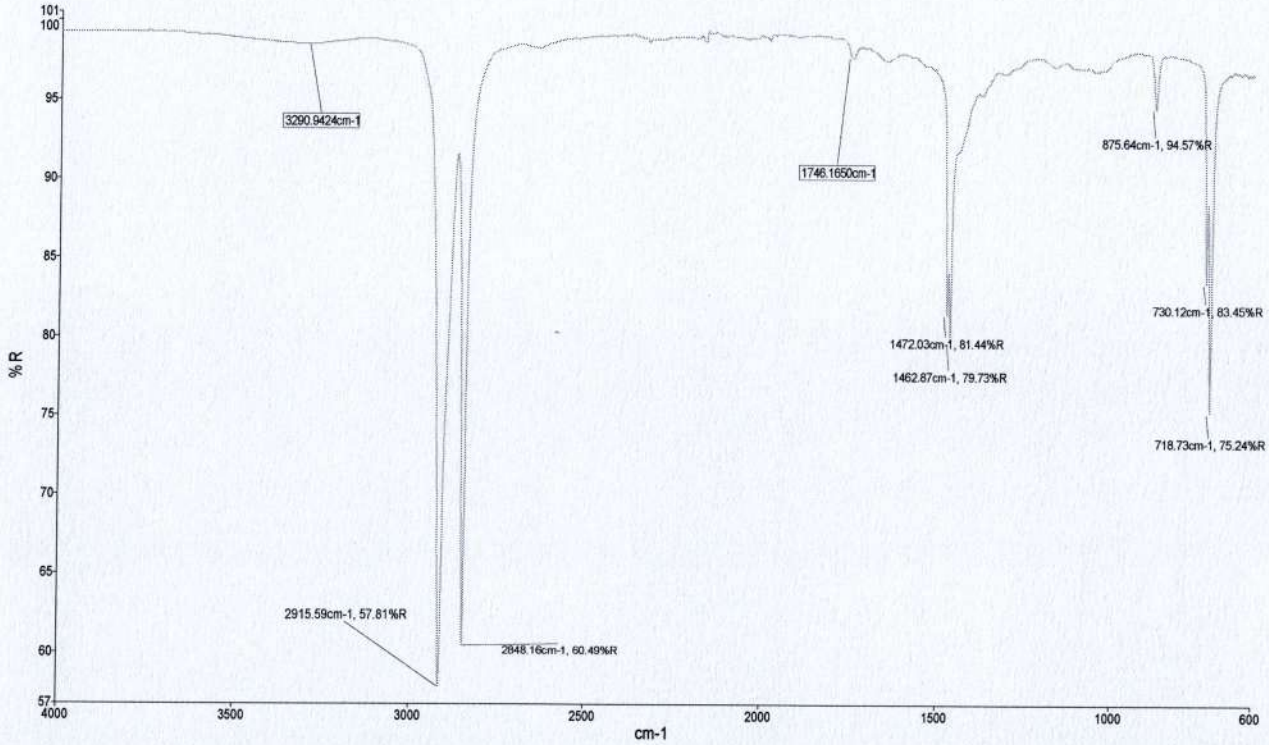
## ANALYSIS SHEET

Page : 04 of 12

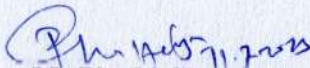
TEST REPORT NO. -00901

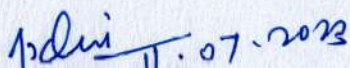
DATE : 11.07.2023

FTIR Analysis :Recycle 1



Wave Number (cm <sup>-1</sup> )	Possible Nature of the Bond
3290.94	OH Stretch
2915.59, 2848.16	CH Stretch
1746.16	C=O Stretch
1462.87, 1472.03	CH <sub>2</sub> Bend
718.73, 730.12	CH <sub>2</sub> Rock

  
 Mr. Pinaki Chatterjee  
 (Technical Manager)  
 AUTHORISED SIGNATORY

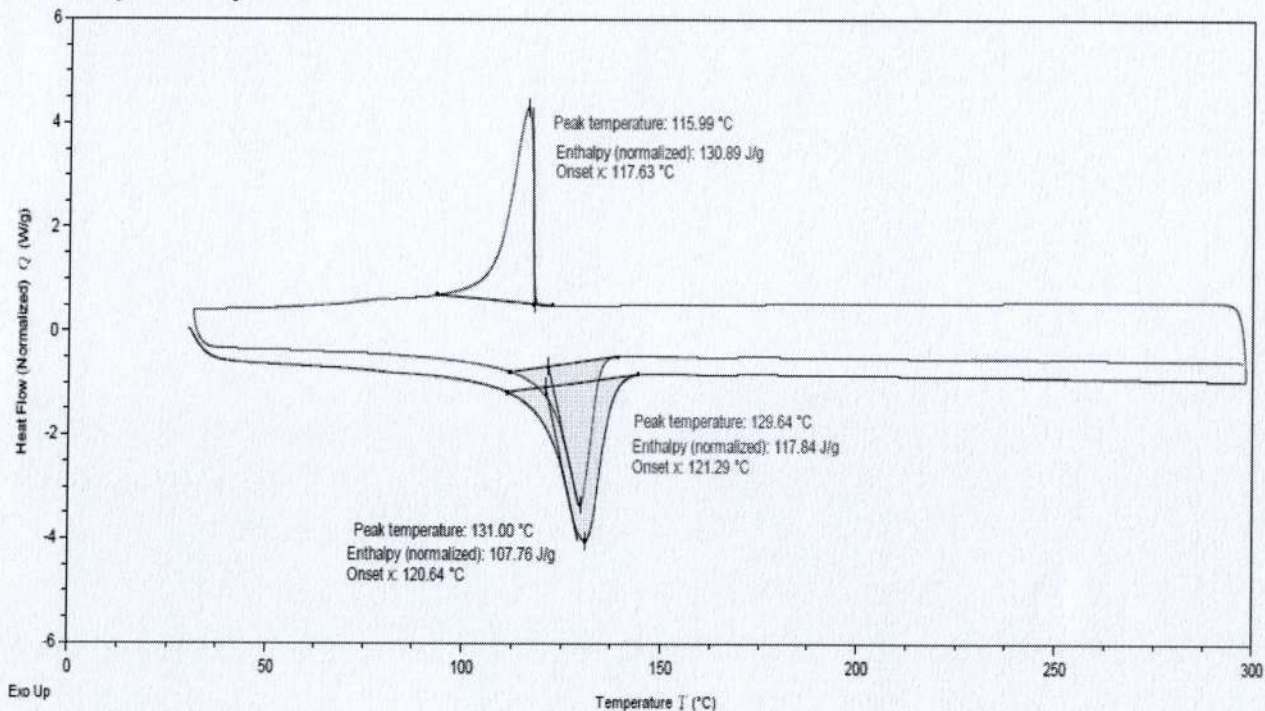
  
 Dr. Arshaya Kumar Palai  
 (Quality Manager)  
 AUTHORISED SIGNATORY

ANALYSIS SHEET

TEST REPORT NO. -00901

Page : 05 of 12  
DATE : 11.07.2023

DSC Analysis: Recycle 1



*Pinaki Chatterjee*

Mr. Pinaki Chatterjee  
(Technical Manager)  
AUTHORISED SIGNATORY

*pd ai 11.07.2023*

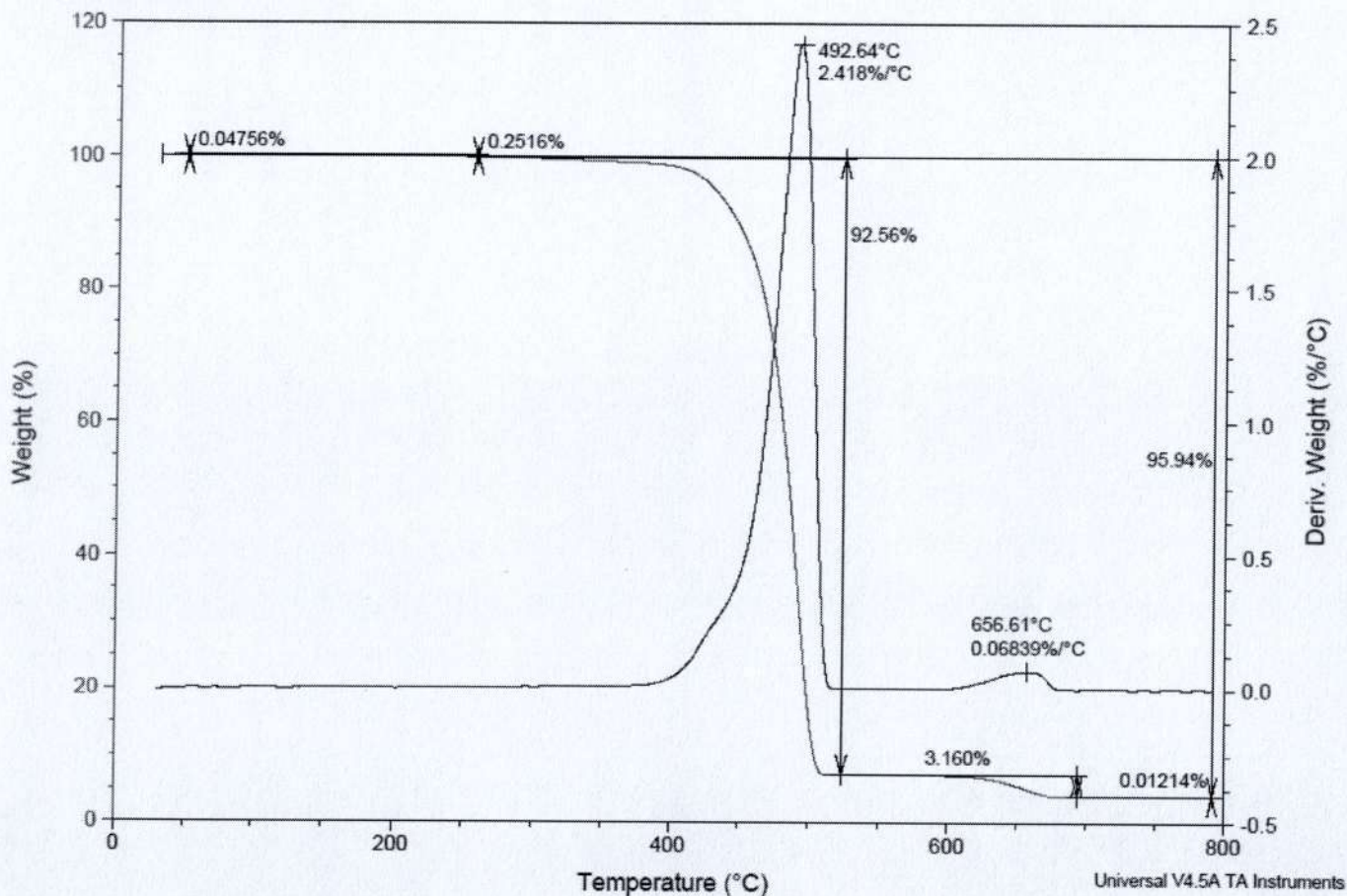
Dr. Akshaya Kumar Palai  
(Quality Manager)  
AUTHORISED SIGNATORY

ANALYSIS SHEET

TEST REPORT NO. -00901

DATE : 11.07.2023

TGA Analysis: Recycle 1



*Mr. Pinaki Chatterjee*

Mr. Pinaki Chatterjee  
(Technical Manager)  
AUTHORISED SIGNATORY

*Dr. Akshaya Kumar Palai*

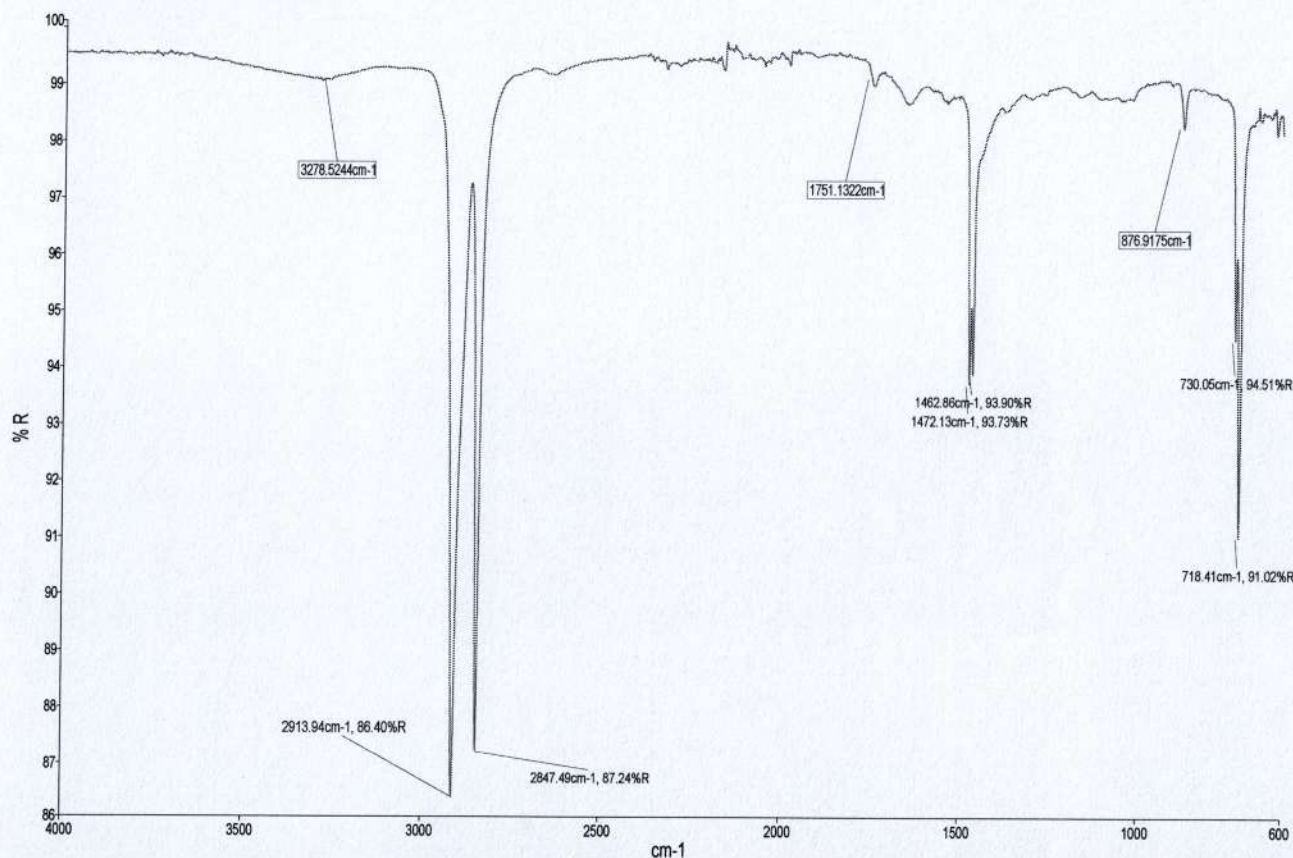
Dr. Akshaya Kumar Palai  
(Quality Manager)  
AUTHORISED SIGNATORY

## ANALYSIS SHEET

TEST REPORT NO. -00901

Page : 07 of 12  
DATE : 11.07.2023

FTIR Analysis :Recycle-2



Wave Number (cm <sup>-1</sup> )	Possible Nature of the Bond
3278.52	OH Stretch
2913.94, 2847.49	CH Stretch
1462.86, 1472.13	CH <sub>2</sub> Bend
1751.13	C=O Stretch
718.41, 730.05	CH <sub>2</sub> Rock

*Pinaki Chatterjee*  
 Mr. Pinaki Chatterjee  
 (Technical Manager)  
 AUTHORISED SIGNATORY

*Akshaya Kumar Palai*  
 Dr. Akshaya Kumar Palai  
 (Quality Manager)  
 AUTHORISED SIGNATORY

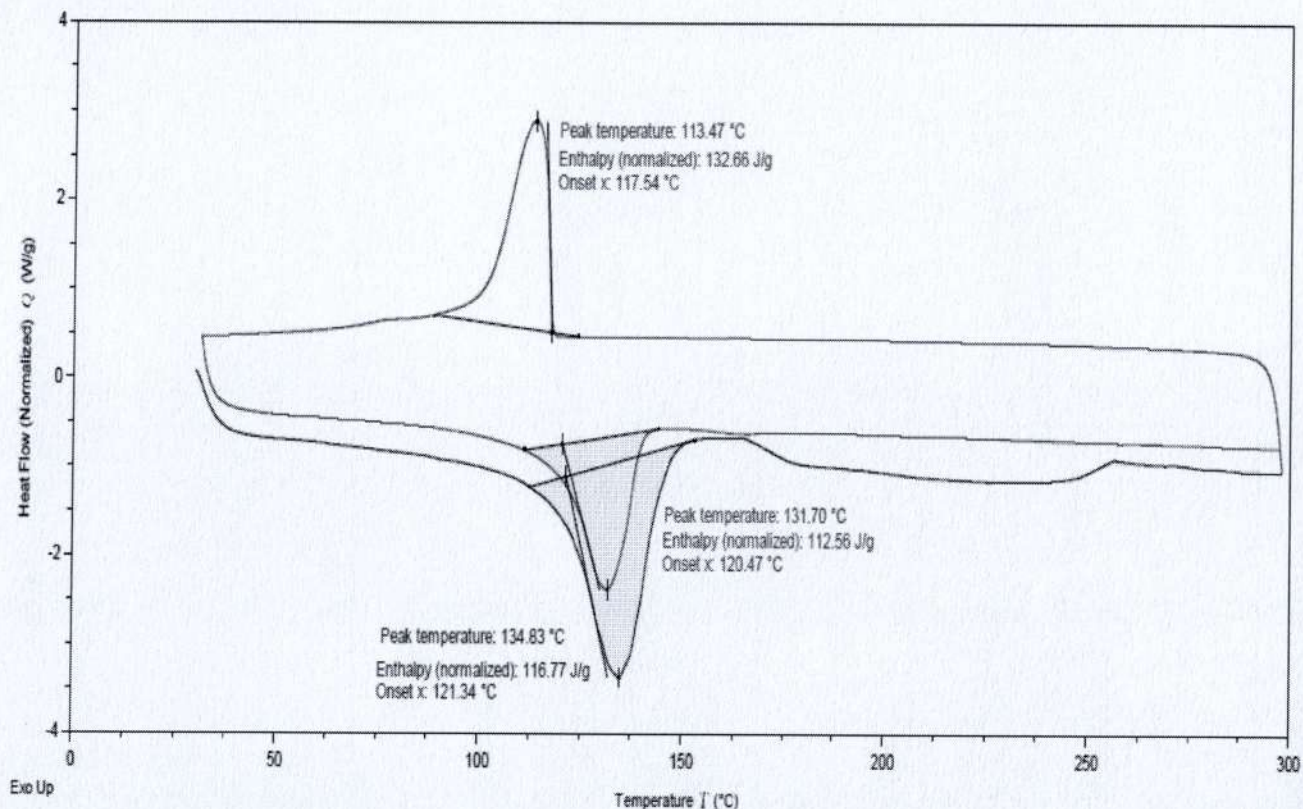


ANALYSIS SHEET

TEST REPORT NO. -00901

Page : 08 of 12  
DATE : 11.07.2023

DSC Analysis : Recycle 2



*Pinaki Chatterjee*  
11.07.2023

**Mr. Pinaki Chatterjee**  
(Technical Manager)  
AUTHORISED SIGNATORY

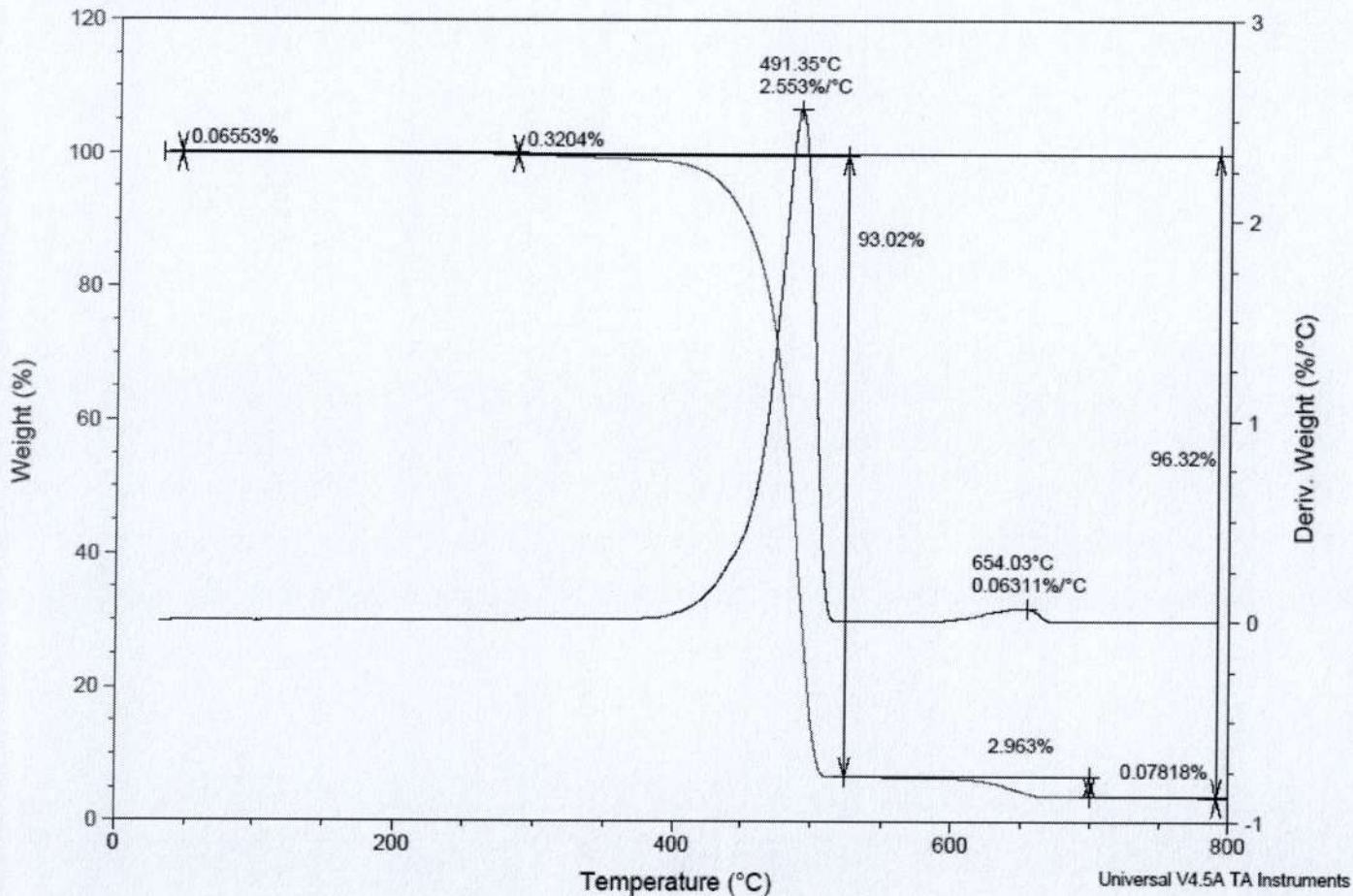
*Akshaya Kumar Palai*  
11.07.2023

**Dr. Akshaya Kumar Palai**  
(Quality Manager)  
AUTHORISED SIGNATORY

ANALYSIS SHEET

TEST REPORT NO. -00901

TGA Analysis : Recycle 2



*Pinaki Chatterjee*

Mr. Pinaki Chatterjee  
(Technical Manager)  
AUTHORISED SIGNATORY

*Dr. Akshaya Kumar Palai*  
11.07.2023

Dr. Akshaya Kumar Palai  
(Quality Manager)  
AUTHORISED SIGNATORY

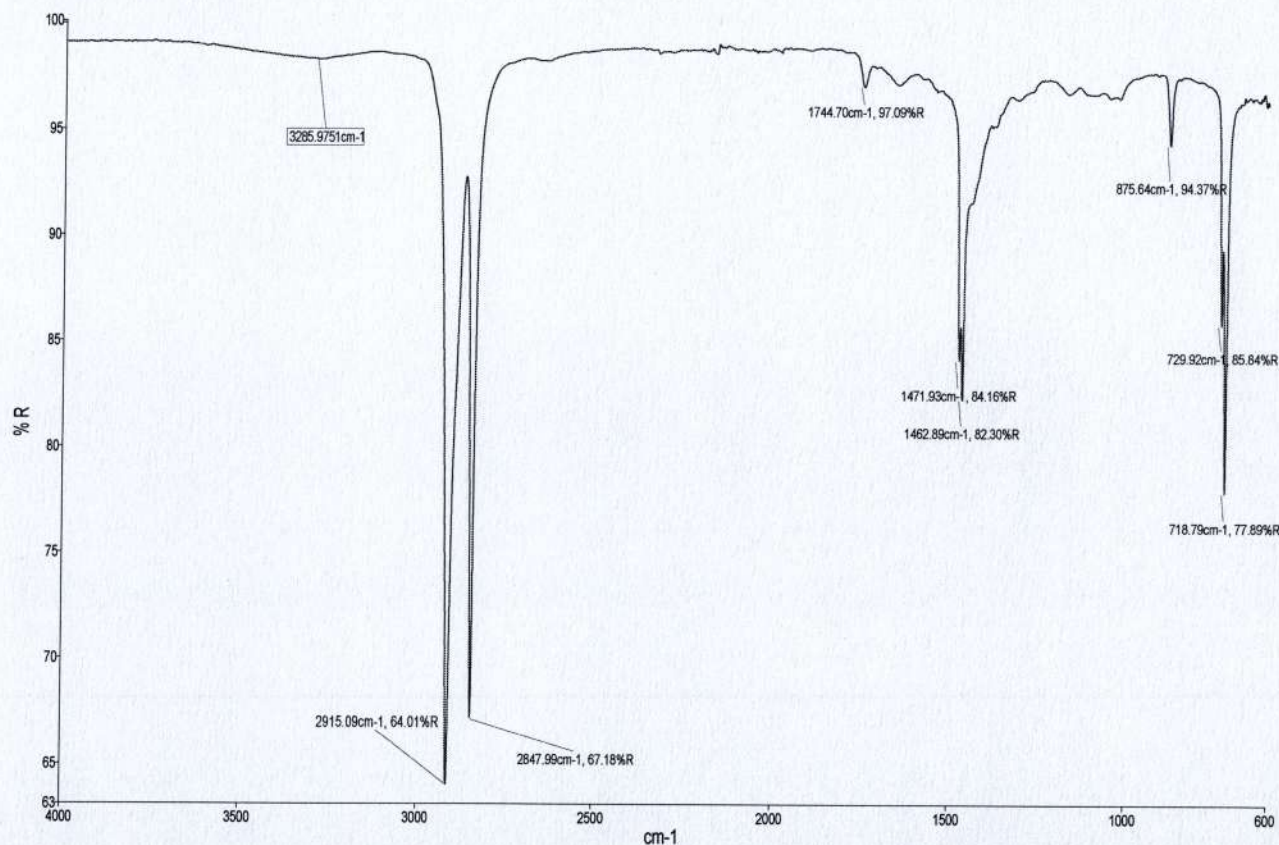
## ANALYSIS SHEET

Page : 10 of 12

DATE : 11.07.2023

TEST REPORT NO. -00901

FTIR Analysis :Recycle 3



Wave Number (cm <sup>-1</sup> )	Possible Nature of the Bond
3285.97	OH Stretch
2915.09, 2847.99	CH Stretch
1744.70	C=O Stretch
1462.89, 1471.93	CH <sub>2</sub> Bend
718.79, 729.92	CH <sub>2</sub> Rock

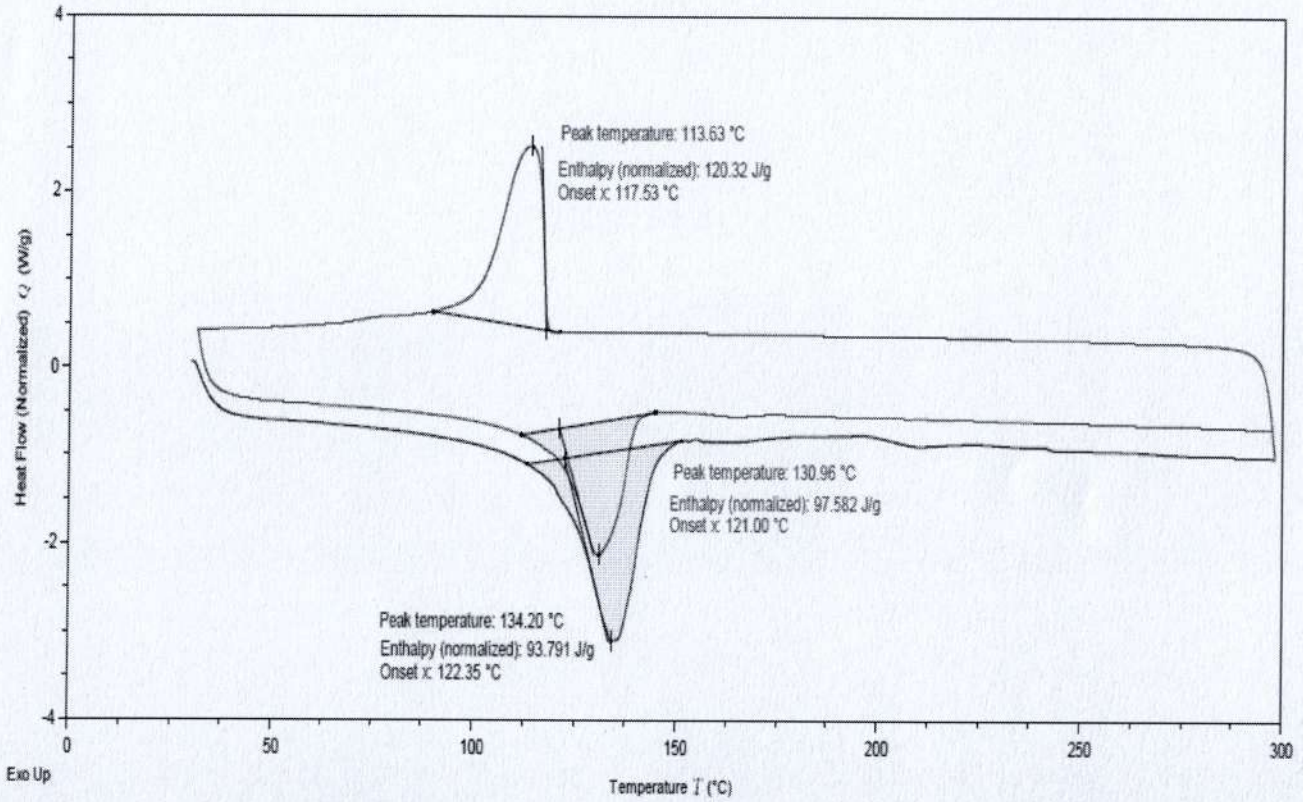
*Pinaki Chatterjee*  
 Mr. Pinaki Chatterjee  
 (Technical Manager)  
 AUTHORISED SIGNATORY

*Dr. Akshaya Kumar Palai*  
 Dr. Akshaya Kumar Palai  
 (Quality Manager)  
 AUTHORISED SIGNATORY

ANALYSIS SHEET

TEST REPORT NO. -00901

DSC Analysis : Recycle 3



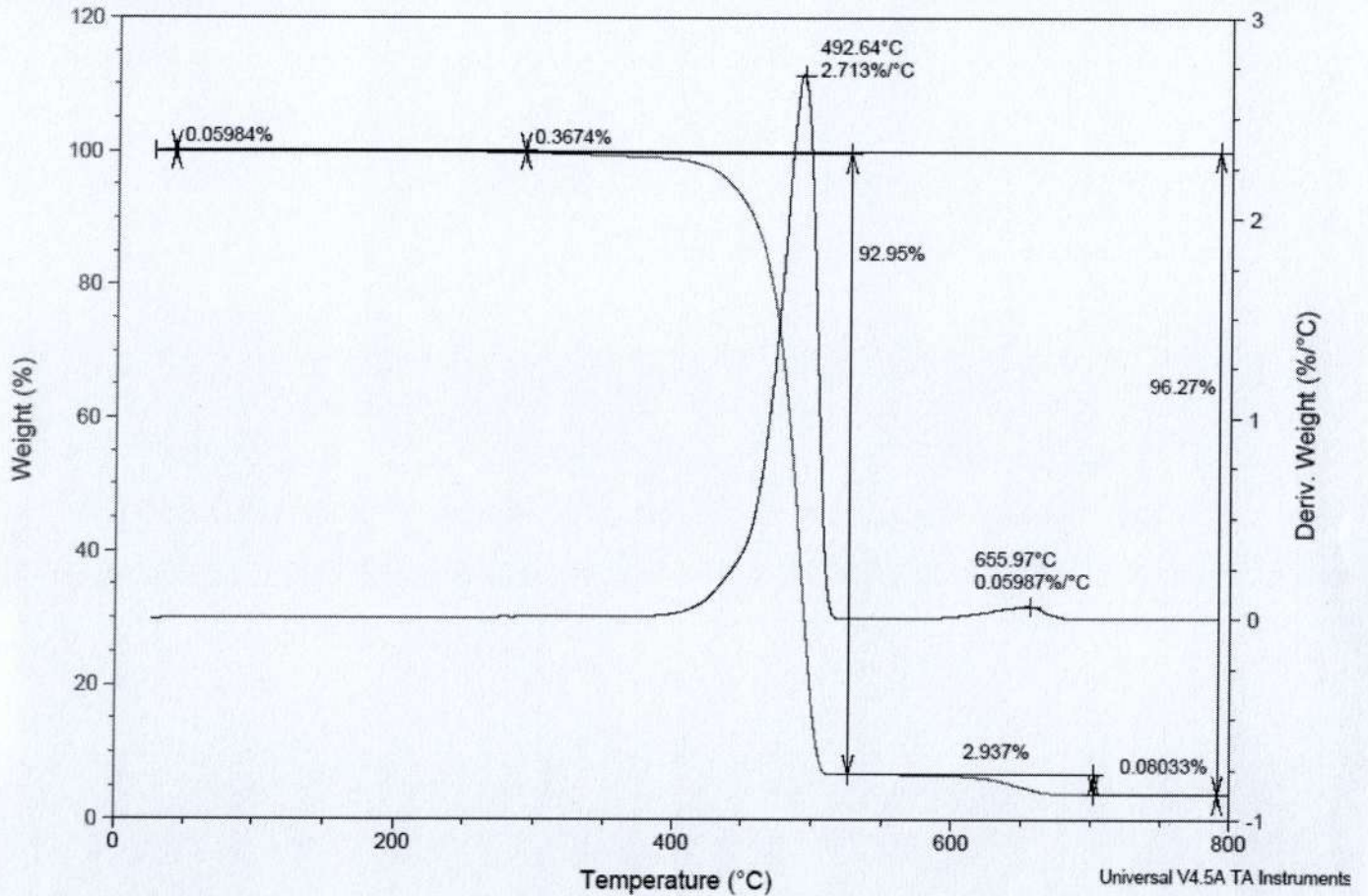
*Pinaki Chatterjee*  
**Mr. Pinaki Chatterjee**  
**(Technical Manager)**  
**AUTHORISED SIGNATORY**

*Akshaya Kumar Palai*  
**Dr. Akshaya Kumar Palai**  
**(Quality Manager)**  
**AUTHORISED SIGNATORY**

ANALYSIS RESULTS

TEST REPORT NO. -00901

TGA Analysis : Recycle 3



*Mr. Pinaki Chatterjee*

Mr. Pinaki Chatterjee  
(Technical Manager)

AUTHORISED SIGNATORY

*Dr. Akshaya Kumar Palai*  
11.07.2023

Dr. Akshaya Kumar Palai  
(Quality Manager)

AUTHORISED SIGNATORY

ANALYSIS RESULTS

TEST REPORT NO. -00901

Page : 01 of 01  
DATE : 11.07.2023

Sample Details : "Bamboo Based Bottle" -as stated by the party.



Supplied Sample ↓



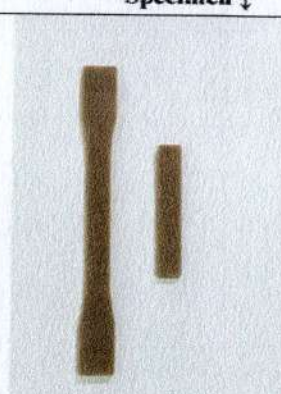
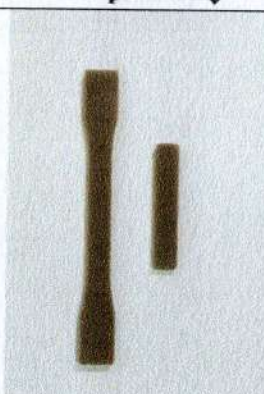
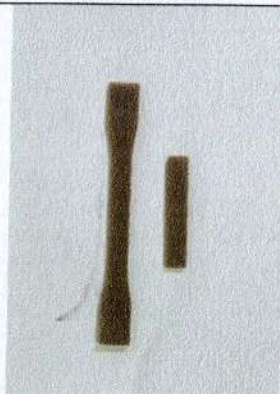
Recyclate 1 →  
Specimen ↓



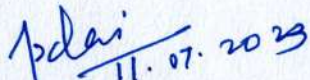
Recyclate 2 →  
Specimen ↓



Recyclate 3  
Specimen ↓



  
Mr. Pinaki Chatterjee  
(Technical Manager)  
AUTHORISED SIGNATORY

  
Dr. Akshaya Kumar Palai  
(Quality Manager)  
AUTHORISED SIGNATORY